

Battery Anode Material (BAM) Facility

Environment Impact Statement (EIS)

JBS&G

May 2024

Version	Author	Reviewer
16/04/24 - Revision 0	JBS&G – CB, MM, NP	JBS&G - AQ
09/05/2024 – Revision 1	JBS&G – MM	JBS&G - AQ

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Executive Summary

Introduction

The Siviour Graphite Project, currently being developed by Renascor Resources Ltd (Renascor), involves the mining and primary processing of Graphite at the Siviour Graphite Mine (Mining Lease 6495) on the Eyre Peninsula, South Australia (SA), and downstream processing and refining of the concentrate from the mine at a purpose-built Battery Anode Material (BAM) Facility in the Bolivar area of Adelaide's northern suburbs (Siviour BAM Project).

The BAM Facility (the Project – the subject of this EIS) will complement Renascor's Siviour graphite mining operation. The Project consists of an industrial downstream processing facility for refinement and purification of graphite and will produce a micronised, spheronised and highly purified (>99.95% Carbon) product, known as Purified Spherical Graphite (PSG).

Graphite concentrate from the Siviour Graphite Mine will be transported to the BAM Facility via road, processed to form PSG which is graded by particle size before being packaged for transport from Port Adelaide, whereby it will be exported to various global markets unless able to be sold domestically.

As a project of substantial scale which supports Australian Government objectives regarding in-country critical minerals capacity, the BAM Facility is a project of state significance. Accordingly, and commensurate with the Facility's anticipated scale, intensity and potential for environmental impacts, the BAM Facility was declared by the Minister's delegate to be an Impact Assessed Development under Section 108(c) of the *Planning, Development and Infrastructure Act 2016* (PDI Act) on 8 December 2022, requiring preparation of an Environmental Impact Statement (EIS).

Project Description

The Project involves the construction and operation of a downstream mineral processing facility to produce PSG as a key component of battery anodes. The BAM Facility comprises of:

- Micronisation and spheronisation milling trains
- Caustic roast kiln
- Water treatment equipment (including reverse osmosis plant, demineralisation, caustic process water treatment and acid process water treatment)
- Leach tanks (caustic and acid), filtration equipment and repulp tanks
- Industrial buildings
- Product storage silos
- Chemical reagents and waste storage including appropriate bunding and hardstand
- Truck loading and unloading facilities, access and egress
- Product bagging plant equipment
- Mechanical, hydraulic and pneumatic conveyance and feed structures
- Water pipes to the SA Water outfall channel including intake and outfall points.

Other associated infrastructure upgrades, including an upgrade of Robinson Road, electricity and gas supply to the site, are outside the scope of this project.

Project Benefits

The Project forms a key part of the transition of SA to a circular economy and produces the following environmental benefits compared with the possible alternative option of downstream processing in China (refer to Section 2.4.1):

- Environmental Benefits
    - Reduced emissions of greenhouse gases, as this Project does not require transportation of graphite concentrate to another country for processing. In addition, the SA grid is predominantly supplied by renewable energy.
    - Reduced carbon footprint of lithium ion batteries for use in renewable energy projects.
    - Supplying vital components to manufacture lithium ion batteries which allows for storage of renewable energy thus encouraging the transition to a carbon neutral future and a circular economy.
    - Processing in a tier 1 jurisdiction (Australia) will ensure environmental outcomes are delivered upon.
- Economic and Social Benefits
    - Creation of over 1,200 Full Time Equivalent (FTE) jobs (direct, indirect and flow on) including ~840 jobs in the Northern Adelaide Region
    - Contribution to the Gross State Product is estimated at $2.6B over the life of the Project
    - Project is expected to have a net social and community benefit via increased employment, support of local goods and service providers and sponsorship opportunities for community, social and sporting clubs.

Staging and Timing

The Project is anticipated to be staged, with Stage 1 construction commencing in 2025 and a planned Stage 2 expansion approximately 3 years later. Stage 1 is anticipated to produce in the vicinity of 50 ktpa of PSG, and anticipated to expand to 100 ktpa following Stage 2 expansion. The precise timeframe of Stage 2 is yet to be finalised but will be an iterative process responsive to market forces, commerciality and regulatory conditions.

Approval process

The status of the BAM Facility as an impact assessed development was determined by a delegate of the Minister for Planning under the PDI Act, and declared by notice published in the Government Gazette and on the SA Planning website on 8 December 2022.

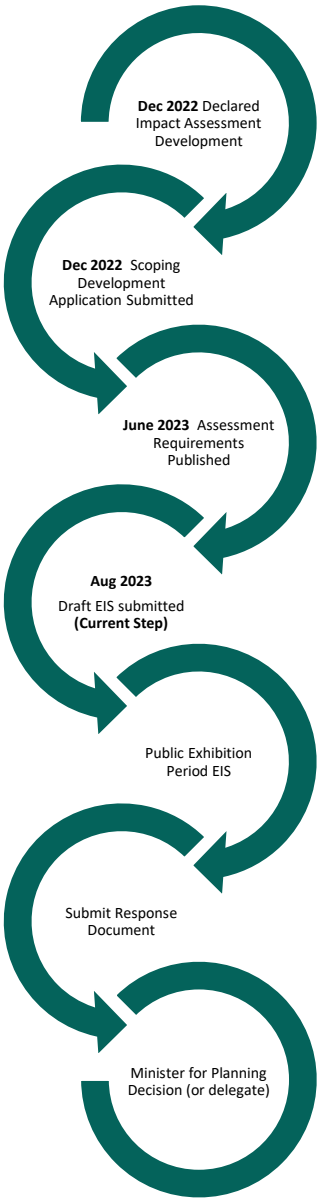
Following the declaration of impact assessed development, a Scoping Development Application (DA) covering both Stage 1 and Stage 2 of the Project was submitted to the Minister for Planning on 9 December 2022, which included initial baseline environmental studies to establish the characteristics of the site and assist in identifying the potential impacts of the Project. The DA articulated the extent to which impacts were already known or able to be predicted with a high degree of confidence, in addition to identifying those impact parameters which were less well-known and subject to further study.

This baseline data and preliminary assessment was referenced by the State Planning Commission (SPC) in developing project-specific Assessment Requirements (formerly Guidelines) for the preparation of an EIS in relation to the two stages of the Project.

The Assessment Requirements set out the major environmental and social aspects associated with the Project, the degree of their significance and outline the way in which they should be addressed through impact assessment. The extent to which impacts can be accurately predicted can influence the level of study required for a particular environmental parameter.

Stakeholder Engagement

Renascor have developed a stakeholder and community engagement plan. Engagement undertaken to date on the Project (including during preparation of the EIS) has included face to face and targeted meetings, fact sheets, government briefings, meetings with local community groups, website updates with dedicated phone and email contact details. Engagement will be ongoing throughout the life of the Project with opportunities for community to engage through the EIS process and beyond into construction and operations.



Project Approval Timeline

Environmental, Social and Economic Assessment

The proposed BAM Facility is located in the northern suburbs of Adelaide, approximately 20 km from the Adelaide CBD, along the haulage route from the Siviour mine site on the way to Port Adelaide. The BAM facility site is located approximately 25 km from the container terminal export facility located at Outer Harbour.

The local area is industrial in nature and the BAM facility site is located within SA Water Corporation's Bolivar Waste Water Treatment Plant (WWTP) property. The site is currently disused, with intermittent grazing and revegetation activities undertaken over the preceding decades. The EIS addresses the following environmental, social and economic aspects that were identified through the scoping DA as being relevant to all stages of the Project (and as per the published Assessment Requirements).

Air quality

Modelling has been undertaken for operational air quality emissions and concluded that emitted air pollutants will achieve all human health limits prescribed in the *Environment Protection (Air Quality) Policy 2016* (Air EPP). Key commitments include; adaptive management plan for dust management to be developed as part of Construction and/or Operations Environmental Management Plans (CEMP/OEMP), mechanical shaping and bagging buildings to be negative pressure with dust collectors installed to capture graphite fines. Key findings of the air quality assessment:

- Construction activities will not result in increases in dust / particulate matter above what is currently experienced in the area and will not impact the health or amenity of the community, vegetation growth or the marine environment
- Management of dust to prevent human health limits as prescribed in the Air EPP will also adequately manage dust to prevent impacts to amenity, vegetation growth and the marine environment
- Emissions of H_2S during operations have been modelled to be compliant with limits set in Air EPP for both odour and toxicity.

Noise and Vibration

Modelling of noise impacts was undertaken for construction and operation of the Project in accordance with requirements in the *Environment Protection (Commercial and Industrial Noise) Policy 2023* (Noise EPP) and the EPA 425/23 Construction noise Information Sheet (EPA, 2023d). Key commitments include; noise reduction devices to be installed on mobile equipment and emission stacks, and noisy equipment to be installed behind screens and enclosed where practicable.

- Construction activities will occur between 7 am and 7 pm, Monday to Saturday and include all required mitigations set out in the Noise EPP. Activities outside of these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d) and *Environment Protection Act 1993* (SA) to ensure no adverse impact on amenity. All reasonable and practicable measures will be taken to minimise noise resulting in an acceptable level of impact to adjacent land users
- Operational noise may have a minor impact at the nearest sensitive receptors

- Native fauna in the area is adapted to urban noise and thus achieving the noise limits set out in the Noise EPP is considered to represent an adequate level of protection.

Visual Amenity

The BAM Facility is located in a relatively flat, low-lying landscape with minimal upper storey vegetation in the surrounding area. Once constructed, it will be the dominant feature in the local landscape and potentially visible from some distance. There are other developments of a similar scale and nature in the broader locality, including the Iberdrola gas power station, buildings associated with the Bolivar WWTP and other industrial and infrastructure landscape elements.

- Visual Points were identified with baseline photographs taken and visual renders of the Project including screening measures
- Residents of Robinson Road and St Kilda Road will experience altered visual character mitigated by vegetation screening
- Project elements will not detract from the visual character of the landscape from main roads
- Visual impact of the Project will be similar to existing developments (including Torrens Island Power Station and St Kilda Grain Silos) from tourism locations within St Kilda.

Traffic and Transport

A Traffic Impact Assessment (TIA) has been undertaken for the Project. A TIA Report and a Heavy Vehicle Route Assessment (HVRA) have been carried out and impact assessment conducted based on the findings of the reports.

The BAM Facility will generate a number of different road traffic sources including delivery of supplies to the site (during construction), haulage of graphite concentrate via roads from Siviour to Bolivar, haulage of finished products to the port for shipping, removal of by-products and solid wastes, delivery of consumables, and transport of workers to the site daily.

Several of the surrounding roads are not gazetted to carry vehicles of the category anticipated to be utilised to deliver graphite concentrate to the BAM Facility. Required upgrades are expected to occur in the near future by third parties and the TIA has assumed that upgrades have been completed prior to Project commencement.

The potential impacts from increased traffic have been assessed to be managed to As Low As Reasonably Practicable (ALARP) levels and considered not to be significantly different from existing conditions. In some cases, there is likely to be improvements (e.g. upgrades to road pavement along Robinson Road) as a result of the Project.

Flora and Fauna

A desktop and on-ground ecological survey was undertaken inform baseline conditions at the site at the Project site.

A desktop assessment was also undertaken at the existing SA Water outfall channel location at Freshwater Creek.

Flora

Five EPBC threatened flora species were predicted in the vicinity of the Project site and / or Freshwater Creek. No flora of conservation significance were assessed as likely to occur on the Project site. The Bead Glasswort (*Tecticornia flabelliformis*) (Cth – Vulnerable; SA – Vulnerable) was assessed as possibly occurring in the broader vicinity of Project site including in the vicinity of Freshwater Creek. Given its large geographic range, the fact that the species was not recorded during the ecology survey on the subject site and that no land clearance or physical disturbance of habitat will occur at Freshwater Creek, significant impacts to this species are considered unlikely.

The Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community was assessed as likely to occur at Freshwater Creek. Saltmarsh communities are widespread along coastal margins to the north of the BAM Facility site including at Freshwater Creek. This TEC being listed as 'Vulnerable' does not however, constitute a Matter of National Environmental Significance (MNES) for the purposes of Part 3 of the EPBC Act. No habitat clearance or physical disturbance will occur at Freshwater Creek. Hence, Freshwater creek habitat will not be significantly impacted by the proposed development.

Ten vegetation associations were recorded across the Project site during the field survey. The majority of these vegetation associations have been planted historically, or are re-emergent native vegetation associations. Vegetation was in overall poor condition and providing low habitat value; with the presence of emergent naturally generated species but which are well known grow naturally in highly disturbed areas.

Clearance of existing vegetation within the Project footprint will be required. Upper estimates indicate that approximately 22.22 ha of native vegetation would be cleared (from a total cleared vegetation area of 26.72 ha). A Significant Environmental Benefit (SEB) has been estimated based on the proposed clearance footprint and a Native Vegetation Clearance application for SEB Offset will be submitted for the Project.

The Project layout has been designed so as to minimise the number of regulated and significant trees (as prescribed under the PDI Act) that require removal. Design works to avoid a known cultural heritage site have also minimised the need for removal of regulated and significant trees in the north-eastern corner of the Project site.

Fauna

Two EPBC threatened bird species, Australian Fairy Tern (*Sternula nereis nereis*) and Blue-winged Parrot (*Neophema chrysostoma*), and one EPBC threatened mammal species, Grey-headed flying-fox (*Pteropus poliocephalus*) were assessed as possibly occurring at the Project site. Several threatened birds were assessed as possibly occurring at Freshwater Creek with two threatened bird species (Curlew Sandpiper (*Calidris ferruginea*) and Great Knot (*Calidris tenuirostris*)) considered as likely to occur at Freshwater Creek. No fauna of national significance were observed during the field survey at the Project site, and none of these species were considered to utilise habitat on the BAM Facility site due to poor overall quality of habitat.

None of the species were considered dependent on habitat at Freshwater Creek and no impact resulting from treated process water discharge is likely from the Project. Treated process water would be mixed and diluted prior to entering the marine environment at Freshwater Creek and would not contribute to a significant material difference in composition or volume to what is currently discharged by SA Water.

Approximately thirty EPBC listed migratory bird species were assessed as possibly occurring at the BAM Facility site and/ or Freshwater Creek, and with same two species threatened species (Curlew Sandpiper and Great Knot) considered as likely to occur at Freshwater Creek. However, it was considered that neither the BAM Facility site nor Freshwater Creek would provide important habitat. None of these species were considered likely to be impacted by Project.

Three state threatened fauna species assessed as possibly occurring at the Project site. None of these were recorded during the field survey. The Elegant Parrot (*Neophema elegans*) and Little Egret (*Egretta garzetta*) are typically transient in nature and do not occupy habitats on a permanent basis and the Brown Quail (*Coturnix ypsilophora*) requires dense undergrowth which is not present within the Project site.

The Project is not expected to impact nationally listed fauna, migratory species or state listed fauna species.

Surface Water

The Project is located on relatively flat ground (approximately 1 m fall across entire site) within the Smith & Adams Creeks Catchment. While there are no surface water features onsite, the topography means most surface water pools onsite following rainfall events.

The nearest significant flowing water feature is the SA Water outfall channel (not defined as surface water) which runs along the western side of the Bolivar WWTP lagoons. This channel is man made and has a number of inputs including outfall from SA Water's Bolivar WWTP and High Salinity Plant, as well as outfall from the Buckland Dry Creek salt fields, a local fish farm and stormwater captured within the WWTP ponds and downstream locations.

Stormwater and Flooding

A stormwater channel which contains runoff from urban development including suburban development to the east of the BAM Facility site runs parallel to the SA Water outfall channel, before entering the marine environment at the same location.

Stormwater will be managed on the site to direct any water with potential to be in contact with process fluids and treated before reuse. Chemicals, reagents and hazardous substances will be stored and/or bunded in accordance with the relevant EPA and Australian Standards.

As described above, the topography of the BAM Facility site is such that stormwater tends to accumulate after moderate or heavy rainfall events, with partial inundation and saturation of portions of the site observed during initial site investigations. Project surface water and storm water infrastructure is proposed to manage rainfall events and ensure protection of the environment and the site.

Flood modelling has been undertaken to elevate the required floor level of the BAM Facility to 300 mm above the predicted level of a 1% Annual Exceedance Probability (AEP) flood event. Other activities regarding offsite stormwater management are ongoing with the City of Salisbury Council.

Coastal and Marine

Impacts of the BAM Facility on the composition and quality of treated process water exiting to the marine environment via the SA Water outfall channel has been studied in detail. Environmental

studies have been undertaken to determine the potential impacts of the BAM Facility under a range of operating and environmental conditions.

BAM facility water will be sourced from the SA Water Bolivar High Salinity Plant, currently one of the main flows in the SA Water outfall channel. Treated and neutralised process water from the BAM Facility combined with RO brine will be returned to the SA Water Outfall Channel which is predicted to be of a comparable quality to the quality of water in the channel at present (as baseline) and of a similar volume to what which was extracted, resulting in no material change to water quality or quantity to that which would be experienced without the Project.

The BAM Facility is isolated from the coastal environment by the Bolivar WWTP lagoons, as there is no predicted material change to the quality of water within the SA Water Outfall Channel and therefore no source of impact to the coastal environment. A Draft Discharge Criteria Management Plan has been developed and attached to the EIS.

Landform and topography

The Project Site is located within the Northern Adelaide Plains Land System which consists of flat to very gently undulating plains with slopes of less than 1%. The site itself is flat with a fall of approximately 1 m being 6 m AHD to the east and 5 m AHD to the west. The site geology (from the South Australian Resource Information Gateway (SARIG)) indicates that the site overlays quaternary (Pliocene-Pleistocene) alluvial and fluvial sediments. The site is an area with a low seismic risk, there are no known active or historical mine workings in the immediate vicinity of the Project nor is there any landslide risk perceived (ENGEO, 2023).

Groundwater

Groundwater within the Bolivar project site was encountered between 1.5 m and 2.5 m below ground level (BGL) during site investigations. Groundwater depth variation is likely subject to tidal variations as well as seasonal variation, given the proximity to the coast. The expected groundwater flow direction is likely towards nearby water bodies (Barker Inlet to the west and St Kilda Mangroves to the north-west), however it is possible that local variations are present based on subsurface geology.

The DEW Northern Adelaide Plains Water Allocation Plan (WAP) identifies 5 key aquifers in this area. The shallow quaternary aquifer (approximately 2 – 5 m BGL) has very few users due to the high salinity (rendering it unsuitable for drinking or irrigation) and has identified contamination with per-and-polyfluoroalkyl substances (PFAS) contamination from the Edinburgh RAAF Base. This contamination has not been identified from sampling of wells onsite and is the site is not within the identified Groundwater Prohibition Area.

As the floor level of the BAM Facility needs to be elevated to 300mm above the level of a 1% AEP flood event, the need for construction activity to intersect groundwater is planned to be avoided. In the instance of groundwater intersection, EPA dewatering during construction management guidelines would be followed and will ensure mitigation of potential impacts.

Soil and Land Quality

Soil sampling, undertaken to supplement regional mapping of Acid Sulfate Soil (ASS) probability (CSIRO, 2023) has concluded no ASS or Potential Acid Sulfate Soils (PASS) occurred onsite. An extensive geotechnical program as well as a Preliminary Site Investigation (PSI) included onsite soil and groundwater testing and concluded no signs of contamination with the following exceptions:

- Small fragments of cement sheet present at site contained presence of chrysotile asbestos fibres
- Soil samples contained coliforms from 300 Most Probable Number / gram (MPN/g) to 17,000 MPN/g adjacent to the Bolivar sludge ponds.
- Asbestos will be removed from site prior to construction occurring. Construction and operations will be managed in accordance with EPA guidelines to prevent introducing a source of contamination (through importation of clean fill and management of hazardous substances onsite). Soil erosion will be adequately managed through industry standard practices.

Social and Economic Environment

A social and economic impact assessment and cost-benefit analysis has been undertaken, informing several sections of the EIS including social impact assessment, economic impact assessment, land use assessment and the urban design and placemaking assessment. Demographic analysis was conducted, based on Census data, to inform the baseline socioeconomic environment.

The subject site is located within the City of Salisbury local government area (LGA) that sits within the Green Adelaide Landscape Management region. The site is approximately 10 km west of Salisbury, approximately 17 km north of Wingfield and approximately 25 km northeast of North Haven. The closest businesses and residences are to the east of the site along Robinson Road. A recent economic development study for the Salisbury area (City of Salisbury, 2022) found that the LGA's primary industries of employment have shifted from the traditional manufacturing roles to advanced manufacturing, with growth in defence related industries, construction and logistics.

The Project is expected to have a net social and community benefit via increased employment, support of local goods and service providers and sponsorship opportunities for community, social and sporting clubs. Negative social impacts such as amenity impacts, housing affordability or availability are expected to be negligible.

Heritage

Aboriginal Cultural Heritage

A search of the Department of Premier and Cabinet, Aboriginal Affairs and Reconciliation (DPC-AAR) Taa Wika Register of Aboriginal sites and objects conducted on 13 May 2022 identified the occurrence of an Aboriginal site within the subject site. The Bolivar Project has been designed to avoid this site and an exclusion zone implemented. DPC-AAR reference points place several other sites outside of the subject site in the broader locality.

Early and open engagement with Traditional Owners (the Kaurna Yerta Aboriginal Corporation (KYAC)) is ongoing and this will continue throughout the development and life of the Bolivar Project. A cultural

heritage survey of the Bolivar Project site has been undertaken in consultation with KYAC and a cultural heritage management plan has been prepared and endorsed by KYAC.

Non-Aboriginal Cultural Heritage

A search of the SA Heritage Places Database (DEW 2022) generated no results for registered European heritage places within or adjacent to the Bolivar site. The nearest registered site is an historical farmhouse in Paralowie, approximately 3.5 km away.

Hazard

Assessment of the design quality of the BAM Facility has been undertaken including the ability to the facility to contain hazards (including contamination and hazardous substances) as well as withstand external hazards (including fire and flood). Internal stormwater management and flood mitigation measures (including raising the floor level to 300 mm above the 1% AEP flood) will not worsen the effects of flooding on adjacent land.

Design and management controls have been applied to reduce the likelihood of any risk event occurring such that they are only considered likely to happen in extraordinary circumstances and the risks are therefore considered to be as low as reasonably practicable.

Climate Change

The climate of South Australia is projected to continue to change over the coming decades. South Australia has identified a number of measures to reduce the impacts of climate change including greenhouse gas (GHG) emission targets, moving from waste management to creation of a circular economy and requiring developing projects to design for changing climatic conditions. A climate change impacts risk assessment has been undertaken and identified that impacts to the BAM Facility due to climate change are able to be managed using standard design and management strategies.

Renascor have integrated the principles of circular economy into the Project design to reduce raw inputs, transport and packaging as well as resale of products otherwise considered to be waste (graphite fines, solid precipitates). The BAM Facility forms part of the broader SA response to climate change by increasing SA's capability to process critical minerals for production of renewable energy technologies.

To understand the GHG emission intensity for the product (PSG) Renascor commissioned a Life Cycle Assessment (LCA) of their project including the upstream mine and transport. The carbon footprint for Renascor's PSG product is 2.0 kg CO_2 eq per kg PSG. The LCA also identified the largest contributor to the carbon footprint was electricity supply, specifically the burning of natural gas to power the SA power grid. As SA's power generation increases the percentage of renewable energy sources, the carbon footprint of the Project will also decrease.

Conclusion

The BAM Facility is a project of substantial scale and importance which supports Australian Government objectives regarding in-country critical minerals capacity. Baseline studies, monitoring, modelling and assessment have been undertaken for both Stage 1 and Stage 2 of the Project to identify all potential environmental, social and economic impacts and mitigation measures proposed to reduce potential impacts and risks to as low as reasonably practicable.

1 Introduction

1.1 Project Overview

The Siviour Graphite Project, as developed by Renascor Resources Ltd (Renascor), involves the mining and primary processing of graphite at the Siviour Graphite Mine (Mining Lease 6495) on the Eyre Peninsula, South Australia (SA), and secondary processing and refining of the concentrate from the mine at a purpose-built Battery Anode Material (BAM) Facility in the Bolivar area of Adelaide's northern suburbs (Siviour BAM Project).

The BAM Facility (the Project – the subject of this EIS) will complement Renascor's Siviour graphite mining operation. The Project consists of an industrial downstream processing facility for refinement and purification of graphite and will produce a micronised, spheronised and highly purified (>99.95% Total Carbon) product, known as Purified Spherical Graphite (PSG).

Graphite concentrate from the Siviour Graphite Mine will be transported to the BAM Facility via road, processed to form PSG which is graded by particle size before being packaged for transport from Port Adelaide, whereby it will be exported to various global markets unless able to be on sold domestically.

Graphite, when refined to PSG, is an essential mineral resource in the manufacture of anodes for lithium-ion batteries, a sector which is a component in reducing climate change impact and is projected to experience significant growth in the coming decades. Renascor undertook feasibility and technological studies for the potential for Siviour graphite to be processed into PSG in SA. The Siviour BAM Project is the resultant strategy, incorporating best-practice technologies and processes into a vertically integrated graphite mining and PSG production project wholly within SA. This provides an opportunity for SA to become a global leader in the manufacturer of lithium-ion battery anode material.

As a key part of the Siviour BAM Project, the BAM Facility is considered to be of state significance. Accordingly, the BAM Facility was declared by the Minister to be an Impact Assessed Development under Section 108C of the *Planning, Development and Infrastructure Act 2016* (the PDI Act) on 8 December 2022, requiring preparation of an Environmental Impact Statement (EIS) (refer Section 1.8). This EIS has been developed in accordance with project specific Assessment Requirements, published by the State Planning Commission on 30 March 2023 and included in Appendix 3.

1.2 Details of the Proponent

Renascor is a South Australian-based, ASX-listed (ASX:RNU) mineral development company contributing to the clean energy sector, after the discovery of the Siviour Graphite Deposit (Siviour) near Arno Bay, on the Eyre Peninsula. Siviour is the world's second largest proven reserve of graphite and the largest graphite reserve outside of Africa (Renascor 2022).

Ausmin Development Pty Ltd (a subsidiary of Renascor) will operate the Siviour Graphite Mine on ML 6495. A Program for Environment Protection and Rehabilitation (PEPR) was approved for ML 6495 in November 2022. The mine, once operational, will produce high quality graphite concentrates.

Proponent details are provided in Table 1-1 below.

Table 1-1: Proponent details

Proponent	Renascor Resources Ltd – trading as Renascor (ASX:RNU)
Registered ABN:	90 135 531 341
Registered Address:	Level 5, 149 Flinders Street, Adelaide SA 5000
Nominated Contact	David Christensen
Phone	+61 8 8363 6989
Email	community@renascor.com.au
Website	www.renascor.com.au

Renascor will develop the Siviour Graphite Project (including the BAM Facility) under the guidance of the board of directors. The board operate in accordance with a Corporate Governance Charter which is available on the Company website. A number of corporate policies have been developed to guide operations, a copy of the Environment Policy is attached (Appendix 5) and the key policies are summarised in Table 1-2.

Table 1-2: Key Renascor policies

Policy	Description
Corporate Governance Charter	This document sets out the main principles adopted by the Board of Directors of the Company in order to implement and maintain a culture of good corporate governance both internally and in its dealings with outsiders.
Anti-Bribery and Corruption Policy	This Policy has been developed to establish the standards regarding anti-bribery and the prevention of corruption by all personal.
Whistleblower Protection Policy	This Policy promotes a culture of compliance, honesty, and ethical behaviours within Renascor. It aims to encourage staff to report any wrongdoing in good faith and in an environment free from victimisation so that the Board and Senior Management can adequately manage risk and cultural issues.
Diversity Policy	This policy promotes recruitment, development and retention of a talented and diverse workforce so as to maximise its corporate goals.
Trading Policy	This policy is intended to ensure that persons who are discharging managerial responsibilities, do not abuse, and do not place themselves under suspicion of abusing, inside information that they may be thought to have, especially in periods leading up to an announcement of the Company.
Environment Policy	This policy outlines Renascor's commitment to minimising the environmental impact of exploration, mining and rehabilitation activities through identifying and implementing best practice environmental planning, management and monitoring techniques and continuous improvement of environmental performance.

Renascor aims to develop an Environmental and Social Management System (ESMS) to support their Environmental Policy. The ESMS will define the structure for management of environmental and social impacts and the elements and expectations by which the environment and the public are protected during conduct of Renascor's operations. The ESMS will also set out a series of procedures and programs to ensure compliance with regulatory requirements and other commitments made by the Company.

Current day to day operations are overseen by the key personnel in Table 1-3.

Table 1-3: Key Renascor Personnel

Name	Position	Biography
David Christensen	Managing Director	David is an experienced mining executive with recent successful experience managing exploration, mining and marketing. Prior to founding the company, David served as Chief Executive Officer of Adelaide-based companies, Heathgate Resources Pty Ltd and Quasar Resource Pty Ltd.
Simon Ballestrin	General Manager – Project Development	Simon is a chemical engineer with over 18 years practical experience across management, design, consulting and operational roles in mineral processing environments and complex process industries. Simon has applied his professional and technical capability with a well-balanced commercial aptitude in project management, engineering management, metallurgy, process engineering, risk assessment, commissioning and operating roles for greenfield and brownfield projects at various operational sites across Australia. Simon has CP accreditation as a member of the AusIMM.
Vicki Hood	Environment and Approvals Manager	Vicki is a qualified environmental practitioner with more than 20 years experience managing environmental, community and sustainability in the mining and oil and gas industries. She has extensive project management experience having been involved in many projects in Australia and Africa from development and approvals, through construction and then operations.
Lin Zhou	Principal Metallurgist	Lin Zhou is an experienced metallurgist with over 15 years of Australian and international experience in the mining industry. He has worked with a wide range of commodities, including graphite, copper, molybdenum, gold/sliver, lead/zinc, nickel, cobalt, tungsten, iron ore, lithium and kaolin/HPA. Lin is a member of the Australian Institute of Mining and Metallurgy.
Aaron Maddern	Project Manager	Aaron is an experienced Project Manager with over 13 years working across heavy industries including oil and gas, mining and construction. He has complete project lifecycle experience including feasibility, engineering design, construction, commissioning and start up with a strong history delivering results and driving value.

1.3 The Project

1.3.1 Project Background

The Siviour Graphite Mine (not subject to this approval document) on the Eyre Peninsula is sited over the second largest reported graphite reserve in the world, and the largest known outside of Africa. Through feasibility studies and market analysis, Renascor has identified the potential economic and global supply chain benefits of developing an integrated battery anode material (BAM) project wholly within SA. A map showing the location of the Siviour Graphite Mine and proposed BAM Facility is included in Figure 1-1.

The development of in-country downstream processing aligns with 2022 Australian Government policy to achieve greater autonomy in the development of critical minerals infrastructure and processing capacity, and contributes meaningfully to the ongoing diversification of the South Australian economy.

The Siviour BAM Project has been granted Major Project Status by the Commonwealth Government. The Commonwealth Government has conditionally approved a loan facility of $185M to support the BAM Project under a $2B Critical Minerals Facility, established in September 2021 which is focussed on emerging resource development. Satisfaction of all conditions of approval and completion of documentation is projected to coincide with the Final Investment Decision (FID).

Renascor has adopted a caustic roast purification process for use in the BAM Facility which focuses on reducing potential environmental impact. Most global PSG production at present utilises either a very high-temperature thermal purification process, or intensive chemical treatment utilising hydrofluoric (HF) acid as a key reagent. Renascor has developed a more eco-friendly process to purify Siviour graphite concentrates to battery grade without the use of hydrofluoric acid (HF-Free). This HF-Free process uses less environmentally harmful reagents in combination with a lower-temperature kiln process to minimise environmental impacts.

The BAM Facility represents significant economic benefit by introducing a first-in-State process to add value to mined graphite, for which demand is predicted to increase substantially over the life of the Project. The Siviour BAM Project is predicted to contribute up to $2.6B to the State economy ($1.6B in Gross Regional Product within the Northern Adelaide region) over a 40 year life of Project. This includes over 1,200 FTE jobs created (~800 FTE jobs within the Northern Adelaide region). Capital investment in the Project is expected to be in excess of $200M, representing significant investment in the State. Including the Siviour Graphite Mine, the total Siviour Graphite Project will contribute $4.3B to the State economy and create over 2,000 FTE jobs within South Australia.

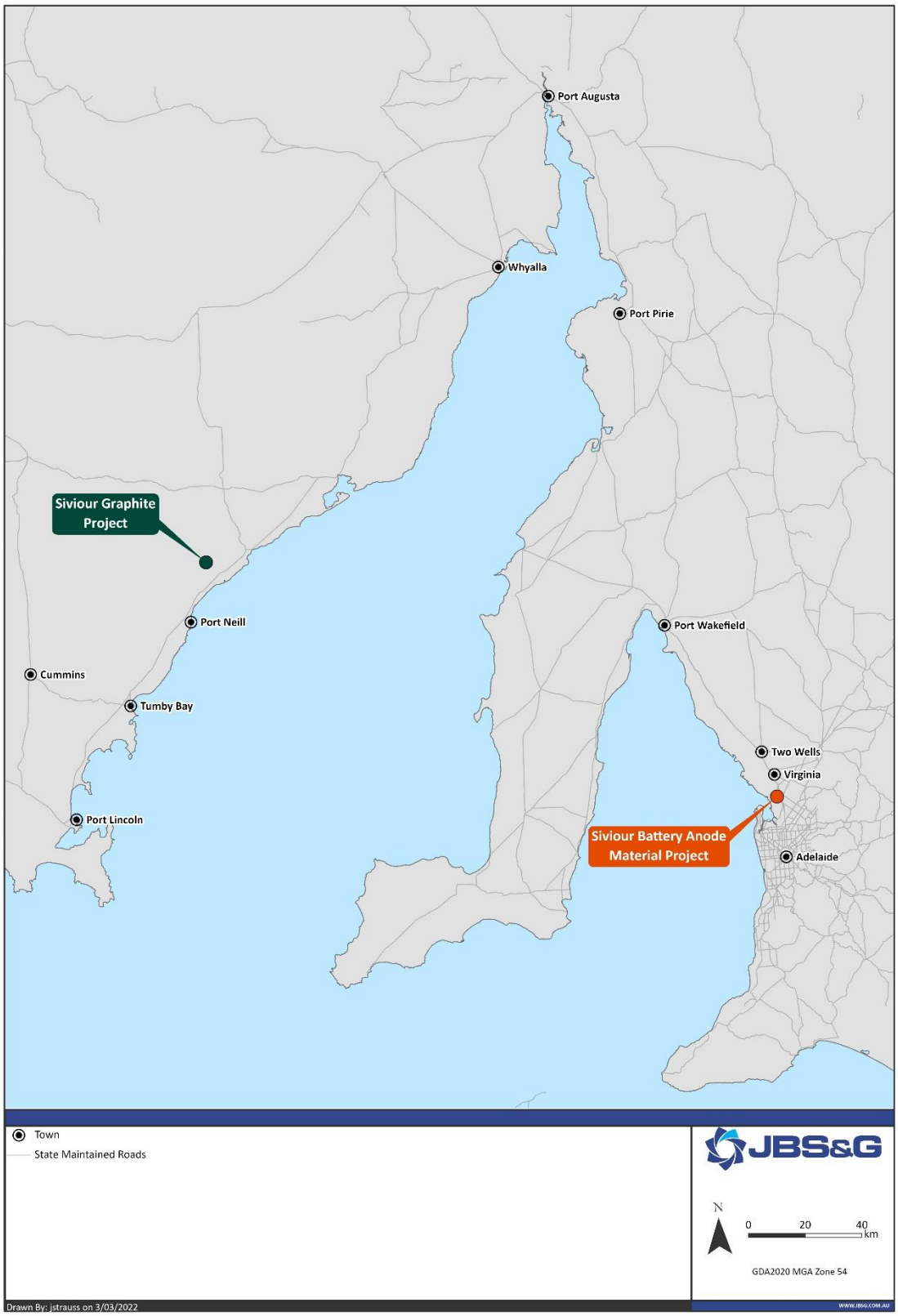


Figure 1-1: Location of the Siviour Graphite Project (ML 6495)

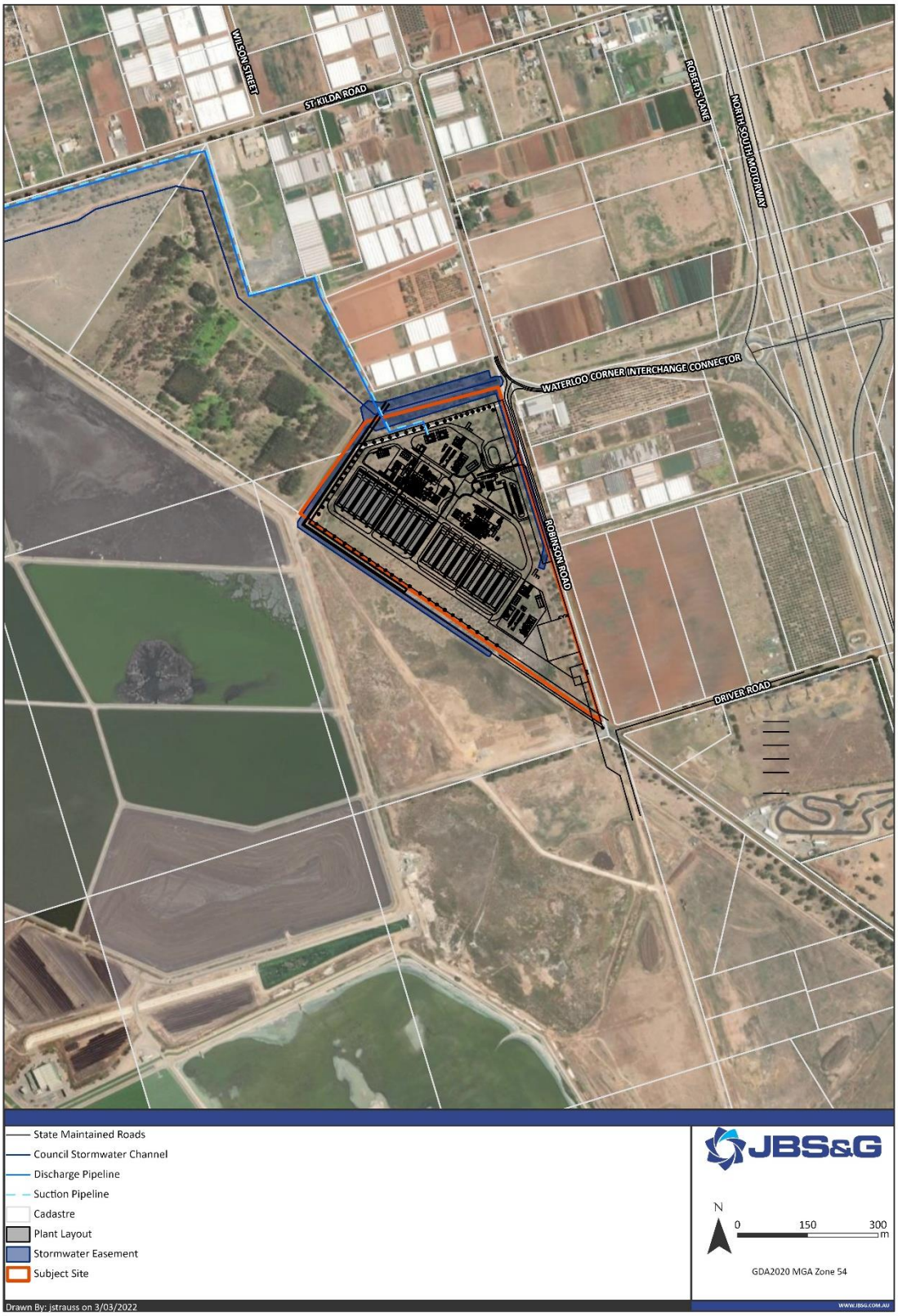


Figure 1-2: Site plan for proposed BAM Facility – Stage 1 and 2

1.4 Objective of the Project

Renascor's ambition is to supplement the economic benefit of the Siviour mining operation through in-country downstream processing to produce a refined graphite product for direct use by the global battery anode manufacturing sector at world-competitive prices. Renascor's stated aim is to become a global leader in the supply of sustainable, Australian made battery anode material with a focus on sound environmental management. A key aspect of this is the development of a purification process that is significantly more environmentally friendly than prevailing global PSG production technologies. Renascor's purification process avoids the use of HF as a reagent, offering a cleaner and safer HF-free process.

1.5 Project Description

The Project involves the construction and operation of a downstream mineral processing facility to produce PSG as a key component of battery anodes. The BAM Facility comprises of:

- Micronisation and spheronisation milling trains,
- Caustic roast kiln,
- Water treatment equipment (including reverse osmosis plant, demineralisation, caustic process water treatment and acid process water treatment),
- Leach tanks (caustic and acid), filtration equipment and repulp tanks,
- Industrial buildings,
- Product storage silos,
- Chemical reagents and waste storage including appropriate bunding and hardstand,
- Truck loading and unloading facilities, access and egress,
- Product bagging plant equipment,
- Mechanical, hydraulic and pneumatic conveyance and supporting structures,
- Water pipes to the SA Water outfall channel including intake and outfall points.

Other associated infrastructure upgrades, including the upgrade of Robinson Road, electricity and gas supply lines, are outside the scope of this project. The selection of this site for the BAM Facility is described in Chapter 2 Project Justification, a full description of all elements of the Project is included in Chapter 3 Description of the proposed Project.

1.6 Staging and Timing

Subject to approval by Ausmin and the Board of Renascor, completion of Project financing, and satisfactory progress with permitting, the Project is anticipated to be staged with construction proposed to commence from 2025, with Stage 1 commencing construction in 2025 and a planned Stage 2 expansion approximately 3 years later, pending the Final Investment Decision and commercial arrangements. The precise timeframe of Stage 2 is yet to be finalised but will be an iterative process responsive to market forces, commerciality and regulatory conditions. Indicative delivery timeframe is provided in Table 1-4.

Table 1-4: Project delivery timeframe

Project Stage	Timeframe
Stage 1 Construction	Construction to commence as soon as possible following receipt of development approval, final engineering design and receipt of long lead equipment. Construction timing estimated as 80 weeks.
Stage 1 Commissioning	To occur immediately following construction, for a period of approximately 3 months.
Stage 1 Operations	To occur immediately following commissioning, anticipated life of project approximately 40 years based on available supply of graphite from Siviour Graphite Mine.
Stage 2 Construction	Construction anticipated to commence 3 years following commissioning of Stage 1 and estimated to take 80 weeks.
Stage 2 Commissioning	To occur immediately following commissioning, for a period of approximately 3 months.
Stage 2 Operations	To occur immediately following construction, anticipated life of project approximately 40 years based on available supply of graphite from Siviour Graphite Mine.

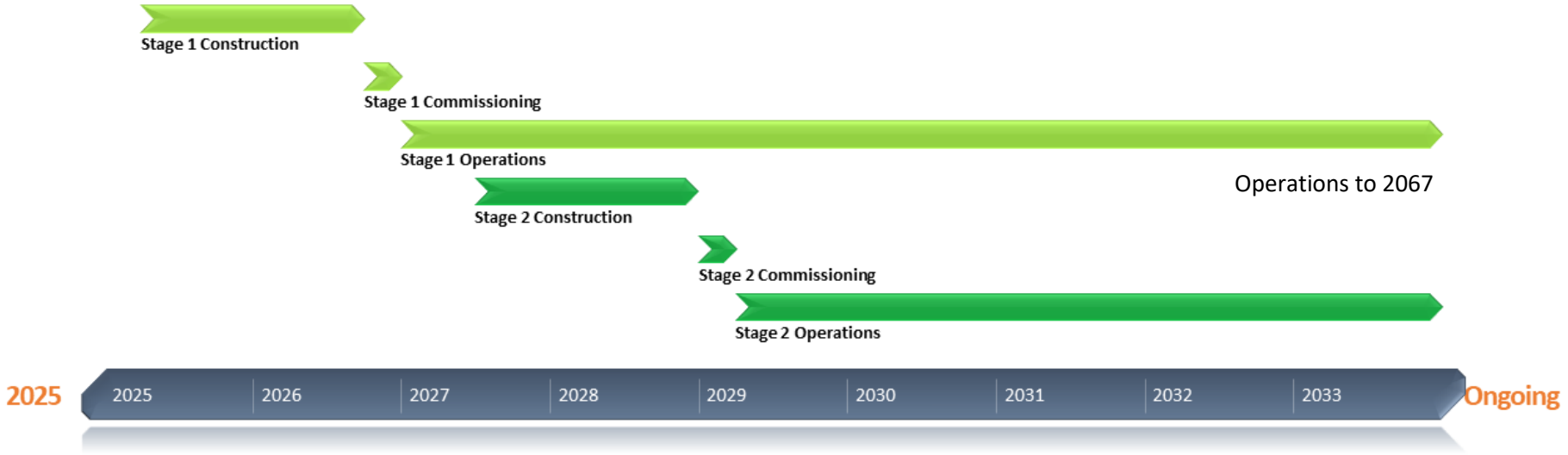


Figure 1-3: Proposed Development Delivery Timeline

1.7 Overview of the Regulatory Approvals process

On 8 December 2022, the Minister for Planning (the Minister), by notice published in the Government Gazette, declared the proposed Project as an Impact Assessed Development pursuant to Section 108(1)(c) of the PDI Act, necessitating the preparation of an EIS.

A Scoping Application including a planning report was prepared pursuant to the requirements of Practice Direction 4 – Restricted and Impact Assessed Development and submitted to the State Planning Commission (SPC) on 9 December 2022. The Scoping Application was prepared to assist SPC in determining the level of detail required for the EIS, and included a preliminary assessment of the BAM Facility's expected impacts to environmental, economic and social values.

On 15 December 2022, Practice Direction 17 – Impact Assessed Development was issued by SPC. The purpose of Practice Direction 17 is to provide specific direction relating to Impact Assessed Development, while Practice Direction 4 was updated simultaneously to only relate to Restricted Development (not being Impact Assessed Development). The issue of a new Practice Direction specific to Impact Assessed Development streamlines the process. On 7 March 2023, the Scoping Application was formally lodged following gazettal and publication of new Practice Direction 17 in February 2023.

Following submission of a Development Application and associated planning report, the State Planning Commission (SPC) issued formal Assessment Requirements to guide the preparation of an Environmental Impact Statement (EIS) on 30 March 2023.

The EIS has been prepared in accordance with the Assessment Requirements and includes engagement with the general public, relevant stakeholders and State Government agencies to ensure a holistic, integrated and streamlined assessment process.

1.8 Purpose and Description of the EIS

An EIS is an important, iterative process that will inform the construction and operational requirements of the Project. By understanding the relevant positive and negative environmental, social and economic impacts of a development, appropriate mitigation measures and management actions can be incorporated into the concept and detailed design of the Project.

This EIS has been prepared to identify and assess the environmental, social and economic impacts and benefits of constructing the Project, including cumulative impacts and benefits.

The objectives of the EIS are to:

- provide a source of information for stakeholders to facilitate informed consultation and feedback
- explain the need for the Project and evaluate the case for approval of the Project over the alternatives which have been considered
- identify and assess the potential impacts of the Project on the community and the environment, and the measures to avoid, minimise and mitigate those impacts
- provide a framework for decision-makers to consider the Project in line with environmental, social, economic, cultural and technical factors; and
- address the EIS Guidelines which will be assessed against the legislative framework described in Chapter 4.

1.8.1 Consistency with EIS Assessment Requirements

This EIS has been prepared in accordance with the EIS Assessment Requirements for the Project issued by the SPC (refer Appendix 3). Relevant Assessment Requirements are included in each chapter of this EIS. Where specific requirements have been addressed in another chapter than specified in the Assessment Requirements for clarity or ease of understanding this is identified in the chapter. The checklist included in Appendix 3 sets out where each aspect of the Assessment Requirements is addressed.

1.8.2 Structure of the EIS

The EIS has been prepared to ensure that the Project is described adequately, the potential environmental, social and economic impacts are assessed and proposed mitigation measures are identified. The EIS has been divided into chapters of similar environmental aspects mostly, but not entirely, mirroring the structure of the Assessment Requirements. Specialist studies supporting key impact assessments have been attached to the EIS as Appendices. This structure is set out in Table 1-5 and Table 1-6.

Table 1-5: EIS Structure - Chapters

Chapter	Title	Chapter Summary
1	Introduction	Provides background to the proposed Project, the proponent and structure of the EIS
2	Project Justification	Sets out the objectives and justification for the Project.
3	Description of the proposed Project	Provides a detailed description of the proposed Project
4	Statutory Framework	Describes the Commonwealth, State and local government legislative framework relevant to the Project.
5	Planning Assessment	Assessment of the Project against the relevant State and local planning documents.
6	Stakeholder and Community Engagement	Presents a summary of the key engagement activities undertaken as part of the EIS process, as well as future engagement opportunities.
7	Impact Assessment Methodology	Describes the impact and risk assessment process employed for the EIS.
8	Land Use and Site Conditions	These chapters set out the impact assessment for each environmental and social – economic element and: Describe the existing baseline conditions for each environmental and social element and identify relevant environmental values; Identify and discusses potential impact events and proposed controls and mitigation strategies; Present the outcomes of impact assessment for identified impact events for each environmental and social element, including any additional mitigation where relevant.
9	Physical Environment	
10	Biological Environment	
11	Amenity and Environmental Quality	
12	Social and Economic Impact	
13	Cultural Heritage	
14	Climate Change and Resource Efficiency	
15	Hazard and Risks	
16	Design Quality	Assessment of the Project against the relevant design standards supporting the State and local planning documents.
17	Environmental Management Framework	Describes the environmental management framework that will be applied during construction and operation for the Project.
18	Conclusion	Conclusions of the EIS
19, 20	Glossary and References	Lists references referred to or relied on in the EIS and a glossary of all terms and acronyms used in EIS drafting.

Table 1-6: EIS Structure - Appendices

Appendix	Report	Referenced in EIS
1	Certificates of Title	Chapter 5
2	Site Plans and Layouts	All chapters
3	Assessments Requirement Checklist	All chapters
4	Community Engagement Strategy & Plan	Chapter 6
5	Renascor's Environmental Policy	Chapter 1, 14 and 17
6	Environmental Impact Assessment Tables	All chapters
7	Preliminary Site Investigation	Chapter 9 and 15
8	Geotechnical Investigation	Chapter 9 and 15
9	Ecology Assessments	Chapter 10
10	Flood modelling	Chapter 9, 10 and 15
11	Air Quality Assessment	Chapter 11
12	Environmental Noise Assessment	Chapter 11
13	Traffic Impact Assessment	Chapter 11
14	Heavy Vehicle Route Assessment	Chapter 11
15	Visual Amenity Impact Assessment	Chapter 11
16	Economic Impact Assessment	Chapter 12
17	Waste Management and Minimisation Strategy	Chapter 14 and 17
18	Discharge Criteria Management Plan	Chapter 9, 10 and 15

1.8.3 Key EIS Terminology

Table 1-7 lists the key terms that are discussed throughout the EIS. A full list of terms used in the EIS is provided in Chapter 19 Glossary.

Table 1-7: Key EIS terminology

Term	Definition / Explanation
The Project	The proposed Battery Anode Materials Facility and associated water intake and outfall pipelines located at Bolivar, SA.
Siviour Graphite Project	The Siviour Graphite Mine near Arno Bay and the BAM Facility (defined as "the Project") in Bolivar
Project site	The land contained within the project footprint (CT 5723/299) as well as the pipeline and water intake and outfall points (refer to Figure 1-2).
Study area	The area used for investigation for an impact assessment study, which is specifically defined in each relevant EIS chapter.

1.8.4 EIS Project Team

In 2022, Renascor appointed JBS&G Australia Pty Ltd (JBS&G) as independent environmental and social practitioners to undertake the site selection and environmental assessment and approval process for the BAM Facility (the Project).

JBS&G is a leading environmental consultancy with offices across Australia and more than 250 multi-disciplined environmental professionals. The contact details for JBS&G are as follows:

JBS&G Australia Pty Ltd

ABN 62 100 220 479

100 Hutt St

Adelaide SA, 5000

T: +61 8 8431 7113

F: +61 8 8431 7115

www.jbsg.com.au

The EIS team is provided in Table 1-8.

Table 1-8: EIS Team

Activity	Person and Organisation
EIS Project Management	Andrew Querzoli (JBS&G) Katy Fechner (JBS&G) Aaron Maddern (Renascor)
Renascor Project Management, Engineering and Environment	Simon Ballestrin (Renascor) Aaron Maddern (Renascor) Vicki Hood (Renascor)
EIS Authors and Document Compilation	Andrew Querzoli (JBS&G) Katy Fechner (JBS&G) Laura Johnson (JBS&G) Dr Nicole Pattern (JBS&G) James Warrington (JBS&G) Charlotte Baker (JBS&G) Anna Nambiar (JBS&G) Greg Barbara (JBS&G) Stephen Milne (JBS&G) Morgane Maillard (JBS&G)
Digital Delivery and Communications	Jessica Strauss (JBS&G) Sam Hardy (Consentium)
Specialist Studies	
Flora and Fauna	Dr Nicole Pattern (JBS&G) Stephen Milne (JBS&G) Ecosphere Ecological Solutions
Cultural Heritage	Laura Johnson (JBS&G) Integrated Heritage Services
Visual Amenity	Charlotte Baker (JBS&G) Shadowlab Design
Air Quality	SLR Consulting Australia Pty Ltd
Noise and Vibration	Resonate Consulting
Traffic and Transport	Tonkin Consulting Pty Ltd
Social Environment	Anna Nambiar (JBS&G)
Economic Environment	Charlotte Baker (JBS&G) Laura Johnson (JBS&G) ERC Pty Ltd
Planning Assessment	James Warrington (JBS&G) Katy Fechner (JBS&G)
Surface Water	Greg Barbara (JBS&G) Dr Nicole Pattern (JBS&G) Charlotte Baker (JBS&G) Proxa Water
Flooding	Tonkin Consulting Pty Ltd
Contaminated Land and Geotechnical	Marina Sarunic (JBS&G) Will Ellis (JBS&G) ENGEO Australia Pty Ltd

2 Project Justification

2.1 Introduction

The Siviour Graphite Project (ML 6495) on the Eyre Peninsula is sited over the second largest reported graphite reserve in the world, and the largest known outside of Africa. Through feasibility studies and market analysis, Renascor has identified the potential economic and global supply chain benefits of developing an integrated battery anode material (BAM) project wholly within SA.

Renascor's model represents the first instance of an integrated graphite mining, concentrating and downstream processing operation in Australia. The development of in-country downstream processing aligns with 2022 Australian Government policy to achieve greater autonomy in the development of critical minerals infrastructure and processing capacity, and contributes to the ongoing diversification of the South Australian economy.

The Siviour BAM Project has been granted Major Project Status by the Commonwealth Government. The Commonwealth Government has conditionally approved a loan facility of $185M to support the BAM Project under a $2B Critical Minerals Facility, established in September 2021 to support emerging resource development. Satisfaction of all conditions of approval and completion of documentation is projected to coincide with the Final Investment Decision (FID).

Renascor have adopted a caustic roast purification process for use in the proposed development which focuses on reducing potential environmental impact. Most global PSG production at present utilises either a very high-temperature thermal purification process, or intensive chemical treatment utilising hydrofluoric acid as a key reagent. Renascor has developed a more eco-friendly process to purify Siviour graphite concentrates to battery grade without the use of hydrofluoric acid (HF-Free). This HF-Free process uses less environmentally harmful reagents in combination with a lower-temperature kiln process to minimise environmental impacts.

The BAM Facility represents significant economic benefit by introducing a first-in-State process to add value to mined graphite, for which demand is predicted to increase substantially over the life of the Project. The Project will generate a total positive impact on Gross State Product of an estimated $2.6 billion over the extended period (in present value terms and excluding the Gross Operating Surplus of the mining operation itself). This includes the direct impacts of the Project, and the production and consumption induced impacts of flow through effects. Capital investment in the proposed development is expected to be in excess of $200M, representing significant investment in the State.

Detailed analysis of the justification and alternatives for the proposed development (including the no-project scenario) and the social and economic benefits are provided in this EIS.

2.2 Need for the Proposal

This proposal forms a key part of fulfilling the objectives under the Australian Government's 2022 Critical Minerals Strategy, diversifying the South Australian economy and is well placed to contribute to meeting the changes in ESG requirements for battery materials and manufacture.

2.2.1 Australian Government 2022 Critical Minerals Strategy

In 2022 the Australian Government released the Critical Minerals Strategy with a vision that:

> *By 2030, Australia is a global critical minerals powerhouse. We are integral to international critical mineral supply chains and technologies crucial to the global economy.*

Critical minerals are essential resources for the functioning of modern technologies, economics or national security, for which supply chain disruption risks have been identified. Graphite has been identified as a critical mineral due to its use in lithium-ion batteries to support the growing renewable energy sector among other aspects. The CSIRO Critical Energy Minerals Roadmap (CSIRO, 2021) identified that at time of publishing 60% of the world's graphite supply was produced in China who are also responsible for all downstream processing for lithium-ion batteries. This poses a high risk for the supply chain with all downstream processing occurring in the same country. The Australian Critical Minerals Strategy acknowledges the need for robust supply chains as a key learning from the COVID-19 pandemic with increasing importance placed on moving downstream processing onshore. By developing PSG facilities within South Australia, Renascor are diversifying the supply chain and thus increasing stability (Figure 2-1).

The Critical Minerals Strategy outlines a number of objectives to fulfil the vision as defined in Table 2-1. In recognition of the key role Renascor's proposed BAM Facility plays in achieving the objectives of the Critical Minerals Strategy, the Critical Minerals Facility has conditionally loaned $185 million to Renascor to develop this project.

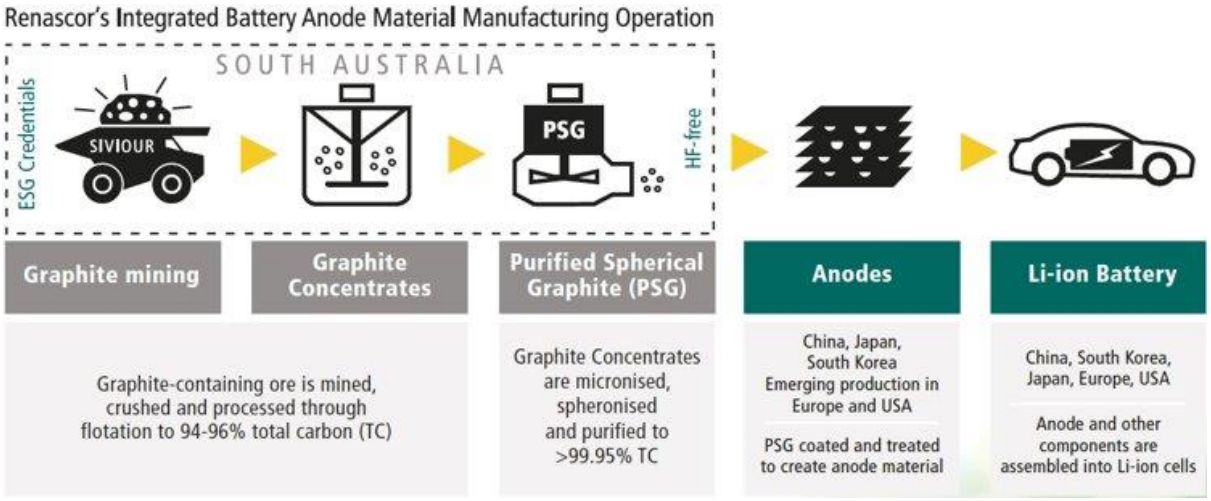


Figure 2-1: Graphite to battery supply chain, showing the activities included in Renascor's Siviour BAM Project.

Table 2-1: Australia's Critical Minerals Strategy

Objective	Description	How BAM Facility meets this objective
Stable supply	Australian projects will make a significant contribution to meeting the growing global demand for critical minerals. Securing investment and commercial offtake agreements for Australian projects will increase the diversity of supply and support secure, robust supply chains.	Renascor's model represents the first instance of an integrated graphite mining, concentrating and downstream processing operation in Australia. The Project aims to introduce downstream processing to the state which will diversify the state economy and provide a more stable supply chain for batteries which has been identified as a key issue following the breakdown of supply chains during the COVID-19 pandemic.
Sovereign capability	Expanding our knowledge of critical minerals and moving into downstream processing will: Grow our capability in specialist skills, technology and advanced manufacturing Ensure our intellectual property stays in Australia Capture more of the value chain by exporting higher value-added products.	The Project aims to introduce downstream processing to the state which will grow Australia's capability in advanced manufacturing and capture more of the value chain.
Regional jobs and growth	A thriving critical minerals sector will create numerous jobs in the exploration, manufacturing and processing of critical minerals. This will support economic growth in Australia's regional communities.	The BAM Facility is projected to increase employment by over 1,200 FTE (direct, indirect and flow on) across the state with ~840 of these jobs being created within the Northern Adelaide Region.

2.2.2 South Australian Context

South Australia is the ideal location for a graphite purification facility to build on the existing industries and opportunities in the sector. Energy generation in South Australia is strongly supported by renewable energy with up to 69.5% contribution by renewables, averaged over the year and up to 100% of demand met by renewables during periods in summer (AEMO, 2021). To support the renewable energy sector and increase the contribution of renewables year-round, further work is occurring in the area of battery storage. The BAM facility is a development that significantly contributes to building more jobs and investment in the battery storage sector within the state.

The BAM Facility is being developed to process graphite concentrate from Renascor's Siviour Graphite Mine. South Australia contains 66% of Australia's confirmed graphite resources (DEM, 2023) with most graphite resources concentrated on the Eyre Peninsula (including Uley, Kookaburra Gully and the Campoona Graphite deposits). The BAM Facility provides a proof of concept for other graphite processing facilities to support the graphite minable resources within the state and increase the number of skilled jobs and value-adding that can occur within South Australia.

The manufacturing industry sector has the greatest contribution to economic output in South Australia with approximately 17.7% of state output due to manufacturing (Economic Development Australia, 2023). With reduction in the car manufacturing sector, the proposed BAM Facility is leading the way for creating a battery materials and manufacturing hub to transition the South Australian manufacturing industry to support a clean, green future.

2.2.3 Battery Market

Recent initiatives such as the European Union Battery Directive and the Global Battery Alliance's Battery Passport Program promote a more sustainable and transparent battery market including materials, manufacture, use and disposal. As South Australia is a tier 1 jurisdiction, the state legislation regulating manufacturing will ensure graphite mining and purification are aligned with the ESG requirements of the market.

2.3 Project Benefits

2.3.1 Environmental Benefit

The Project forms a key part of the transition of SA to a circular economy and produces the following environmental benefits compared with the possible alternative option of downstream processing in China (refer to Section 2.4.1):

- Reduced emissions of greenhouse gases, as this Project does not require transportation of graphite concentrate to another country for processing. In addition, the SA grid is predominantly supplied by renewable energy.
- Reduced carbon footprint of lithium ion batteries for use in renewable energy projects.
- Supplying vital components to manufacture lithium ion batteries which allows for storage of renewable energy thus encouraging the transition to a carbon neutral future and a circular economy.
- Processing in a tier 1 jurisdiction (Australia) will ensure environmental outcomes are delivered upon.

2.3.2 Economic & Social Benefit

Key socio-economic benefits of the Project include:

- Over one hundred full-time construction jobs, growing to a workforce of 200 to 300 at the peak of construction
- More than 100 staff at commencement of operation, increasing to up to 200 ongoing, full-time jobs for the life of the Project. These are highly skilled, high-tech engineering and manufacturing industry jobs
- Including indirect and flow on effects the average annual employment impacts of the BAM Facility project is projected at approximately 700 FTE for stage one growing to over 1,200 FTE across the state with commencement of stage 2 (~800 FTE located within the Northern Adelaide Region)
- $2.6B contribution to State economy at peak production from the BAM Facility including $1.6B increase in Gross Regional Product for the Northern Adelaide Region. This figure does not include tax contributions
- Capital investment greater than $200M, represents a significant investment in the state
- Diversification of South Australia's economy

- Increased security of supply for battery materials within Australia (identified as a key priority in Australia's Critical Minerals Strategy 2022)
- Increased support of local goods and services providers, and sponsorship opportunities for community, social and sporting clubs.

Market

Over the 12 months to June 2022, the graphite market saw a price increase of over 40% for PSG (from US$2575/T to US$3,650/T). The price of -194 mesh graphite flake, a common feedstock for PSG, increased 58% over the same period (from US$520/T to US$830/T) (Fast Markets 2022).

Since March 2022, graphite prices have plateaued but remained stable (current at 21 June 2022), despite a reduced demand for EV battery raw materials due to the Russia-Ukraine war, Covid-19 lockdowns in China and logistical challenges including high container costs.hyd

Negotiations are underway to secure non-binding PSG supply (offtake) agreements with existing customers and leading global anode companies in South Korea, China and Japan. As the market demand for PSG far exceeds production capacity of Stage 1 of the proposed PSG facility, offtake agreement discussions are projected to continue positively.

2.4 Alternatives to the Project

This section lists some of the options that were considered and justification of why the project has been selected in its current form.

2.4.1 'No Project' Scenario

Should the Project not proceed the likely scenario is graphite from Siviour's approved Graphite Mine on the Eyre Peninsula is trucked to Port Adelaide and shipped offshore for downstream processing. Currently, China processes all graphite into PSG for lithium ion batteries (CSIRO, 2021) and so is the most likely destination for shipping. In this scenario the following is likely:

- No economic benefit from the 'value-adding' that processing provides.
- No job creation in Bolivar (highly skilled engineering and manufacturing industry jobs)
- No diversification of SA economy
- Increased carbon footprint of lithium ion batteries due to shipping for offshore processing.
- Reliance on unstable supply chains (all processing is currently undertaken in China) – this has been identified by the Australian Government as a key risk for critical minerals.
- Less support for transitioning to the circular economy within SA (SA's Waste Strategy 2020-2025)

2.4.2 Site Selection

A detailed site selection process has been undertaken to determine the optimal location for the BAM Facility. Key considerations of the site selection process involved identification of the potential environmental, social, engineering (utility), cultural and land use constraints.

This section summarises the approach undertaken to select the proposed development site, and the constraints and opportunities that were considered.

A number of sites were investigated across several localities positioned strategically along the road haulage route between Renascor's Siviour Graphite Deposit near Arno Bay, and Port Adelaide, from where final product export will occur. Alternative sites were considered and progressively eliminated through identification of primary and secondary constraints, including fatal flaw analysis, liaison with key stakeholders and industry partners, and ecological and cultural heritage assessments.

Site Selection Objectives

The objective of the site selection assessment was to identify a suitable site giving due consideration to environmental, social, engineering, schedule and cost factors as well as key regulatory requirements.

Site Selection Methodology

Data Sources

The following government and industry databases were systematically reviewed:

- LocationSA
- SA Power Networks and ElectraNet
- Department for Environment and Water
    - NatureMaps
- Department for Energy and Mining
    - South Australian Resources Information Gateway (SARIG)
- Department for Infrastructure and Transport
- Land Services SA
    - South Australian Integrated Land Information System (SAILIS)
- Department for Trade and Investment (Planning layers)
    - South Australian Property and Planning Portal
    - National Native Title Tribunal.

Site Selection Requirements

Primary constraints

Potential localities were identified using a filterable digital portal. The following were considered primary constraints, without which the BAM Facility is unable to be technically or economically developed:

- Adequate available land area for construction of Stage 1 and 2
- Capacity of water supply and distance to nearest water supply
- Capacity for process water disposal or discharge
- Power supply and proximity to appropriate substations

Once primary constraints were determined, the spatial analysis identified "no-go" areas, areas to avoid as well as priority areas for investigation. Five potential localities were identified which merited deeper investigation based on the following:

- Parcels within 5 km of the haulage route
- Parcels with a minimum of 12 vacant hectares available
- Parcels with the following existing land use:
    - Commercial
    - Utilities / Industry
    - Vacant
    - Agriculture
    - Livestock
- Parcels which did not abut residential land
- Parcels within 2 km of a substation

The five localities identified through the primary constraints analysis were:

- Whyalla Terminal / Whyalla Central
- Port Augusta
- Hughes Gap Regulator (Crystal Brook)
- Bungama (Port Pirie)
- Bolivar

Secondary Constraints

Following primary constraints analysis, potential priority sites within each of the identified localities were investigated more thoroughly against secondary constraint considerations. Secondary constraints considered in the site selection process included:

- Gas supply (non-essential, but preferable)
- Proximity to major freight routes
- Community values and acceptability
- Cultural Heritage
- Environmental sensitivity
    - Sensitive receptors (adjacent land uses)
    - Site contamination
    - Native vegetation and habitat
    - Environmental water
- Infrastructure connection costs and requirement for additional infrastructure

- Workforce availability

Figure 2-2 presents infrastructure availability within the Bolivar locality.

Access to gas supply was not considered critical since plant equipment can be engineered to run solely off electricity. However, it is considered an economically beneficial option.

The investigation findings were tested with key stakeholders as part of a fatal flaw analysis which refined the suite of viable sites to identify a single proposed location for further evaluation and engagement.

Further analysis, including ecological and cultural heritage assessments, feedback from landholders and other stakeholders, has assisted in confirming Bolivar as the location for the proposed development.



Figure 2-2: Infrastructure Availability

Priority Sites

Figure 2-3 shows the sites which were assessed in the Bolivar locality, with the project area identified.



Figure 2-3: Potential UPSG Facility Sites: Bolivar Locality

2.4.3 Purification Options

Renascor have adopted a caustic roast purification process rather than the common graphite processing options of either very high-temperature thermal purification process or intensive chemical treatment using hydrofluoric acid as a key reagent. A high-level comparison of the purification processes has been included in Table 2-2.

Table 2-2: Comparison of graphite processing techniques[1]

	Thermal purification	Chemical purification	Caustic roast purification (selected option)
Temperature (degrees C)	3,000 degrees	65 - 120 degrees	400 – 800 degrees
Chemicals required	Gases (including argon, chloride gas and Freon depending on which impurities are present).	Most commonly HF sometimes in combination with HCl (hydrochloric acid) or H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide), H_2SO_4 (sulfuric acid)
Final fate of impurities	Exhaust to atmosphere (gases)	Reduced by hydrofluoric acid (HF) Some fluoride by-products are toxic.	Captured in process water (neutralised following treatment) and solids
Purity	Extremely high, however, requires high purity feedstock, >99%	Purity output is variable depending on the level of sulfur in the feedstock.	Produces consistent high purity graphite
Advantages and disadvantages	Less hazardous chemicals used in process, extremely pure output, however, extremely energy intensive and not yet been progressed to industrial scale development (currently only used for specific fields requiring the purity output).	Low energy intensity, however uses hydrogen fluoride (and production of fluoride by-products), inability to deal with sulfur in ore resulting in extremely variable product purity.	Less energy intensive than thermal purification, less hazardous chemicals than chemical purification. High purity product with less variability than chemical purification, acceptance of more variable feedstock than both processes.

2.4.4 Water Source Options

The selected site has four main sources of water which could be used for the process; water from the SA Water Outfall Channel, water from SA Water Bolivar High Salinity Plant (HSP), water from the Northern Adelaide Irrigation Scheme (NAIS) Managed Aquifer Recharge (MAR), and/or mains water. The Project has selected water sourced from the Bolivar HSP, Table 2-3 summarises the water options.

[1] Zhao, 2022

Table 2-3: Comparison of water supply options

Water Supply options	SA Water Outfall Channel	SA Water High Salinity Plant (HSP) (selected option)	Managed Aquifer Recharge scheme (eg. Northern Adelaide Irrigation Scheme)	Mains Water
Source of water	Water from the main Bolivar Waste Water Treatment Plant (WWTP).	Water from Port Adelaide area (higher salinity water) through the Bolivar HSP.	Groundwater (T2 aquifer)	River Murray
Quality	Saline (EC 10389 mg/L) with elevated levels of some heavy metals.	Highly saline (EC 6300 mg/L) with elevated levels of some heavy metals.	Irrigation quality	Potable water quality.
Supply security	Highly secure, with some variable water quantity depending on season (approximately 83 – 230 ML/d)	Highly secure. Constant supply of approximately 21 ML/d with no periods of > 8 hours without flow.	Current reinjection is greater than demand from T2 aquifer leading to artesian conditions (especially near area of NAIS). No supply issues anticipated.	Dependent upon climatic conditions, demands and water trading upstream of Adelaide.
Other users	Water mixed with fresher sources for supply to Mawson Lakes dual reticulation schemes.	No other current users	Market gardens and other horticultural land uses.	Residents and businesses of Greater Adelaide Area.
Benefits	Limited other users of water, low cost.	No competition with other users, secure supply, low cost. Use of water with no other users due to quality issues.	Divert water that is otherwise injected into the T2 aquifer which is resulting in problematic artesian conditions in this area.	Appropriate quality for immediate use.
Negatives	Requires treatment prior to use, some variability in supply although sufficient/secure water availability.	Requires treatment prior to use.	Potential for future users of this water due to quality which could compete with project.	Costly and competition with other users for this water, water sourced from a stressed system (River Murray)

2.5 Summary of Preceding Actions

The development of the EIS is the culmination of detailed feasibility and optimised engineering studies, baseline surveys, stakeholder engagement and other technical reports. These include:

- Definitive Feasibility Study (including environmental and optimised engineering work)
- Stakeholder engagement (refer to Chapter 6 for more information)
- Baseline environmental and heritage surveys including:
    - Flora & Fauna
    - Cultural heritage
    - Water quality
    - Soils and Preliminary Site Investigation (PSI)

- Noise

- Technical assessments of:
  - Air quality (including odour)
  - Noise
  - Economic impacts
  - Visual Amenity
  - Traffic impact assessment
  - Fire and hazard management
  - Climate change risk assessment
  - Water quality from process and treatment technology
  - Flood modelling
  - EPBC self-assessment

2.6 Conclusion

Renascor's BAM Facility has been developed in response to the growing demand for critical minerals and strengthening the security of their supply chains. As there is a global movement towards renewable technologies the demand for batteries and the materials to manufacture them will increase. The recent COVID-19 pandemic highlighted the importance of secure supply chains, with all PSG currently produced in China there is a substantial risk to the supply of this product. By building capacity in South Australia to purify graphite it will diversify the state economy but also the supply chain for this critical mineral allowing a more secure foundation for the renewable energy transformation.

3 Description of the proposed Project

3.1 Introduction

This chapter provides a detailed description of the Project. These details have been used as the basis for determining the potential impacts of the Project (see Chapter 8 to 16).

3.2 EIS Content Requirements

Practice Direction 17 requires that the description of the proposal should address all aspects of the project that are assessed by the EIS. The Assessment Requirements for the description of the proposal as per Practice Direction 17 are described in Table 3-1.

Table 3-1: EIS Content Requirements – Description of the proposed Project

EIS Content Requirements
• Nature of the proposal and location • Scale and intensity of the project • Key elements of the receiving environment • A project plan to outline objectives, constraints, key activity schedule and quality assurance • Site layout plans (including indicative land division plan if relevant) • Construction and commissioning timeframes (including staging) • Description of working hours • Description of the existing environment (including the immediate and broader location, identifying sensitive receptors and adjacent land uses which may lead to cumulative impacts) • Description of the current commercial activities occurring in the area • Details of all buildings and structures associated with the proposal • Details of any other infrastructure requirements and availability • Details on the operation of the proposal, including operating hours • Relevant Zones and Overlays defined by the Planning and Design Code • Management arrangements for the construction and operational phases (including Environmental Management and Monitoring Plans) • A contingency plan for delays in construction

Aspects of the content requirements identified in Table 3-1 above which are not addressed in this chapter are listed Table 3-2 together with the applicable chapter and section.

Table 3-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter	Section
Description of existing environment – identifying sensitive receptors	Chapter 6 – Stakeholder and Community Engagement, Chapter 11 – Amenity and Environmental Quality (and associated Appendices)	Section Impact Assessment 11.2.7 – Air assessment Sensitive Receptors Section 11.3.7 – Noise assessment Sensitive Receptors
Details of buildings, structures, infrastructure and equipment	Appendix 2 – Site Plans and diagrams	Appendix 2 – Site Plans and diagrams
Relevant Zones and Overlays defined by the Planning and Design Code	Chapter 4 – Statutory Framework	Section 4.4 South Australian Legislation and Policies

3.3 Project Location

3.3.1 Project site

The Project is located at Waterloo Corner, South Australia, approximately 6.3 km north-east of Port Adelaide and 20 km north of Adelaide (Figure 3-1). The Project site occupies approximately 20.5 hectares within a larger freehold landholding registered to South Australian Water Corporation Ltd (SA Water), on which it operates the Bolivar Wastewater Treatment Plant (Bolivar WWTP) (Figure 3-2)[2]. The Project site comprises the majority of Allotment 3 (F115108AL3) and a portion of Allotment 4 (F115108AL4), with a street frontage of approximately 700 m to Robinson Road, a local road. The Project site occurs within the City of Salisbury's West Ward.

Further details on the subject land are provided in Table 3-3.

Table 3-3: Project site details

Category	Description
Street Address	Unit 1, 9 Robinson Road, Waterloo Corner, SA 5110
Certificate of Title (CT)	CT Volume 5723 Folio 299
Plan	Filed Plan 115108; Allotment 3 and a portion of Allotment 4
Site Area	Approximately 20.5 hectares (ha)
Local Government Area	City of Salisbury

3.3.2 Locality & Land Use

The Project site comprises open flat land which has been extensively modified and historically used for livestock grazing, cropping and horticulture, dating back to the 1860s.

The locality is characterised as a modified supratidal alluvial plain, typified by flat or gently undulating terrain featuring clay-rich soils, shallow groundwater depths and natural vegetation types ranging from samphire marshland and coastal mangroves to grassland and open to dense woodland. Surface soils are extensively disturbed across the majority of the Project site.

To the west of the Project site, artificial ponds associated with the Bolivar WWTP extend for over one kilometre in an east-west direction and approximately 5 kilometres in a north-south direction, effectively isolating the site from the coastal environment. The Project site, whilst occurring within the buffer zone associated with the Bolivar WWTP, is not presently used by SA Water in connection with the operation of the WWTP. The Land Use of the Project site is defined by the South Australian Property and Planning Atlas (SAPPA) as Utilities / Industry, however, the site was previously cropped and is currently intermittently grazed for land management purposes.

[2] Where the plant layout is depicted outside of the Project site (such as Figure 3-2), assume actual plant layout is confined to within the Project site. The plant layout does not overlay vegetation outside of the Project site.



Figure 3-1: Project location

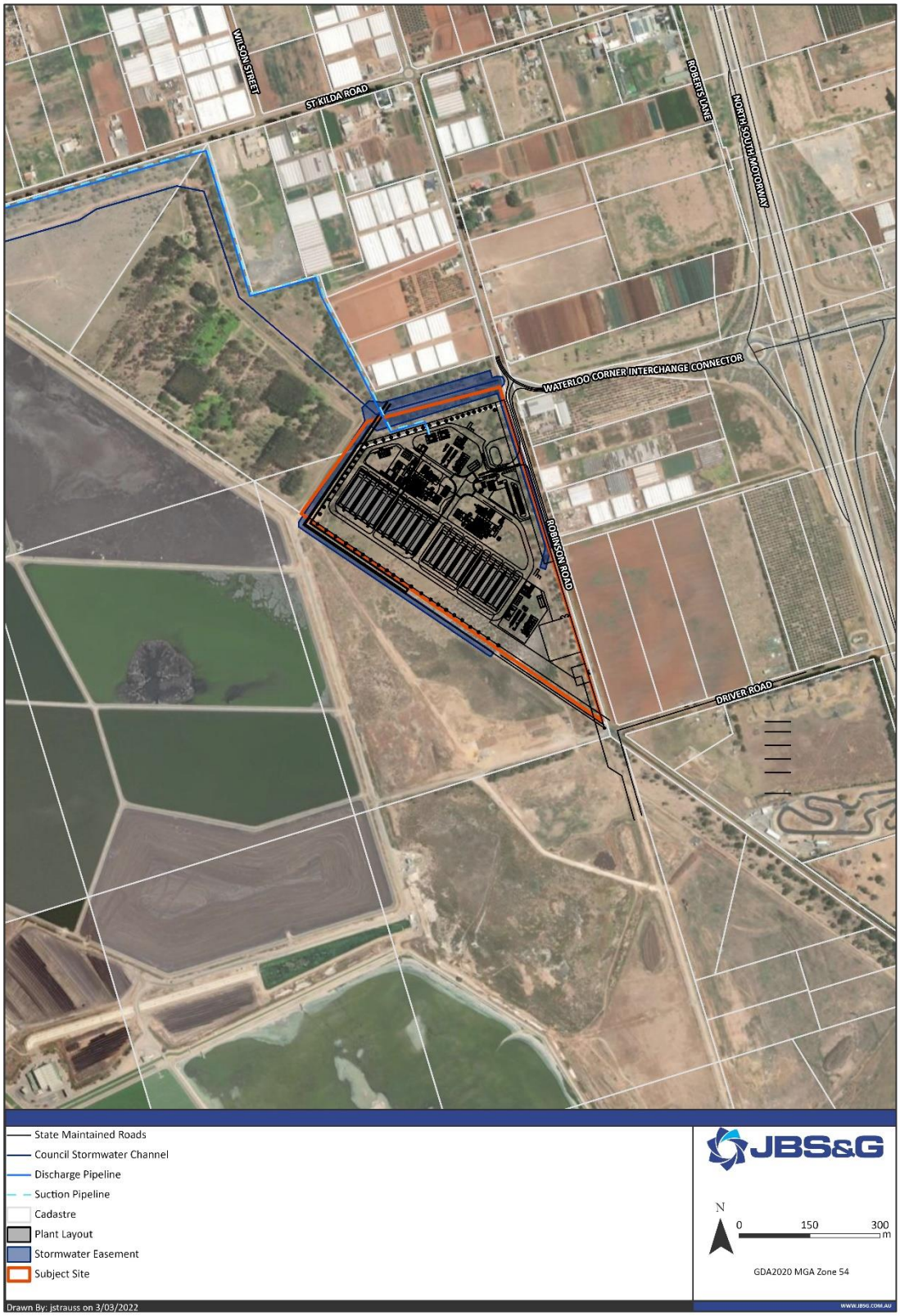


Figure 3-2: Project site

The North-South Motorway alignment lies 600 m, and Port Wakefield Road 1.2 km, to the east, separating the Project site from the residential suburbs of Paralowie and Burton. The nearest suburban residential properties, in the suburb of Burton, lie approximately 1.7 km to the east of the subject site.

Other significant land uses in the broader area include Winaityinaity Pangkara National Park (Adelaide International Bird Sanctuary) (2.5 km west of subject site at closest point)), the Edinburgh Royal Australian Air Force (RAAF) base and Airport (4.3 km separation distance) and Port Adelaide (6.4 km).

The South East Australia Gas (SEA Gas) pipeline runs close to the southern boundary of the subject site. A mains water pipeline exists along Robinson Road and the continuation of Driver Road on the eastern and southern site boundaries. Reclaimed water mains pipelines underlie and abut the site. A 66 kV transmission cable runs along Robinson Road, which connects to an SA Power Networks (SAPN) electrical substation 3.7 km to south.

3.3.3 Planning and Design Code Zones and Overlays

Identification of the relevant Planning and Design Code Zones and Overlays is provided in Section 5.3. The Planning Report in Chapter 5 provides an assessment of the Project against the relevant Zones and Overlays, in addition to the General Development Policies and other statutory and policy frameworks identified in Chapter 4.

3.4 Existing Environment Overview

This section provides a summary of the existing environment for the Project subject site and broader area. For further detail on the existing environment for the Project refer to Chapter 8 Land Use and Site Conditions, Chapter 9 Physical Environment, Chapter 10 Biological Environment and Chapter 12 Social and Economic Impact.

3.4.1 Physical Environment

The Project site is located within the Northern Adelaide Plains Land System which consists of flat to very gently undulating plains with slopes of less than 1%. The site itself is flat with a fall of approximately 1 m (being 6 m AHD to the east and 5 m AHD to the west).

There are no natural surface water features in the surrounding 2 km of the site. The key points stormwater enters the site from are the culverts under Robinson Road at the north eastern point and midway along the eastern boundary of the site. The stormwater flows from the north to the south of the site with the deepest ponding of stormwater in the southern portion (Appendix 10).

The geology of the site indicates that the site overlays quaternary (Pliocene-Pleistocene) alluvial and fluvial sediments (SARIG, 2023). These sediments contain undifferentiated sediments and quaternary rocks. A drillhole located approximately 2.5 km northwest of the site (GH100) shows undifferentiated quaternary sediments for the first 1.2 m below ground level followed by 2.6 m of the Glanville Formation and the Hindmarsh Clay Formation. Groundwater was encountered in this borehole at a depth of 4.3 m BGL.

Groundwater was identified in test pits within the site between 0.60 m BGL and 1.8 m BGL and in the boreholes between 1.5 m and 2.5 m BGL. Given the proximity of the site to the coast, groundwater elevations may be subject to tidal variations as well as seasonal variation.

Soil samples within the site were taken as part of the PSI (JBS&G, 2022) and show silty sand in the upper 0.2 m layer and clay, some gravel and sands in deeper layers (i.e. > 0.2 m).

Bolivar/Waterloo Corner has a Mediterranean climate with hot summers and mild winters. Temperature ranges between an average maximum of 30.2°C in January and an average minimum of 6.1 °C in July. The highest recorded maximum is 47.5°C. Average rainfall is 430 mm per year with generally highest rainfall between May and September.

The Edinburgh RAFF BOM site shows 9 am wind direction predominantly north to north easterly (average speeds between 11.7 and 18.4 km/h) and the 3 pm wind direction predominantly east to south easterly (average speeds between 17.6 to 24.1 km/h).

3.4.2 Biological Environment

The Project site has been heavily grazed (as a farming allotment). Ten vegetation associations were recorded across the Project site during field surveys. The majority of these vegetation associations have been planted historically, or are re-emergent native vegetation associations. Vegetation is in overall poor condition as a result of grazing and historical land modification.

Eighteen regulated trees were recorded within the Project site, with ten of these trees classed as significant; i.e. having a circumference of greater than 3 m. Many of these were in less than optimum health, with broken limbs and dieback observed.

No EPBC threatened flora species were assessed as possibly occurring at the Project site, nor were these species recorded in field surveys (see Ecosphere 2023 and JBS&G 2023 for further details).

Three EPBC threatened species (Australian Fairy tern (*Sternula nereis neris*); Blue-winged Parrot (*Neophema chrysostoma*) and Grey-headed Flying Fox (*Pteropus poliocephalus*)) were assessed as possibly occurring at the Project site. However, none of these species were recorded during field surveys and habitat on the Project site is not well suited to any of these species (see Ecosphere 2023 and JBS&G 2023 for further details).

Approximately 60 EPBC listed migratory bird species were predicted to occur or use habitat within the Project site. None of these species were observed during field surveys (see Ecosphere 2023 and JBS&G 2023 for further details).

Three NPW listed species were considered as possibly or likely to occur within the Project site (Elegant Parrot (*Neophema elegans*); Little Egret (*Egretta garzetta nigripes*) and Brown Quail (*Coturnix ypsilophora australis*)).

More than 20 weed species were recorded on the Project site during the field survey.

There are no records of the soil and water borne organism *Phytophthora* from within the Project site or wider area.

Several groups of pest fauna species are known to occur or have records (in the last 20 years) in the 5 km area surrounding the Project site.

3.4.3 Social and Economic Environment

Waterloo Corner is a small rural suburb used primarily for horticulture, located 22 km north of Adelaide and covering an area of ~26.5 km^2. It is bisected by the heavily trafficked Port Wakefield Road (a four-lane, dual-carriage road) and the North-South motorway, which forms part of the National Highway A1 connecting Adelaide to the Yorke Peninsula and beyond. Waterloo Corner comprises mainly small acreage blocks with low density housing and a mix of horticultural and other commercial businesses.

The estimated population of Waterloo Corner is 1,103 people, of which 1.1% identify as Aboriginal and/or Torres Strait Islander.

Waterloo Corner is an area containing relatively few community services and facilities. Residents must travel to other nearby suburbs (e.g. Salisbury) to access health, education, and emergency services. Waterloo Corner does not contain any schools or day care centres, community centres, hospitals/medical clinics restaurants/eateries, hotels or motels.

Waterloo Corner is located within the council area of Salisbury LGA (Salisbury) which is located in Adelaide's northern suburbs approximately 25 km from the Adelaide CBD, covering an area of 160 km2. In additional to residential, other major land uses in Salisbury are parks and reserves, commercial, industrial and rural horticulture.

The population of Salisbury is estimated at 148,000 people, of which approximately 2.4 % identify as Aboriginal and/or Torres Strait Islander.

There is an abundance of health, education, emergency and social services available in Salisbury and nearby suburbs including the Lyell McEwin hospital (Elizabeth), Modbury Hospital (Modbury), the Calvary Central Districts Hospital (Salisbury), the University of South Australia (Mawson Lakes Campus) and Technical and Further Education (TAFE) SA (Parafield and Salisbury campuses).

Salisbury includes numerous schools (public and private) and day care centres, places of worship, sporting facilities and clubs, recreation clubs, parks, reserves, wetlands and walking tracks, restaurants/eateries, shopping centres, community centres, hotels, motels, caravan parks and other short term accommodation facilities.

Some of Salisbury's key recreational assets are the St Kilda Adventure Playground, St Kilda Tramway museum, the Adelaide Planetarium, Globe Derby Park, Cobbler Creek Recreation Park, Dry Creek and Linear Park, and Adelaide International Bird Sanctuary National Park.

Socio Economic Index for Areas (SEIFA) is a summary measure of an area's relative socio-economic advantage or disadvantage using a combination of Census data pertaining to that area on income, education, employment, occupation, housing and family structure. SEIFA is combination of four indexes, each of which summarise a particular socioeconomic aspect in a geographic area. For each index, geographic areas are given a score, and then divided into five groups (or quintiles) ranking from most advantaged to most disadvantaged.

Waterloo Corner and Salisbury rank in the lowest or second lowest quintile for all indexes, indicating they are amongst the most socioeconomically disadvantaged populations across all of Australia.

3.4.4 Existing Commercial Activities

The Project site sits within a wider area of existing commercial activities.

The Project site itself is situated within land held by the South Australian Water Corporation (SA Water). Large ponds associated with the SA Water Bolivar WWTP extend for over 1 km east-west and approximately 5 km north-south, separating the Project site from coastal mangroves and Gulf St Vincent.

The Adelaide Zoo Feedlot is located north west of the Project site. This area is used to grow food and vegetation for zoo animals.

On the eastern boundary of the Project site is Robinson Road, along which, several small-medium sized land users have established a mix of horticultural and agricultural operations including greenhouses, orchards and cropping.

Recreational facilities in the area include the Southern Go Kart Club and the South Australian Gun Club (see Figure 3-3).

Tourism destinations in the wider area include the Tramway museum, St Kilda Mangroves Boardwalk and St Kilda Adventure Playground (see Figure 3-3). In the broader area, other commercial activities include land-based aquaculture, light industry, infrastructure and resource extraction.

Potential impacts from Project activities on existing commercial and recreation activities and tourism destinations are addressed in Chapter 8.

3.4.5 Sensitive receptors

The Project is situated adjacent to several residences (some within 100 m to the east and 250 m to the north) on Robinson Road (see Figure 3-3). Potential impacts to sensitive receptors from the Project in relation to noise, air quality, visual amenity and traffic are addressed in Chapter 11.



Figure 3-3: Sensitive receptors

3.5 Project Overview

The proposed development, once constructed, comprises two discrete but integrated industrial plants—mechanical shaping and purification—with associated equipment and reagents. The BAM Facility will conduct micronisation and spheronisation of graphite concentrate (milling), followed by a caustic roast purification process (chemical works). Additionally, equipment for the packaging and distribution of a range of PSG products and related by-products will be incorporated into the proposed development. Project delivery is anticipated to be staged, with Stage 1 capacity to be doubled by the Stage 2 expansion.

The BAM Facility will accept graphite concentrate at a quality of approximately 95% carbon from the Siviour Graphite Mine (Mining Lease 6495) at an initial (Stage 1) rate of approximately 75 ktpa, and is intended to process, refine and package PSG products with a purity of greater than 99.95% C, classified according to spheronised particle size. Packaged PSG products will be transported by road to Port Adelaide for export.

The two key processing aspects of the BAM Facility are defined as follows:

- **Micronisation (including spheronisation)**: The shaping of graphite concentrates (processed ore) by mechanical milling processes into a micronised (less than 50 microns) and spherical form, and
- **Purification**: The cleaning and concentrating of the shaped graphite by a thermal-chemical caustic roast process into a highly purified product suitable for the production of lithium-ion battery anodes. This process includes caustic roast, caustic and acid leach stages.

Leached product is filtered and repulped between each stage of the purification circuit. Finally, the spheronised and purified graphite product is dried and packaged for distribution. Products which cannot be reused in the process are neutralised through chemical precipitation and dried. Graphite fines produced through the micronisation/spheronisation process may be a saleable by-product dependant on feasibility and demand for the product.

The process produces both liquid and solid by-product streams. As part of ongoing investigations, Renascor is exploring options for both reuse and recycling of process by-products, which has the potential to improve environmental and commercial outcomes.

Process information and process flow design are further described in Section 3.10.4.

3.6 Nature of the Proposal

Renascor propose to establish a new industrial facility purpose-built to conduct the primary activities discussed above. Delivery of the Project involves the staged construction and operation of a BAM Facility at the site described above.

The BAM Facility will consist of several industrial buildings with stacks, product storage silos, reagent tanks, storage structures and associated industrial equipment (see Section 3.7). Once constructed, the BAM Facility will receive graphite concentrates by road, process into PSG and export packaged PSG products. The Project will be delivered in two stages as described in Section 3.10.

With the projected Stage 2 expansion of the BAM Facility, the overall PSG production capacity is anticipated to double (see Section 3.10). Following Stage 2 expansion, the BAM Facility will occupy the majority of the Project site.

Section 3.6.1 describes key aspects of the Project.

3.6.1 Key Project Aspects

Key aspects of the Project include:

- Clearance of vegetation (including native vegetation under the NPW Act and Regulated Trees under the PDI Act) from the site.
- Earthworks across the site including fill and elevation.
- Construction of hardstand areas including access roads and car parking.
- Fencing including gated access.
- Structures associated with an industrial process, including:
    - industrial buildings
    - product storage silos
    - truck loading and unloading facilities, access and egress
    - product bagging plant equipment, including pneumatic conveyance and feed hoppers
    - mechanical, hydraulic and pneumatic conveyance and feed structures for the purpose of moving graphite concentrate, partially and wholly processed PSG, chemical reagents and process by-products within the Plant
    - chemical storage equipment suitable for the storage of solid and liquid, caustic and acidic reagents including appropriate bunding/hardstand
    - graphite milling machinery comprising mechanical micronisation/spheronisation circuits, associated feed hoppers, dust mitigation, collection and conveyance structures, subject to final engineering design, including collection of by-products (potentially graphite fines).
- Equipment associated with chemical processing including:
    - caustic roast kiln (electric or gas-fired) including reagent mixing, cooling equipment, lump-breaking and re-pulping equipment
    - leach tanks (caustic and acid), filtration equipment and repulp tanks
    - reverse osmosis (RO) water treatment equipment, including demineralisation, brine capture and release
    - caustic process water treatment
    - acid process water treatment
    - solid by-product isolation, drying and containment (including potentially graphite fines).
    - process monitoring equipment
    - water intake and outfall pipelines.

In addition, the BAM Facility will include *either:*

- Electric kiln (including kiln off-gas scrubbing equipment), steam production and drying equipment, subject to availability and viability of a natural gas supply, or:
- Fuel burning equipment including kiln and boiler structures, natural gas connection, kiln off-gas scrubbing equipment, and associated emissions monitoring and combustion management equipment, or:
- A combination of electric and gas-fired equipment associated with kiln processes, steam production and drying equipment, subject to the outcomes of further engineering studies.

Additionally, equipment for the packaging and distribution of a range of PSG products and related by-products is part of the Project.

3.6.2 BAM Facility Layout

The BAM Facility comprises two discrete but integrated industrial plants—mechanical shaping (micronisation and spheronisation) and purification, and with associated buildings, equipment and reagents. Appendix 2 shows the proposed Project site layout.

3.7 Key Infrastructure

Key infrastructure of the Project, including constructed buildings and elements and fixed plant equipment are listed in Table 3-4.

Table 3-4: Key Project Infrastructure

Project Element	Number (Stage 1)	Number (Stage 2)
Buildings		
Micronisation and Spheronisation Buildings	2	2
Kiln Building	1	1
Purification Plant Buildings	1	1
Bagging Plant Buildings (adjoining and connected to purification plant building)	1	1
Product Storage Building (adjoining and connected to purification plant building)	1	1
Workshop / Warehouse	1	1
Gatehouse / Access Control	1	0
Administration Building / Offices	1	0
Plant Ablutions Block	1	1
Plant Control Room	1	1
Sample Laboratory	1	1
Compressor Building	1	1
Other Constructed Elements		
Delivery, conveyance and product dispatch structures	1	1
Reverse Osmosis Water Treatment Plant (Demineralisation)	1	1
Reagent Storage Areas	1	1
Process water Treatment Plants	1	1
Graphite / PSG Silos Graphite Concentrate Delivery PSG Feed Silos Final PSG Product Silos Combined Graphite Fines Silos	26	26
Internal Roadways, Car Parking Area	1	1
Entrance Curtilage	1	0
HV Electrical Switchyard	1	0
Fixed plant components		
Milling Trains	TBD	TBD
Micronisation and spheronisation mills (per train)	TBD	TBD
Kilns	1	1
Flash Dryer	1	1
Air Compressors	3	3
Conveyance Infrastructure	1 element	1 element
Reagent storage components / equipment (bunded tankage, secure storage, cleaning equipment (scrubbers, WWTPs, dust filters))	1 element	1 element
Caustic and Acid Leach Tanks (including. Repulp tanks)	TBD	TBD
Filters (including filters in the water treatment plant)	TBD	TBD
Pumps across plant	30+	30+
Water pipelines (intake and outfall)	2	0

Project Infrastructure are described below grouped as part of the buildings and or areas where key processing aspects will occur. Ancillary infrastructure and mobile equipment are further detailed below.

3.7.1 Silos to store concentrate

Concentrate will be delivered via concentrate trucks and pneumatically conveyed into silos for storage ahead of micronising and spheronising mills. The pneumatic conveyance system is enclosed (with dust collection system). Concentrate will be directed to the start of each milling train by conventional materials handling equipment.

3.7.2 Micronisation and Spheronisation Buildings

The shaping of graphite concentrate by mechanical milling (micronisation and spheronisation) occurs in the micronisation and spheronisation buildings. These buildings will be designed to maintain a negative pressure in the building via induced draught fans.

See Appendix 2 for detailed drawings and plans of the micronisation and spheronisation building including the plant and equipment included within them.

The building height will be approximately 8.3m at the ridge and 5.5m at the eaves, with stacks for the milling dust collectors extending approximately 3m above the roof line to a height of approximately 10 m.

There are four buildings in total, two in Stage 1 and two in Stage 2. Each building contains a number of micronisation and spheronisation trains and is a fully enclosed sheet metal and steel building approximately 93m by 87m. Some sides of the shed will be internally lined with fibre cement sheet to mitigate noise egress (subject to further engineering).

The colour and appearance of the sheet metal exterior for the mechanical shaping building will be chosen to blend in with the existing environment.

Motor starter control cabinets (six in each mechanical shaping building) span the length of each building.

Material transfer to each milling train is via a pneumatic material transfer system. This system is enclosed and also enables material transfer between buildings.

Each milling train is comprised of multiple micronisation and spheronising mills. Each mill is fitted with an exhaust stack, cyclone and baghouse to collect fines. As above, stacks for the dust collectors extend approximately 3m above the roof line to a height of approximately 10m.

Each stack will have a silencer installed to mitigate noise emissions.

Personnel access into each micronisation and spheronisation building is via single doorway access to each of the milling trains on the western side, and via airlocked doorways through the switch rooms on the eastern side of the buildings. Roller door maintenance access is provided for each set of milling trains on the western and eastern sides of the building. A service corridor runs adjacent to each train.

3.7.3 Kiln building

The kiln building is located to the east of the purification plant building and is approximately 35m by 15m x 27m (at the tallest point) and with the roof line above kiln at an elevation of approximately 18 m. A stack extends approximately 3m above the tallest roof line to a height of approximately 30m. An associated caustic and acid leach circuit is located in its own building immediately to the west of the kiln building.

See Appendix 2 for detailed drawings and plans of kiln building including the plant and equipment included within.

Kiln building

The kiln building includes the following:

- Spherical graphite kiln feed bin (approximately 21m tall)
- Screw feeders
- Spherical graphite and caustic mixer
- Caustic Roast Kiln
- Lump breaker
- Kiln dust collector
- Alkaline gas scrubbing
- Roasted graphite storage bin (approximately 9m tall)

3.7.4 Purification plant, bagging plant and product storage buildings

The purification plant (including acid and caustic leach), bagging plant and product storage areas occur in three attached buildings that are adjacent and connected. A crane bay access area is located outside the building structure in the northern corner of the area of the buildings.

The total footprint of the purification plant, bagging plant and product storage building/area is 82m by 41m by 22m (at the tallest point). The buildings are fully enclosed and made of sheet metal and steel. Some sides of the shed will be internally lined with fibre cement sheet to mitigate noise egress (subject to further engineering and subsequent noise modelling).

Product is dried and bagged in a building connected to and adjacent the purification plant building. The bagging building will be fully enclosed and designed to maintain a negative pressure in the building via induced draught fans. The product drying and bagging building has a roofline elevation of approximately 15 m at the ridge and approximately 13 m at the eaves.

See Appendix 2 for detailed drawings and plans of the purification plant, bagging plant and product storage buildings including the plant and equipment included within them.

Purification plant, bagging and product storage buildings

The purification plant, bagging and product storage buildings house all equipment for the purification process of the shaped graphite including:

- Product feed preparation
- Acid leach
- Caustic leach
- Product filtration
- Product drying, bagging, handling and storage
- Silos for product storage

3.7.5 Ancillary infrastructure

Several ancillary infrastructure buildings and areas will support the Project. These are described below.

- Workshop and warehouse facility / Warehouse
- Administration Building / offices
- Emergency response and first aid building
- Change rooms
- Sample laboratory
- Plant ablutions block
- Plant control room
- Demineralised water treatment plant
- Process water treatment plant
- Dry waste storage
- Reagent storage area comprising bunded tankage, secure storage,
- Compressor building
- HV Electrical Switchyard
- Entrance Curtilage and internal Roadways
- Car parks
- Lay down areas.

3.7.6 Mobile equipment

In addition to the permanent building and fixed plant and supporting services, mobile plant and equipment required during operation include those listed below in Table 3-5.

Table 3-5: Mobile equipment during used during operation

Mobile Equipment	Number	Operation
Gas forklift – storage/ bagging	2	2
Utility Vehicle	4	4
CAT 988 Loader	1	1
Truck 3 Tonne	1	1
Forklift 3T	2	2
Container Lifter 30Tonne	1	1
Integrated Tool Carrier	1	1
Mobile Crane 25t	1	1

During construction, typical earthmoving and building equipment and vehicles will be utilised (e.g., excavators, trucks, utility vehicles, mobile crane(s), forklift(s)).

3.8 Supporting Services

To facilitate the operation of key plant components, the following services are proposed to be incorporated as a part of the Project.

3.8.1 Steam Generation

Demineralised water and recycled condensate will be fed into a steam boiler powered either electrically or by natural gas to produce steam for various heat exchange process required within the process plant.

3.8.2 Air Compressors

Compressed air will be generated for services required within the process plant, including pneumatic conveyance of products. Air receivers located throughout the plant will hold service air, while dedicated receivers will hold compressed air for conveyancing, bag filter and for instrument control and function.

3.8.3 Demineralisation plant

Water required in the caustic and acid leach processes will be demineralised in the demineralisation plant using a combination of pre-treatment, packaged reverse osmosis and polishing equipment for water purification (See Section 3.11.1 for process details).

3.8.4 Process water treatment plant(s)

Treatment of process water (prior to reuse or return to the SA Water outfall channel) will occur in the acid and caustic process water treatment plants. (See Section 3.11 for further details on treated process water reuse and release).

3.8.5 Negative Pressure Environments and Dust Mitigation

Induced draught fans in the micronisation and spheronisation building (also see Section 3.7.2) and the bagging building (also see Section 3.7.3) create a negative pressure environment to reduce the potential for any airborne graphite fines from exiting the building.

3.8.6 Access, roads and carparks

Road access to the facility will be via the North-South Motorway or Port Wakefield Road, using the Waterloo Corner Interchange Connector road. Access to the site will be via Robinson Road and controlled by a gatehouse with security fencing around the site perimeter. Use of Robinson Road to move from one part of the proposed development to another is not proposed.

Separate to this Project, upgrades of Robinson Road and the intersection with Waterloo Corner Road will be undertaken.

Entrance to the site and primary internal roads will be sealed. Based on detailed engineering and construction design, it is possible for some internal roads to be unsealed compacted surfaces.

Car parking will be sited within the boundary of the subject site, on the eastern boundary. Internal roadways, loading areas and designated parking spaces for service vehicles will be provided within the site boundary. The stage 1 car parking area has provision for 75 carparks with additional carparks to be provided as part of Stage 2 if required.

3.9 Utility requirements

The BAM Facility requires water, electricity and natural gas. The Project includes the water pipeline (two pipelines) and electrical substation. The connection to the electricity grid and natural gas pipeline are provided for context but will be covered by a separate approval process.

3.9.1 Power

The BAM Facility could require up to 120 MW of power at peak production (Stage 2 option where all process elements are electrically powered), ramping upward from an initial 30 – 40 MW with the delivery of Stage 1. Actual power consumption is subject to change, depending on engineering design of the plant – in particular, whether kilns and drying equipment will be electric or gas-fired. Co-location with existing or planned renewable energy facilities was considered desirable during the site selection process.

Power for the site will be supplied from distribution and transmission infrastructure located near the processing facility. Power supplied into the facility will feed a 33 kV switchboard which will then reticulate power to the various processing plant substations.

Metering will be provided at a location to be agreed between the electricity provider and Renascor.

The distribution voltage will be 415 V and distribution will generally be via cable within the processing buildings.

3.9.2 Water

The Project will initially require up to 2.4 ML/day of water supply, growing up to 4.8ML/day following Stage 2 expansion. Water will be sourced from the Bolivar High Salinity Plant (HSP) directly downstream of weir 1 in the SA Water outfall channel (Figure 3-4). The water will be transported to site via a mix of above and underground pipeline due to certain requirements (i.e. road crossings) and will be defined during further engineering stages (Figure 3-4).

Incoming water from the HSP will be treated through reverse osmosis in the demineralisation plant for subsequent use in processing. RO Brine will be mixed with treated process water and returned to the SA Water outfall channel (see Section 3.11.2 for further details on process water management).



Figure 3-4: Proposed location of water intake and outfall pipeline

3.9.3 Gas

Subject to the outcome of engineering design and feasibility studies, up to ~1.6TJ/day of gas supply may be required depending on the energy supply requirements of the final kiln selection. If required, the supply of natural gas to the site will be from an underground pipeline connection to the nearby SeaGas pipeline. A metering station and pressure let-down station will provided at the site boundary. Gas distribution to the kiln, product dryer and boiler buildings will be via underground pipeline to the relevant process building then above ground within the building to the required process equipment. Gas supply connection hardware will be addressed in a separate approval process.

3.10 Project Plan

The objective of project implementation is to construct and operate the BAM Facility as intended and designed whilst ensuring no harm to workers, the public, community and the environment. A detailed project plan forms part of Renascor's project development process including detailed scoping, costing, scheduling, risk management, project management, project controls and performance monitoring. Constraints to project implementation are considered by Renascor as a normal part of project planning and business management, with the key constraint for the project including a final financial investment decision to be made by Renascor.

3.10.1 Staging and Schedule

Subject to approval by Ausmin and the Board of Renascor, completion of Project financing, and satisfactory progress with permitting, Project development will be staged, with Stage 1 to be constructed in CY2024 and a planned Stage 2 expansion to follow (see Table 3-6). Construction of Stage 2 is proposed to occur following the commissioning and concurrent with operations of Stage 1 (see Table 3-6) pending the Final Investment Decision and commercial arrangements.

The total life of the project including construction and operation is anticipated to be 40 years.

Table 3-6: Project delivery timeframe

Project Stage	Timeframe
Stage 1	
Construction	Construction to commence as soon as possible following receipt of development approval, final engineering design and receipt of long lead equipment. Construction timing estimated as 80 weeks.
Commissioning	To occur immediately following construction, for a period of approximately 3 months.
Operations	To occur immediately following commissioning, anticipated life of project approximately 40 years based on available supply of graphite from Siviour Graphite Mine.
Stage 2	
Construction	Construction anticipated to be completed within 3 years following commissioning of Stage 1 and estimated to take 80 weeks.
Commissioning	To occur immediately following commissioning, for a period of approximately 3 months.
Operations	To occur immediately following construction, anticipated life of project approximately 40 years based on available supply of graphite from Siviour Graphite Mine.

Stage 1 is anticipated to produce in the vicinity of 50 ktpa of PSG, and anticipated to expand to 100 ktpa following Stage 2 expansion, subject to commercial considerations, final engineering design, process variations and natural variances in flake graphite concentration and yield volume (Table 3-7).

Table 3-7: Projected PSG Production

Project Stage	Graphite Concentrate Receival	Indicative PSG Production	Indicative Graphite By-Products (fines)
Stage 1	~75 ktpa	~50 ktpa	~25 ktpa
Stage 2	~150 ktpa	~100 ktpa	~50 ktpa

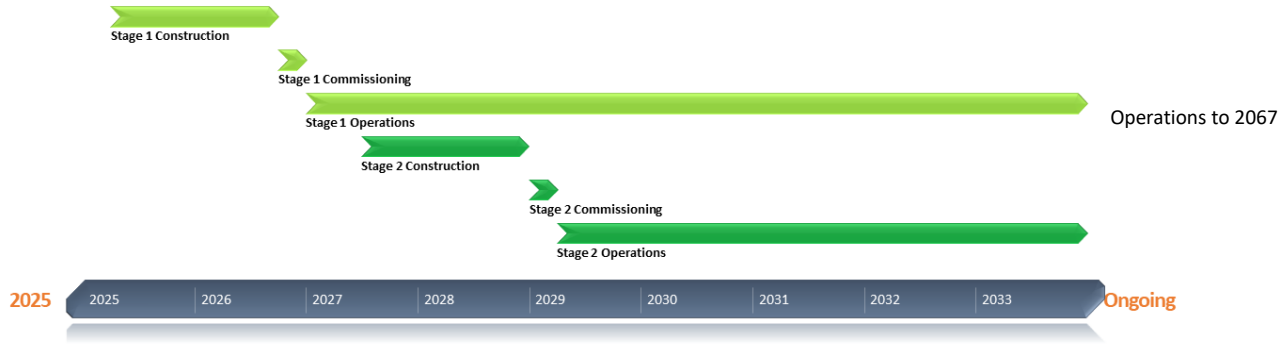


Figure 3-5: Proposed Development Timeline

3.10.2 Key Activities

Key activities occurring in each of the construction and operation phases of the Project are detailed below. Decommissioning is a key activity that will be set out and described in the Operational Environmental Management Plan (OEMP).

Environmental management arrangements for the construction phase will be detailed in a construction environment management plan (CEMP). Similarly, environmental management arrangements during the operational phase of the Project will be covered in the OEMP. Where applicable, other specific management and monitoring plans will be implemented for the Project. These will be referenced below and further in Chapter 17.

3.10.3 Construction

Key construction activities for the Project are described below.

Vegetation Clearance and topsoil stockpiling

To accommodate the construction of Stage 1 and 2 of the BAM Facility, clearance of existing vegetation within the footprint (and water pipeline corridor and stormwater easement) will be required. Vegetation clearance will be staged, with clearing for Stage 1 undertaken initially, followed by Stage 2 (prior to commencement of Stage 2 construction).

Approximately 22.22 ha of native vegetation will be cleared. A Native Vegetation Clearance application for Significant Environmental Benefit (SEB) Offset will be submitted for the Project in accordance with the Native Vegetation Act 1991 (See Appendix 9B, Native Vegetation Clearance Report).

In addition, the Project will require the removal of up to 18 trees regulated under the PDI Act. Project infrastructure has been sited to minimise the impacts to regulated trees on the perimeter of the Project site.

Traditional civil plant and machinery will be used to clear the vegetation from the site, with potential dust impacts managed through a CEMP (see Chapter 11 Amenity and Environmental Quality for further details on dust mitigation measures during construction).

Where possible, topsoil will be stripped and stockpiled for later use onsite.

Earthworks and site elevation

The site requires importation of fill material for raising the ground to accommodate finished floor levels 300mm above 1% AEP flood levels, and for access tracks and hard stand areas. Fill material will be imported and laid to meet these requirements.

Fill material will comply with EPA requirements and may be sourced from excavation of the stormwater drainage channel to the north of the site; and from built stormwater channels along the eastern and western boundaries of the site (within the site).

Additional borrow material and crushed rock or other construction materials (e.g. concrete) where required, will be obtained from a range of sources including commercial suppliers, existing approved borrow pits or waste derived fill from surrounding developments that meets the EPA criteria for reuse. Quantities and sources will be determined following detailed design.

Fill material will be compacted and shaped to ensure a shallow gradient for drainage as per surface water / storm water infrastructure designs.

Traditional civil plant and machinery will be used to condition the subgrade, transport the fill and place the fill.

Potential impacts from dust during earthworks will be managed through the CEMP (see Section 11.2 Air Quality for further details on dust mitigation measures during construction).

Temporary construction buildings will be placed on site upon commencement of site works.

Site security and lighting

A security gate house, with controlled access/swipe card access will be built at the entry point on Robinson Road. The Project site is currently fenced and this fencing will be checked for appropriateness to prevent unauthorised access during construction. Necessary upgrades to the fencing will be made prior to construction commencement if required.

Internal roads, access roads and carparks

The construction of internal roads, access roads and the car park will occur during the construction phase.

Installation of stormwater drainage system

The stormwater drainage system will be installed as per the Chapter 9 – stormwater management plan design drawing.

Concrete foundations and buildings

After earthworks, all the concrete foundations will be poured (mix of slab and foundations), followed by structural steel erection for the buildings, and then installation of mechanical and electrical equipment etc.

Power

Site construction is likely to be powered by diesel gensets. Main power supply will be connected in time for plant commissioning.

Lighting

Exterior lighting will be installed.

Installation of equipment

Fixed permanent equipment will be installed within buildings and designated areas as per drawings in Appendix 2.

Water pipeline

Intake and outfall pipework for the Project will be High Density Polyethylene (HDPE) pipe with a likely outside diameter (OD) of 225 mm.

The two pipelines (intake and outfall) will be installed at ground level with some sections to be underground to allow for vehicle crossings and interactions with existing infrastructure. Land access to install and maintain the pipelines will be negotiated with SA Water as the landowner. Pipeline installation is anticipated to occur entirely within land owned by SA Water, subject to detailed design. Pipelines are expected to be installed within a 10 m corridor, to allow for micro-siting during installation to avoid environmental impacts. Minor vegetation clearance is expected to be required to facilitate pipeline installation in some sections (see Appendix 9B Native Vegetation Clearance Report).

Rehabilitation of temporary areas of disturbance

Areas of temporary disturbance during construction will be rehabilitated. All waste material generated during construction will be taken off site by suitably licenced contractors (also see Appendix 17 Waste Minimisation and Management Plan).

Commissioning

Commissioning of the plant and equipment will follow industry standard processes, typically including pre-commissioning, dry commissioning, wet commissioning then a controlled ramp up to name plate capacity.

Contingency plans to address potential delays in construction will be addressed through Renascor's internal corporate risk management and project management framework with appropriate monitoring and strategies implemented.

3.10.4 Operation

A description of key activities proposed to be undertaken for the Project in the refinement of graphite concentrate are detailed below. Process information and detailed process flow design is subject to finalisation of further engineering studies and plant design.

Concentrate Receival

Graphite concentrate will be transported from the Siviour Graphite Project near Arno Bay on the Eyre Peninsula to the BAM Facility for downstream processing and purification. Concentrate transport will occur via public roads by AB triple road trains (or similar) incorporating sealed dry-bulk carrier. The access route will be via the North-South Motorway, Waterloo Corner Road and Robinson Road.

Upon arrival at the BAM Facility, graphite concentrate will be pneumatically conveyed into storage silos.

Reagent receival and storage

The caustic roast and purification process requires the use of chemical reagents. Reagents utilised in the purification process will be delivered to the site via tankers commonly used in chemical transport and transferred into appropriate tanks. The reagent storage area will be appropriately bunded to meet SA EPA requirements.

Details on the reagents used in the caustic roast and purification process are provided in Table 3-8.

Mechanical Shaping

Graphite concentrate is transported from the storage silos to the milling plant via the pneumatic material transfer system. Within the milling plant, graphite is crushed into smaller particles (micronisation) to then undergo the spheronisation process. Spheronisation involves gradual milling of the graphite flakes, followed by a series of cyclones and classifiers to produce multiple grades of spheronised graphite for purification.

Spheronised products are then pneumatically conveyed into silos for storage prior to further treatment in the purification process.

Fines Bagging

This mechanical shaping process produces graphite 'fines' (dust and smaller particles; typically smaller than 8 μm) which are not used further in the processing. Fines generated in the mechanical shaping process will be collected and stored in the fines silo. Bagged fines will be packaged as a separate product and loaded into containers for shipping.

Purification

The caustic roast and leach utilise both thermal and chemical processes to produce PSG. This approach eliminates the need for the use of hydrofluoric acid, while simultaneously avoiding the need for a very high temperature kiln process. Caustic roast can occur at a much lower temperature than thermal purification, which relies on the volatilisation of impurities. See Chapter 2 (Project Justification) further details in regard to the choice of the purification process.

The following outlines the purification process which comprises an acid leach, a caustic roast and leach process, and an acid leach process.

Acid Leach

Leaching of the output from mechanical shaping will first occur by adding sulfuric acid. Solids from this process are filtered to remove the water. Filtrate from this process is sent to the acid leach treatment plant for processing prior to being returned to the SA Water outfall channel (see Section 3.11 for further details). The solids are then mixed into a slurry in the repulp step prior to the next step.

Caustic Roast and Leach

Solids are mixed with sodium hydroxide and then heated in the caustic roast kiln. Hot solids discharge directly into the lump breaker and cooling screw feeder before being fed into the water leach tank.

The kiln will be heated using natural gas, with off gases scrubbed prior to release to atmosphere.

Leaching of the kiln solids will occur by the addition of demineralised water. Solids from this process are filtered to remove water. Filtrate from this process is sent to the caustic WWTP for processing prior to being returned to the SA Water outfall channel (see Section 3.11 for further details). The solids are then mixed into a slurry in the repulp step prior to the next step.

Acid Leach Process

Filter cake from the previous step will be repulped with demineralised water and mixed with sulfuric acid. The resulting slurry will be mixed at an elevated temperature before undergoing filtration and washing.

Filtrate will report to the acid WWTP (see Section 3.11), while the filter cake will report to repulp tanks.

The final product is then filtered one further time before being sent for drying.

Process water

Process water produced in both the caustic and acid purification stages will either be treated onsite through the process water treatment plant prior to return to the SA Water outfall channel, or recycled back to the purification process (see Section 3.11.2).

Product Drying and Bagging

After purification, final PSG product will be fed into a flash-drying process following treatment and purification. The flash dryer will be heated by natural gas with product pneumatically conveyed and cooled to the bagging plant feed silo with off gases sent to a dust collector to capture particulates.

Dried product will be transferred to a bagging plant to be bagged in bulka bags for packing and transport.

Processing chemicals

The purification process has been designed to eliminate the requirement for hydrofluoric acid (refer to Chapter 2 – Project Justification).

Reagents required by the purification process (see below) include sulfuric acid and sodium hydroxide, these will be stored on site in suitable tankage prior to distribution within the plant.

Reagents required in the process water neutralisation process include lime, limestone and carbon dioxide. These chemicals are added to the filtrates from purification, and resultant chemical by products are filtered and removed from site (if solids) or recycled back into the process (sodium hydroxide and condensate/water) if liquid.

Hazardous materials and chemical use and storage are summarised in Table 3-8.

Table 3-8: Hazardous materials and chemical use and storage

Chemical	Delivery	Storage	Storage locations	Use
Sodium hydroxide (NaOH)	Trucked to site, unloaded and stored.		Chemical storage, caustic roast and WWTP	Chemical reagent in caustic roast and leach process.
Sulfuric Acid (H_2SO_4)	Trucked to site and unloaded into acid storage tanks.		Acid leach and WWTP	Chemical reagent in acid leach process and in the demineralisation plant.
Lime	Hydrated lime will be trucked to site and transferred into a silo, from where it will be fed into a mixing tank, and then pumped to a storage tank and reticulated to the water treatment facility.			Lime will be used in WWTP.
Limestone	Limestone will be trucked to site and transferred into a silo, from where it will be fed into a mixing tank, and then pumped to a storage tank and reticulated to the water treatment facility.			Limestone will be used in WWTP.
Carbon Dioxide (CO_2)	Carbon Dioxide will be recovered from the process water treatment process and stored for re-use.			CO_2 will be used in the WWTP.
Mixed calcium and magnesium carbonate and trace silica aluminate & sodium silicate	N/A	Solid by-products from the WWTP are stored near the WWTP in segregated dry storage pens.		By-product from WWTP.
Calcium sulfate (gypsum) ($CaSO_4$)	N/A	Solid by-products from the WWTP are stored near the WWTP in segregated dry storage pens.		By-product from WWTP.

3.10.5 Quality Assurance and Management Systems

Renascor are developing a number of quality assurance and contingency systems to ensure the quality of product can be maintained at that required for the market and all regulatory requirements are met. These standards lay out minimum expectations of employees and contractors with respect to:

- Work health safety management
- Environmental operating requirements
- Environmental Management Systems aligning with AS14001: Environmental Management
- Reporting and performance requirements
- Audits and inspections
- Quality Management Plan aligning with AS/NZS 10005: Current – 'Quality Management Systems – Guidelines for Quality Plans and ISO 9001:2015 Quality Management Systems - Requirements
- Corrective and preventative action plans.

Further detail on the Environmental Management Plans specific to the Project can be found in Chapter 17 (Environmental Management Framework).

3.11 Process by-products

Process by-products of the Project include both liquids and solids. Process residues including calcium sulfate (gypsum), mixed calcium and magnesium carbonate, and mixed silica aluminate and sodium silicate are anticipated to be the main solid by-products of the PSG process, following process water treatment. In addition, the micronisation/spheronisation of graphite concentrate will result in graphite 'fines' which has the potential to be a by-product.

3.11.1 Source Water Treatment

Demineralised water

Incoming water from the Bolivar High Salinity Plant (HSP) will be treated in the demineralisation plant in the following process:

- Incoming HSP water will undergo pre-treatment via ultrafiltration (UF) for metal, solids and precipitate removal to ensure that feed water is suitable for desalination.
- Desalination of pre-treated feed water through Reverse Osmosis (RO) for the removal of bulk of dissolved salts.
- Polishing of RO water through an electro-deionization step to remove any trace dissolved salts.

Products from the RO process include solid by-products (see Section 3.11.2) and liquid waste (see Section 3.11.3).

3.11.2 Process water treatment

Treated process water from the Project is predominantly in the form of neutralised process water and brine produced by the demineralisation plant.

Caustic and acid process water streams will be treated onsite in dedicated acid and caustic process water treatment plants. This process is subject to licensing as a prescribed activity of environmental significance under Schedule 1 of the EP Act. The following describes the process water treatment process.

Caustic and process water treatment

The caustic process water treatment plant receives leachate from the caustic leach process. Carbon dioxide is added to treat the water. This process recovers sodium hydroxide (which is recycled into the caustic roast and leach process), clean water (condensate) which is recycled in the plant and by-products.

Products from the caustic process water treatment include solid by-products and liquid waste.

Solid by-products generated through the caustic process water treatment process will be filtered, stored in appropriate bunkers, and taken offsite by appropriately licenced subcontractors for beneficial reuse in industrial processes or to licensed facilities.

Treated process water will be returned to the SA Water outfall channel (see below).

Acid process water treatment

Acid process water generated from the acid leach process will be neutralised using hydrated lime, limestone and carbon dioxide recovered from the limestone process. Products include solid by-products and liquid waste (see below).

Solid by-products generated through the acid process water treatment process will be filtered, stored in bunkers, and taken offsite by appropriately licenced subcontractors for beneficial reuse in industrial processes or to licensed facilities.

The acid stream is filtered and neutralised prior to returning to the SA Water outfall channel.

Return of treated process water

Brine generated from the demineralisation plant and caustic and acid treated process water will be returned to the SA Water outfall channel (subject to environmental approvals and appropriate licencing).

Water from the SA Water outfall channel enters the coastal environment approximately 11 km north of the BAM Facility at the existing SA Water outfall at Freshwater Creek (see Figure 3-4).

The return of treated process water to the SA Water outfall channel is a prescribed activity of environmental significance under Schedule 1 of the EP Act and will be subject to licencing.

The return of treated process water to the SA Water outfall channel will be managed through a Discharge Criteria Management Plan (Appendix 18). The plan will detail the monitoring requirements for the treated process water return to the SA Water outfall channel against compliance criteria (to be set by EPA licence) and allow for adaptive management controls.

Return of treated process water to the SA Water outfall channel has been modelled under a range of scenarios with regard to flow (See Chapter 9). Baseline data for an upstream and downstream location from the outfall location has been collected since January 2023, with monitoring ongoing (See Chapter 9 for details and impact assessment). The modelling and baseline data will be used to set compliance criteria (for EPA licence).

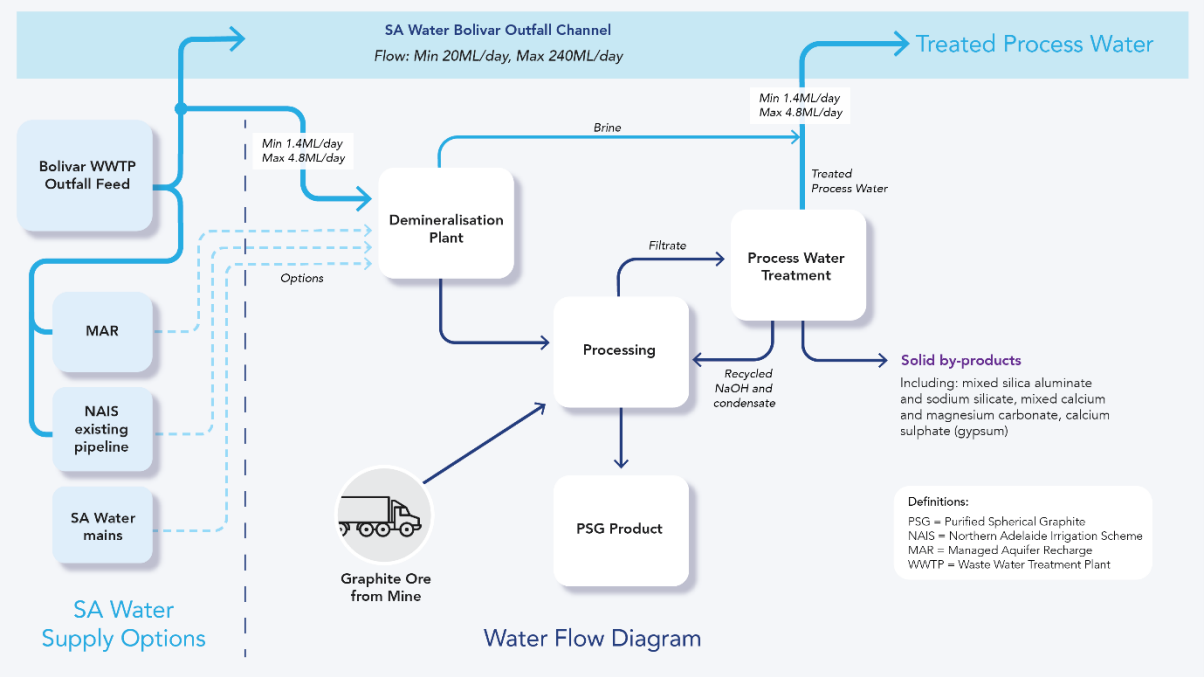


Figure 3-6: Water Flow Diagram

3.11.3 Solid process by-products

Solid by-products from process water treatment

Solid by-products are generated as a function of caustic and acid process water treatment. These include calcium carbonate, magnesium carbonate, calcium sulfate (gypsum), and mixed silica aluminate and sodium silicate.

As detailed above, solid by-products generated through the demineralisation process and the acid and caustic process water treatment process will be filtered, stored in appropriate bunkers, and taken offsite by appropriately licenced subcontractors for beneficial reuse in industrial processes or to licensed facilities.

Solid by-products are anticipated to be chemically neutral, and potentially have beneficial uses to third-party industrial processes subject to testing and classification. Initial investigations are underway to identify possible receivers of solid by-products from the Project in alignment with the waste management hierarchy. Under the waste management hierarchy, avoiding the waste generation is most preferable and with disposal of waste being least preferable.

Graphite Fines

Graphite fines are generated as a function of the micronisation/spheronisation process. Fines constitute graphite particles of a size below that required for the production of PSG. Graphite fines are a potentially valuable by-product and will be collected and packaged separately. Initial investigations are underway to identify possible third-party users of graphite fines.

3.11.4 Emissions

Dust

The processing buildings and materials handling systems for dry graphite will incorporate dust collection and containment systems to avoid fugitive emissions of graphite dust. This includes the following areas:

- Truck unloading points – The transfer of graphite concentrate from pressure tankers to onsite storage silos will be undertaken via pneumatic conveyor, and designed with a vent system to capture escaped dust in a bag house.
- Mechanical shaping building – Each of the mechanical shaping mills incorporate bag-type dust collectors at potential release points. In addition, the building housing the mechanical shaping plant, including the dust collectors, will be designed with negative pressure.
- Kiln feed systems – The kiln feed system will incorporate a bag-type dust collector at potential discharge points.
- Product bagging facility – Loading of dried PSG products into bulka bags will most likely be a robotic operation with minimal human interaction and include dust collectors at potential release points. In addition, the building will be designed with negative pressure.

Gaseous emissions

Gaseous emissions from the processing facilities are subject to the outcome of the engineering design and feasibility studies with the possibility for some or all plant components to be electric if gas is not viable.

In the event that the caustic roast kiln is gas fired, there will be gas from the combustion process. Gaseous emissions would also comprise process off-gases from the kiln, product dryer and steam boiler. Combustion gases and process off-gases are separated in an indirectly heated kiln.

Test work undertaken confirms the design of the kiln, product dryer and steam boiler off-gas chemistry can include appropriate treatment systems where applicable.

All burners used in the above equipment will incorporate burner management systems, where upset conditions in the burner will trigger alarm and/or shutdown of the equipment.

The processing buildings and materials handling systems for dry graphite will incorporate appropriate dust collection and containment systems to manage and mitigate dust emissions. This includes truck unloading points, mechanical shaping facility, kiln feed systems and the product bagging facility.

3.12 Other water management

An onsite wastewater service will be incorporated into the plant to process human wastewater generated onsite. As there is no connection to a common wastewater disposal service available within the Project site, wastewater from the onsite Wastewater Service (septic) will be removed to an appropriately licensed facility.

Wastewater from the workshop / wash pad, car parking area and other trafficked areas will be directed through appropriately designed industry standard oil-water separators prior to treatment and/or release. Separated oils and contaminants will be collected for removal to a licensed facility.

Boiler blowdown and chemical scaling will be sent to trade waste. Chemical wastes derived from the demineralised water treatment plan and WWTP will also be sent to trade waste.

3.13 Stormwater management

Key aspects of stormwater management for the Project will include:

- Raising ground levels on site by approximately 300 mm to be above the 1% AEP flood level.
- Diversion of stormwater around the site to prevent flooding (subject to existing or future capacity of drains and channels).
- Capture of runoff within the site to ensure all run off from the operational areas is collected for treatment and reuse and to prevent potential contamination from leaving the site.

Temporary measures to manage erosion and stormwater during the construction period will be implemented and detailed within an erosion and sediment control plan (within the CEMP) which will align with the Code of Practice for management of stormwater in the building and construction industry (SA EPA, 1999). Development of permanent stormwater management strategies will be covered in the operational sediment and erosion control plan (within the OEMP). See Sections 9.3 (Soils, Landform and Geology) and 9.4 (Surface Water and Groundwater) for further details and assessment of stormwater management.

3.14 Waste Management

As part of ongoing environmental management strategy, Renascor is exploring options for both reuse and recycling of process by-products, which has the potential to contribute to the beneficial reuse of industrial waste products.

Material streams generated from the Project include:

- Graphite fines (investigations are being conducted to identify options for reuse or on-selling)
- Solid precipitate from the water treatment processes (investigations are being conducted to identify options for reuse)
- RO brine and treated process water from the WWTPs
- Chemical waste from boiler blowdown and chemical cleaning
- Waste from oil water separator
- Construction and workshop waste (eg. excess materials, oily rags)

- Domestic waste from offices, ablutions, change rooms etc.
- Septic wastewater (no connection to mains sewer available onsite)

Waste management for the Project will be undertaken in accordance with the waste management hierarchy (Avoid, Minimise, Reuse, Recycle, Recover, Treatment, Disposal), which underpins the objectives of the Environment Protection (Waste to Resources) Policy 2010 and in line with the South Australian Waste Strategy (EPA SA, 2020).

A Waste Management and Minimisation Strategy has been developed to manage waste in accordance with the waste management hierarchy (see Appendix 17 for further details).

3.15 Workforce and Working Hours

3.15.1 Workforce

The Project will create highly skilled, high-tech engineering and manufacturing industry jobs within SA including:

- One hundred full time construction jobs, growing to a workforce of over two hundred at the peak of construction.
- Approximately one hundred staff at commencement of operation, increasing up to two hundred ongoing, full time jobs for the life of the proposed development.

3.15.2 Working hours

Construction activities will occur between 7 am and 7 pm, Monday to Saturday. Activities outside of these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d) and EP Act.

Operations will run 24 hours a day, 7 days a week.

4 Statutory Framework

4.1 Introduction

This chapter identifies the relevant legislative requirements for the Project, including approvals and permits or licences for specific activities. It describes the key legislation and statutory and non-statutory instruments relevant to the Project, and identifies the relevant policies, standards, guidelines and Codes of Practice that will be applied to Project activities.

Assessment of the Project against the Planning and Design Code (the Code), State Planning Policies (SPPs) and Environment Protection Policies (EPPs) is provided in Chapter 5 (Planning Assessment).

4.2 State Environmental Assessment and Approvals Process

4.2.1 Impact Assessed Development

Under Section 108 (1)(c) of the PDI Act, the Minister for Planning may declare that a development falls within the category of 'impact assessed development' (not being restricted development). The Minister may make this decision if they believe it is necessary or appropriate for proper assessment of the proposal and must take into consideration the principles as outlined in section 27 (2) of the *Planning, Development and Infrastructure (General) Regulations 2017*, including but not limited to (a) the character of the receiving environment; and (b) the potential social, economic and environmental impacts of the development or project.

Renascor applied to the Minister for Planning (Minister) for the Project to be declared an 'impact assessed development' on 14 September 2022 as it was considered that:

- Impact assessment was the most appropriate assessment process available to ensure a single, holistic, integrated and streamlined assessment of the proposal by all relevant authorities, agencies and stakeholders.
- Impact assessment would provide the greatest level of certainty for Renascor regarding the process to be undertaken and timeframes involved, which would be of benefit to project planning, construction schedules and investment pathways.
- The BAM Facility is of a scale and intensity not anticipated by the standard development assessment pathways.

Impact assessed development status was subsequently granted by the Minister and declared by notice published in the Government Gazette and on the SA Planning Portal on 8 December 2022. The declaration triggers a State-run assessment process with opportunity for public comment before any decision is made on whether the proposed development warrants approval.

4.2.2 Scoping Development Application and EIS Assessment Requirements

Following the declaration of impact assessed development, a Scoping Development Application (DA) for the Project was formally submitted to the Minister on 9 December 2022.

The purpose of the Scoping DA was to examine the potential impacts arising from the Project which may require assessment through the impact assessment process, and to articulate the extent to which

impacts were already known or able to be predicted with a high degree of confidence. Technical studies were undertaken by appropriately qualified professionals to contribute to the establishment of baseline data, from which the environmental, social and economic effects of the Project could be predicted to understand the scale, intensity and duration of impacts. The Scoping DA included a description of the Project to the extent that it was known at the time of submission, and a preliminary assessment of the expected, predicted or potential effects of the Project on environmental, economic and social values, and how those effects were anticipated to be managed.

The Scoping DA was referred to the State Planning Commission (SPC) to assist in the development of project-specific Assessment Requirements for the preparation of the EIS. Liaison was undertaken between Renascor, consultant impact assessment practitioners and State Government to refine the scope and level of detail assigned to Assessment Requirements.

The formal Assessment Requirements for the preparation of the EIS were released by the SPC on 30 March 2023. The Assessment Requirements set out the major issues associated with the Project, the degree of their significance and outline the way in which those issues should be addressed through impact assessment (Appendix 3)

This EIS has been prepared in accordance with the statutory requirements expressed through Practice Direction 17 and addresses the formal Assessment Requirements produced by SPC and issued to Renascor on 30 March 2023.

EIS Assessment Process

The PDI Act and Assessment Requirements ensure that proponents of impact assessed developments prepare an EIS which is clear, detailed and comprehensive in its analysis of the proposal. This includes analysis of the physical, biological and socio-economic environment in which it will be located, the likely impacts of the proposal and how those impacts will be addressed. An overview of the structure of the EIS and the assessment and approval process is provided in Chapter 1 Introduction.

The assessment process for the Project will commence upon submission of this EIS to the SPC. The EIS will be exhibited by the State Government for public comment for a period of at least 6 weeks (30 business days). The Minister must refer the EIS to the City of Salisbury and relevant government agencies which may include the Environment Protection Authority (EPA SA), SA Water, the Native Vegetation Council (NVC), the Department of Infrastructure and Transport and the Department for Energy and Mining (DEM) during this period.

The Minister must ensure that copies of the EIS are made available for public inspection in a place or places nominated by the Minister and invite interested persons to make written submissions on the EIS within the defined timeframe (e.g. minimum 30 business days). All written submissions received will be provided to Renascor for development of a formal response (Response Document). The Response Document will address the submissions received and provide any relevant additional or updated information in response to the issues raised. The Response Document may include amendment to the EIS as a result of consultation, or indicate changes to the original proposal in response to issues raised. Further public consultation may be required if substantial changes are proposed.

The EIS (including the Response Document) will then be assessed by the SPC and an Assessment Report provided to the Minister for a decision on whether or not to approve the development.

Under Division 2, Subdivision 4 of the PDI Act, the Minister is the final decision maker for impact assessed developments. As outlined in Practice Direction 17, when making the final determination of whether to approve the Project and any conditions that will apply, the Minister must have regard to:

- The State Planning Policies,
- Regional Plans, including the 30-Year Plan for Greater Adelaide,
- Provisions of the Planning Rules and the Regulations,
- the Building Code of Australia (if relevant),
- Where development involves or is for the purposes of a prescribed activity of environmental significance, the EP Act including the objects, General Environmental Duty and relevant EPPs,
- The EIS, Response Document and the SPC's Assessment Report, and
- Where relevant, any other government policy and/or legislation.

The Assessment Report and the Response Document will be published on the SA planning portal once the Minister has made a decision on the development.

4.3 Consistency of the Project with State Government Policy

Practice Direction 17 requires that the EIS include an assessment of the consistency of the expected effects of the Project with:

- Any relevant SPP,
- Any relevant Regional Plan(s), including the 30-Year Plan for Greater Adelaide,
- The Planning and Design Code, and
- Any matters prescribed by the Regulations.

4.3.1 State Planning Policies (SPPs)

SPPs are the highest order policy document in the South Australian planning system and must be considered in the preparation of an EIS to accompany an Impact Assessed development application.

The SPPs provide guidance regarding the Government's strategic directions for land use planning. In some instances, there may be competing priorities or conflict between SPPs. Assessment must be balanced, having regard to contemporary knowledge and local circumstances.

An assessment of the consistency of the Project with the SPPs is provided in Section 5.4 (Assessment Against State Planning Policies).

4.3.2 30-year Plan for Greater Adelaide

Section 64 of the PDI Act provides for South Australia to be divided into planning regions for which regional plans must be prepared that are consistent with relevant SPPs. These regional plans provide a long-term vision for a region to guide land use planning over a 15 to 30-year period, with a particular focus on the integration of land use, transport infrastructure and the public realm.

An assessment of the consistency of the Project with the principles and policies expressed through the 30YPGA is provided in Section 5.5 (Assessment Against 30-Year Plan for Greater Adelaide).

4.3.3 Planning and Design Code

The Planning and Design Code (the Code), established under the PDI Act, applies to all of South Australia and provides the primary metrics against which development proposals are assessed. Developments declared as being Impact Assessed under Section 108(c) of the Act are required to be assessed against the Code to determine the extent to which developments are consistent with the Code. A detailed assessment of Renascor's BAM Facility is provided in Chapter 5 (Planning Assessment).

4.4 Environment Protection Act 1993 and policies

The BAM Facility will involve the carrying out of prescribed activities of environmental significance, as described in Schedule 1 of the *Environment Protection Act 1993* (EP Act). The EIS must contain an assessment of the extent to which the expected, predicted or potential effects of the Project are consistent or at variance with:

- The objects of the EP Act,
- The general environmental duty under that Act, and
- Relevant environment protection policies under that Act.

These activities, and the relevant Schedule 1 clauses, are described in this section.

4.4.1 General Environmental Duty

The EP Act is the regulatory framework for pollution management and general environmental protection in South Australia. The objective of the EP Act is to protect the environment, promote the principles of ecologically sustainable development (ESD) and ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment, having regard to ESD principles.

The EP Act establishes a general environmental duty of care for persons and entities undertaking development activities and prescribes activities of environmental significance that require approval and licensing under the EP Act, in addition to EPPs developed for specific issues based around standardised and endorsed sampling, testing and monitoring methodologies derived from relevant Guidelines.

4.4.2 Environment Protection Policies (EPPs)

A number of EPPs are established under the EP Act, each of which set out requirements, standards, goals and guidelines relating to matters such as air quality, noise, water quality and hazardous materials. The EPPs relevant to the Project are discussed below.

Environment Protection (Air Quality) Policy 2016 (Air Quality EPP)

The main objective of the Air Quality EPP is to protect air quality and minimise the emission of air pollutants. The Air Quality EPP was updated in October 2022 to align with the National Environment Protection Measure (NEPM), and includes statutory limits on the emission rates, emission concentrations and cumulative concentrations of air pollutants. The impact on sensitive receivers of air pollutants is measured according to the *Evaluation Distances for Effective Air Quality and Noise Management* (EPA SA, 2023) (Evaluation Distances).

The Air Quality EPP is relevant to aspects of the Project relating to the emission of off gases from fuel burning activities, the potential for fugitive dust emissions, and the potential for emissions of odour from the process. (Refer Chapter 11 (Amenity and Environmental Quality).

Environment Protection (Water Quality) Policy 2015 (Water Quality EPP)

The Water Quality EPP aims to achieve the sustainable management of water and the protection of the environmental values of water, particularly by controlling the emission of pollutants to surface, ground and marine waters.

The Water Quality EPP is relevant to the Project as pertaining to the return of treated process water to the SA Water outfall channel, potential impacts of returning treated process water to the receiving environment, and stormwater outflow from the site. (Refer Chapter 9 (Physical Environment)).

Environment Protection (Commercial and Industrial Noise) Policy 2023 (Noise EPP)

The Noise EPP provides a statutory framework for the assessment of noise issues, in particular the emission of noise from premises and its impact on nearby sensitive receivers, both natural and built. The emission of noise is considered a form of pollution and is controlled as such, with limits on the emission of noise determined by development type and the sensitivity of receivers, and measured according to the Evaluation Distances.

The Noise EPP is relevant to the Project as pertaining to the emission of noise from operations, including noise impacts from increased traffic movements. (Refer Chapter 11 (Amenity and Environmental Quality)).

Environment Protection (Waste to Resources) Policy 2010 (Waste to Resources EPP)

The objective of the Waste to Resources EPP is to achieve sustainable waste management by applying the waste hierarchy consistently, in combination with the principles of ESD.

The Waste to Resources EPP is relevant to waste management aspects of the Project, in particular the generation of solid by-products from ongoing operations. (Refer Sections 3.14 and 14.6).

4.4.3 Prescribed Activities of Environmental Significance

Schedule 1 of the EP Act prescribes particular activities as being of environmental significance, requiring licensing under the EP Act. Prescribed activities of environmental significance are also reflected in the provisions requiring referral of proposals to agencies under Part 9.1 of the Code, and Schedule 9 of the Regulations. The potential prescribed activities of environmental significance pertaining to the Project are listed in Table 4-1 and are further discussed in Section 3.14 (Waste Management), Section 4.4 (Environment Protection Act 1993 and policies), Chapter 9 (Physical Environment), Chapter 10 (Biological Environment), Chapter 11 (Amenity and Environmental Quality),

Chapter 12 (Social and Economic Impact), Chapter 14 (Climate Change and Resource Efficiency), Chapter 15 (Hazard and Risks) and Chapter 17 (Environmental Management Framework). Figure 4-1 shows the location of these activities within the site.

Table 4-1: Prescribed Activities of Environmental Significance (EP Act, Schedule 1)

Category	Specific Activity	Relevance to the Project
Section 1 – Petroleum and Chemical	(2) Chemical Works The conduct of— Works with a total processing capacity exceeding 100 tonnes per year involving either or both of the following operations: Manufacture (through chemical reaction) of any inorganic chemical, including sulphuric acid, inorganic fertilisers, soap, sodium silicate, lime or other calcium compound; Manufacture (through chemical reaction) or processing of any organic chemical or chemical product or petrochemical, including the separation of such materials into different products by distillation or other means.	The purification circuit of the Project involves the use of caustic and acidic reagents to remove impurities from micronised and spheronised PSG through a caustic roast, leach and acid leach process. After use in the purification circuit, reagents which cannot be recovered and re-used in the process are treated in the process water treatment plant through the addition of neutralising chemicals. Solid precipitates are produced. Sodium silicate and calcium compounds (in addition to other non-listed substances) are produced as waste products of caustic and acidic process water treatment. Investigations are underway into the potential beneficial reuse of solid by-products by compatible industries. (See Section 3.14 – Waste Management).
Section 3 – Resource Recovery, Waste Disposal and Related Activities	(4) Wastewater Treatment The conduct of wastewater treatment works, being sewage treatment works, a CWMS, winery wastewater treatment works or any other wastewater treatment works with the capacity to treat, during a 12 month period— In the case of works located wholly or partly within a water protection area—more than 5 megalitres of wastewater; or In the case of works located wholly outside of a water protection area—more than 50 megalitres of wastewater.	Water drawn from the SA Water Outfall Channel and desalinated through the Demineralisation Plant (see Section 8 (6a) *Desalination Plants* below), is classified as wastewater according to the Water Quality EPP. Process water will report to the caustic and acid process water treatment plant, which will chemically treat up to 4.8 ML/day of process water through the addition of neutralising chemicals. Water and caustic will be recycled through the process to the greatest extent practicable. (See Section 3.11 - Process by-products)
Section 7 – Materials Handling and Transportation	(3) Crushing, Grinding or Milling Processing (by crushing, grinding, milling or separating into different sizes by sieving, air elutriation or any other manner) of— Rock, ores or minerals at a rate in excess of 1 000 tonnes per year.	Mechanical shaping (micronisation and spheronisation) of graphite concentrate by grinding and milling processes at a rate of approximately 75,000 tonnes of graphite concentrate entering the process per year during Stage 1 operations, expanding to approximately 150,000 tonnes per year during Stage 2 operations. (See Chapter 3 – Description of the proposed Project).
Section 8 – Other	(2) Fuel Burning The conduct of works or facilities involving the use of fuel burning equipment, including flaring (other than flaring at petroleum production, storage or processing works or facilities that do not have a total storage capacity or total production rate exceeding the levels respectively ratified in clause 1(5)) or incineration, where the equipment alone or	Caustic roast kilns, steam boilers and flash-dryers are likely to be gas-fired. Possibility that some dust may be produced through kiln and drying processes which is managed through appropriate air emissions scrubbing equipment and dust mitigation equipment.

Category	Specific Activity	Relevance to the Project
	in aggregate is capable of burning combustible matter— At a rate of heat release exceeding 5 megawatts; or At a rate of heat release exceeding 500 kilowatts and the products of combustion are used— To stove enamel; or To bake or dry any substance that on heating releases dust or air impurities.	(See Chapter 3 – Description of the proposed Project).
	(6a) Desalination Plants The conduct of a desalination plant. In this subclause— *Desalination Plant* means a plant for the production of desalinated water that has a production capacity exceeding 200 kilolitres of desalinated water per day, and includes— An underground desalination plant; and A number of underground desalination plants within any 1 square kilometre area that, in aggregate, have a production capacity exceeding 200 kilolitres of desalinated water per day, But does not include— A plant that disposes of all of its wastewater to a wastewater management system that is the subject of a licence; or A plant that produces 2 megalitres or less of wastewater per year.	The proposed development will include a demineralization Plant with a maximum capacity of 4.8 ML/d. The desalination plant will treat raw source water to produce desalinated water for use in the purification circuit (See Chapter 3 – Description of the proposed Project).
	(7) Discharges to Marine or Inland Waters The conduct of operations, other than a desalination plant referred to in subclause (6a), involving discharges into marine waters or inland waters where— The discharges— Raise the temperature of the receiving waters by more than 2 degrees Celsius at any time at a distance of 10 metres or more from the point of discharge; or Contain antibiotic or chemical water treatments; and The total volume of the discharges exceeds 50 kilolitres per day.	Treated process water is to be returned to the SA Water outfall channel, which contains other wastewater from a number of other sources and discharges to the marine environment approximately 11 km north of the subject site, at Freshwater Creek. Treated process water from the BAM Facility is predicted to be up to 4.8 ML/day and thus will exceed the 50 kL/d trigger in the EP Act. (See Chapter 3 – Description of the proposed Project). Raw water is sourced from the SA Water High Salinity Plant (HSP). Raw water is desalinated onsite, used in the purification circuit, and treated before being returned to the SA Water outfall channel, resulting in no change to the volumetric flow of the SA Water outfall channel. The quality of outfall water is addressed in Chapter 9 – Physical Environment.

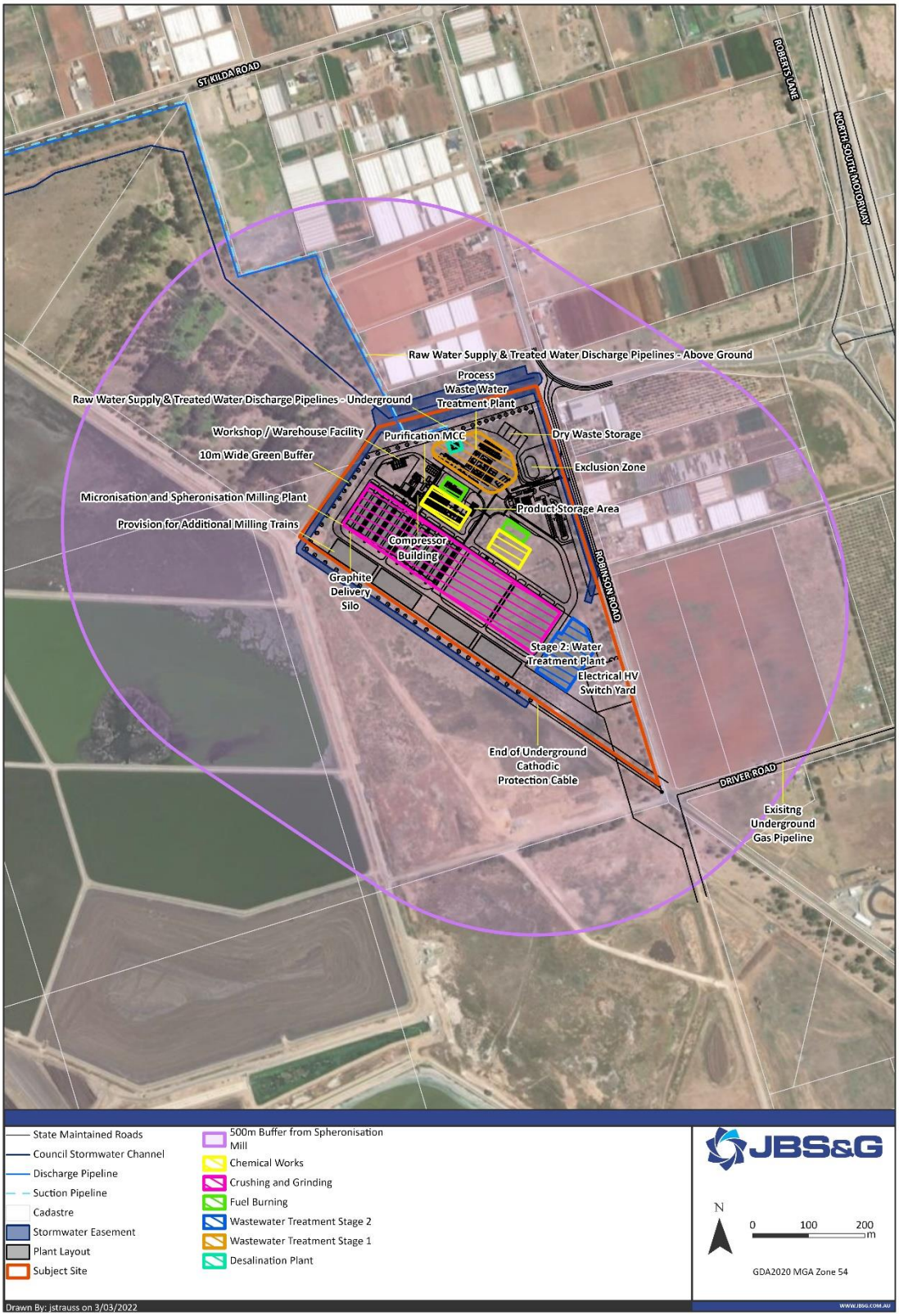


Figure 4-1: Location of Proposed Prescribed Activities of Environmental Significance onsite

4.5 Other Relevant South Australian Legislation and Approvals

In addition to the legislation discussed in Sections 4.4.1 and 4.4.2, the Project will require additional approvals under other relevant legislation. The list of secondary approvals and other legislative requirements identified in Table 4-2 is not a conclusive or exhaustive list and may change subject to detailed engineering design. Acts under which no specific approval is required are also listed.

Table 4-2: Other South Australian Legislation that may apply

Legislation	Objective	Relevance to the Project	Approvals / Legislative Requirements
Aboriginal Heritage Act 1988	To provide protection for all Aboriginal sites, objects or remains, whether known or unknown	All heritage sites, objects or remains are afforded blanket protection under this Act, whether known or unknown.	No sites, objects or remains may be damaged, disturbed or interfered with without appropriate approval.
Climate Change and Greenhouse Emissions Reduction Act 2007	To assist in achieving ecologically sustainable development in the State by addressing issues associated with climate change, in particular through the reduction of greenhouse gas emissions and an increase in renewable energy usage.	Provides emissions reduction targets for the State.	No specific approvals required. Refer to Chapter 14 (Climate Change and Resource Efficiency).
Dangerous Substances Act 1979 Dangerous Substances (General) Regulations 2017	To regulate the keeping, handling, transporting and the conveyance, use, disposal and quality of dangerous substances, administered with respect to the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).	The Project requires the keeping, handling and use of dangerous substances including acid and caustic reagents.	Licences will be obtained as required, as detailed in Chapter 15 (Hazard and Risks).
Electricity Act 1996 Electricity (General) Regulations 2012	To regulate the electricity supply industry, and specify the requirements for vegetation clearance, building and equipment separation distances and safety protocols around transmission lines.	Existing overhead transmission lines exist on the eastern boundary of the Project site.	Elements of the BAM Facility built in proximity to the transmission lines will require appropriate declarations and permits under the Electricity Act.
Fire and Emergency Services Act 2005	Establishes the South Australian Fire and Emergency Services Commission and provides for the continuation of a metropolitan fire and emergency service, a country fire and emergency service, and a State emergency service. The FES Act provides for the prevention, control and suppression of fires and for the handling of certain emergency situations.	There is a duty to prevent or inhibit the outbreak of fire through the creation and maintenance of fire breaks, vegetation management and observation of fire-safe work practices. The subject site of the BAM Facility is within the Adelaide Mount Lofty Ranges Bushfire Management Area (AMLR BMA)	Permits may be required in relations to fire bans and hot work during construction. See Chapter 15 (Hazard and Risks).

Legislation	Objective	Relevance to the Project	Approvals / Legislative Requirements
Heavy Vehicle National Law (SA) Act 2013	To implement a national scheme for facilitating and regulating the use of heavy vehicles supported by State specific regulations. The HVNL prescribes mandatory standards for heavy vehicles (all vehicles over 4.5 tonnes) using public roads.	Heavy vehicles will be used throughout the life of the Project, at all stages including construction and operations.	Compliance with the HVNL and associated guidelines and regulations, as necessary.
Landscape South Australia Act 2019	To provide for a range of aspects of natural resources management.	The Project includes activities that affect surface water and groundwater resources and the management of pest plants and animals.	Permits under the LSA Act will be obtained where required.
Native Title (South Australia) Act 1994	To provide for the recognition and protection of native title.	Not applicable. The Project is located on freehold land which has extinguished native title rights and interests.	None
Native Vegetation Act 1991 Native Vegetation Regulations 2017	To provide for the management and clearance of native vegetation on private and public land in South Australia.	The Project includes the clearance of native vegetation.	The Project will require a Native Vegetation Clearance permit to clear native vegetation. The outcome of ecological surveys and associated desktop investigations are presented in Chapter 10 (Biological Environment).
National Parks and Wildlife Act 1972	To establish a system of conservation reserves in South Australia and provides protection for native plants and animals.	The NPW Act applies to the Project site for the purposes of determining protected species of plant or animals, which influences requirements under the NV Act discussed above. Further information about protected areas is provided in Chapter 8 (Land Use and Site Conditions).	No specific approval is required under the NPW Act, however there is a general duty to comply with the requirements of the Act.
Public Health Act 2011 Public Health (Wastewater) Regulations 2013	To promote and provide for the protection of the health of the public of South Australia, through reducing the incidence of preventable illness, injury and disability from a variety of sources.	The Project will include the installation of an onsite wastewater treatment service.	The Project will require a Wastewater Works Approval under Part 4 of the WW Regulations to operate an onsite wastewater service. The Wastewater Works Approval will form part of Renascor's application for Building Consent.
Road Traffic Act 1961	To provide for nationally consistent road rules, vehicle standards, vehicle mass and loading requirements, the installation, use and	The Project will use existing Local and State road networks for the transport of equipment, materials and products.	No specific approvals under the Road Traffic Act are required for the Project, however a general duty exists to comply with the requirements of the Act.

Legislation	Objective	Relevance to the Project	Approvals / Legislative Requirements
	maintenance of traffic control devices, and the closing of roads for traffic management, and other purposes.		(See Chapter 11 – Amenity and Environmental Quality).
Work Health and Safety Act 2012 Work Health and Safety Regulations 2012	To promote and provide for the health, safety and welfare of persons at work and the elimination, minimisation or mitigation of risks.	Renascor have a duty to ensure that the workplace is safe and that employees and the public are protected from injury and risks to health and welfare.	Health and safety management aspects of the Project are discussed in Chapter 17 – Environmental Management Framework.

4.6 Commonwealth Legislation and Policies

4.6.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation regulating environmental matters. Under the EPBC Act, any action that is likely to have a significant impact on Matter of National Environmental Significance (MNES) is considered a 'controlled action' and requires approval from the Commonwealth Minister for the Environment and Water under Part 9 of the EPBC Act.

Provisions under the EPBC Act entitle proponents to undertake a self-assessment of the impacts of a proposed development on MNES to determine if a referral to the Commonwealth Government will be required.

EPBC Self-Assessment

Renascor has conducted a self-assessment for the Project in accordance with the Matters of National Environmental Significance, Significant impact guidelines 1.1 (Department of Environment (DoE), 2013) which considered:

- Potential impacts on MNES
- Measures to avoid or reduce potential impacts on MNES
- Whether impacts on MNES are likely to be 'significant' (as defined in DoE (2013)).

MNES defined in the EPBC Act which are potentially relevant to the proposed development include:

- Listed threatened species and Ecological Communities
- Listed migratory species.

The self-assessment was conducted in August 2022 via a desktop investigation using the EPBC Act Protected Matters Reports generated though the Protected Matters Search Tool (PMST). Additional information (where required) was sourced from the Biological Databases of South Australia (BDBSA) (DEW 2022b, accessed 9 May 2022), the Atlas of Living Australia (ALA) (ALA 2022) and the species profile and threats database (DCCEEW 2022). The desktop investigation was supported by an in-field ecological survey undertaken by Ecosphere Ecological Solutions (Ecosphere) (Ecosphere 2022 – see Appendix 9).

Two search areas were defined for the purpose of the self-assessment, which considered potential impacts to MNES within a 5 km radius of both the site of the BAM Facility, and the outlet of the SA Water Outfall Channel at Freshwater Creek.

Self-Assessment Process and Outcome

Based on the ecological assessment and desktop investigations undertaken, the self-assessment concluded that the Project is not likely to have a significant impact on any MNES, and is therefore not classified as a controlled action requiring approval under Part 9 of the EPBC Act.

The results of the self-assessment were presented by Renascor and JBS&G to representatives from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 28 February 2023. On 3 March 2023, DCCEEW wrote to Renascor acknowledging the presentation and outcomes of the self-assessment, including acknowledging the self-assessment conclusion that the Project would not need to be referred under the EPBC Act. DCCEEW recommended that we retain a copy of the self-assessment as a record of why the Project was not referred.

4.6.2 Other Commonwealth legislation

The purpose and objectives of other Commonwealth legislation that may be relevant to the Project is discussed in Table 4-3. The implications of these Acts for the Project are addressed where relevant throughout the EIS.

Table 4-3: Other Commonwealth Legislation that may apply

Legislation	Objective	Relevance to the Project	Approvals / Legislative Requirements
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	To preserve areas and objects under threat which are of particular significance to indigenous cultural tradition.	The registered heritage site within the Project area has been endorsed under State heritage legislation.	None.
Airspace Act 2007 Civil Aviation Act 1988	To outline the Commonwealth Government's policy with respect to classification, designation, administration and management of Australian-administered airspace, including aviation safety.	The BAM Facility is located within the controlled lighting zone around the Edinburgh RAAF Base. The possibility exists that aircraft may be present in the vicinity of the subject site.	Potential sources of distraction, glare, confusion or danger to aviation from lighting or other built assets are addressed through the relevant Planning provisions (See Building Near Airfields Overlay, Defence Aviation Area Overlays and Concept Plan 81). The Project will obtain permits if required.
National Greenhouse and Energy Reporting Act 2007	To establish a national framework for Australian corporations to report greenhouse gas emissions, reductions, removals and offsets, and energy consumption and production. The objectives of the NGER Act are administered through the National Greenhouse and Energy Reporting Scheme (NGERS).	A range of Project construction and operational activities will involve the emission of greenhouse gases.	Emissions will be reported under the NGERS as required.
Native Title Act 1993	To provide for the recognition and protection of native title.	Not applicable. The Project is located on freehold land which has extinguished native title rights and interests.	None.

4.7 Non-Statutory Frameworks, Strategies and Designs

The following non-statutory frameworks have been considered in the context of the BAM Facility as follows.

4.7.1 Critical Minerals Strategy

In 2022 the Australian Government released the Critical Minerals Strategy with a vision that:

> *By 2030, Australia is a global critical minerals powerhouse. We are integral to international critical mineral supply chains and technologies crucial to the global economy.*

Critical minerals are essential resources for the functioning of modern technologies, economics or national security, for which supply chain disruption risks have been identified. Graphite has been identified as a critical mineral due to its use in lithium ion batteries to support the growing renewable energy sector among other aspects (Refer Chapter 2 (Project Justification)).

4.7.2 City of Salisbury Strategic Growth Framework

The City of Salisbury City Plan 2035 includes a critical action to develop a comprehensive 25-year Growth Framework for the land west of Port Wakefield Road (Holmes Dyer 2022). The *City of Salisbury Strategic Growth Framework: Waterloo Corner and Bolivar Corridor* (SGF) aims to articulate a pathway toward supporting the orderly and sustainable redevelopment of the areas identified.

The Project occurs within the study area of the SGF. The EIS has been developed with regard to the objectives and principles of land use planning, and strategic ambitions outlined in the SGF. Further assessment against the SGF is provided in Chapter 16 (Design Quality).

4.7.3 Crime Prevention Through Environmental Design

Crime Prevention Through Environmental Design (CPTED) is a strategy that focuses on utilising the planned and designed structure of cities and neighbourhoods to discourage criminal behaviour. CPTED aims to foster conditions, whether real or perceived, in which the potential costs of committing criminal activity are greater than the likely benefits. This is achieved through encouraging and creating environmental and social conditions that:

- Maximise the risk of detection, challenge and apprehension to offenders,
- Maximise the effort (time, energy and resources) required to commit crime,
- Minimise the actual or perceived benefits of criminal activity (removing, concealing or minimising crime attractors and rewards), and
- Minimise excuse making opportunities by removing conditions that facilitate rationalisation of criminal or antisocial behaviour.

There are two ‘generations’ of CPTED Principles, each employing four key strategies which may be applicable to a project. First generation CPTED strategies are territorial re-enforcement, natural or

passive surveillance, space and activity management, and access control. Second generation CPTED strategies are social cohesion, community culture, connectivity, and threshold capacity.

The spatial and built environment aspects of CPTED are applied through the Code.

Renascor's BAM Facility is assessed against the relevant CPTED principles in Chapter 16 (Design Quality).

4.7.4 Environmentally Sustainable Design

Environmentally Sustainable Design refers to a schedule of product and material Specifications published by the Government of South Australia (Department for Infrastructure and Transport (DIT) 2023). The Environmentally Sustainable Design Specifications are intended to be used as a guide by Project teams for fit-out and refurbishment of buildings and spaces.

Renascor's Environmentally Sustainable Design Strategy and targets are outlined in Chapter 16 (Design Quality).

4.7.5 Universal Design

Universal Design (UD) refers to various building, equipment and material standards intended to ensure consistent application of construction and management practices to ensure inclusive, safe and accessible buildings, workplaces, public spaces, homes, transport and products.

UD principles and guidelines are incorporated through the Building Code, the Planning and Design Code and relevant guidelines and legislation, including workplace health and safety. Renascor is committed to adhering to the principles of UD through the development of the BAM Facility.

4.7.6 Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) is an approach to urban planning and design that integrates the management of the water cycle into the land use and development process. The objectives of WSUD are to avoid and mitigate the undesirable effects of urban development on surface water and groundwater, including runoff volume and velocity, pollution and groundwater impacts. WSUD strategies and objectives are integrated into the South Australian planning system and are broadly captured through the Planning and Design Code.

Renascor's BAM Facility has regard to WSUD, integrating water-sensitive design throughout the Project development process and design. WSUD is addressed throughout the EIS where applicable, including Chapter 5 (Planning Assessment), Chapter 16 (Design Quality) and Chapter 11 (Amenity and Environmental Quality).

5 Planning Assessment

5.1 Introduction

This chapter provides an assessment of Renascor's BAM Facility against relevant State Planning Policies (SPPs) and the State Planning Strategy, the 30-Year Plan for Greater Adelaide (30YPGA) (DPTI, 2017), and the Planning and Design Code (the Code). Spatial analysis has been undertaken to support the planning assessment utilising information compiled into a customised filterable digital portal developed utilising publicly available spatial data. This enabled various mapping layers (e.g. base mapping, topography, project components, infrastructure, native title, environmental investigations and studies, land ownership) to be presented, queried and analysed with relation to data contained within the South Australian Property and Planning Atlas (SAPPA). This approach enables the Project to be directly viewed within its statutory and spatial context at a level of detail which surpasses the use of the SAPPA in isolation.

5.2 Summary of Key Planning Issues

The formal Assessment Requirements issued by SPC to guide the development of the EIS outline the following key environmental and social aspects to be detailed within the EIS:

- Interface / land use impacts noting proximity of the site to existing food production / horticultural / agricultural activities, commercial operations, dwellings and the St Kilda township.
- Impacts to the local community and economy considering the Salisbury LGA and potential for job creation.
- Visual impact including design and appearance of the facility, and alteration to the existing landscape character.
- Air quality impacts including dust and emissions during construction and operation, noting the development is likely to trigger prescribed activities of environmental significance including Chemical Works (as defined by Schedule 1 of the EP Act).
- Noise impacts including industrial equipment and heavy vehicle movements.
- Impacts on soil and groundwater quality including spills of chemicals and waste management.
- Impacts on terrestrial, coastal and marine flora and fauna (in particular, bird species) from the clearance of native vegetation and location of the site proximal to sensitive coastal / marine environments and protected areas including Winaityinaityi Pangkara / Adelaide International Bird Sanctuary.
- Stormwater management and flood mitigation with regard to existing surface water movements and treated process water being returned to the SA Water outfall channel impacting on marine water quality.
- Traffic management and impact on existing traffic networks during construction and operation.
- Cultural heritage impacts with respect to known Aboriginal heritage site and proximity to the coast.

5.3 Assessment Conclusions

Renascor's BAM Facility has been assessed as being consistent with the objectives of the applicable State Planning Policies. Impacts to adjacent sensitive receptors and receptors in the broader locality are assessed in the specific impact assessment chapter(s) shown below in Table 5-1.

Table 5-1: Impact Assessment Chapters

Aspect	Chapter
Land Use and Site Conditions	8
Physical Environment	9
Biological Environment	10
Amenity and Environmental Quality	11
Social and Economic Impact	12
Cultural Heritage	13
Climate Change and Resource Efficiency	14
Hazard and Risks	15
Design Quality	16

The Project is consistent with the objectives and policies of the 30YPGA, which is the relevant Regional Plan to the Project. Assessment against the Targets and Policies of the 30YPGA is provided in Table 5-5.

The BAM Facility is located within the Rural Horticulture zone, with ancillary infrastructure elements assessed within the EIS (water intake and outfall pipelines) extending into the adjacent Infrastructure zone. Whilst of a scale and intensity not envisaged by the provisions of the Rural Horticulture zone, the Project is not significantly at variance with the Desired Outcomes or Performance Outcomes of the zone. Water supply infrastructure is ancillary to an industrial development and installed entirely within a single landholding.

The Project is able to satisfy the majority of Desired Outcomes and Performance Outcomes of the relevant General Development Policies (GDPs) identified through Part 4 of the Code. Where gaps exist, these are considered highly likely to be able to be addressed through detailed plant design, which is ongoing and retains flexibility to respond to the findings of the impact assessment. Aspects of the Project which are at variance with the provisions of the Code are able to be effectively managed, as demonstrated by impact assessment, through adherence to the relevant guidelines and application of appropriate mitigation measures. A summary of the Zones and Overlays applicable to the site has been included in Table 5-2.

Table 5-2: Planning and Design Code: Zones & Overlays

Identified Zones & Overlays (All)	Applies to Project site		Assessment Conclusions
	Yes	No	
Zones			
Rural Horticulture	✓		The Project is not envisaged within the zone, however is not significantly at variance with the relevant Performance Outcomes.
Infrastructure	✓		Relevant Project elements (water intake and outfall pipelines) are compliant with the Desired Outcomes of the Zone and not at variance with the relevant Performance Outcomes.
Overlays			
Infrastructure and Transport Overlays			
Building Near Airfields	✓		The Project is able to comply with all requirements.
Defence Aviation Area (All structures over 45 metres)	✓		The Project is able to comply with all requirements, or obtain permits where non-compliance is possible.
Gas and Liquid Petroleum Pipelines	✓		The Project is able to comply with all requirements. Referral to DEM may be triggered by this Overlay.
Major Urban Transport Routes	✓		The Project is compliant with all requirements.
Non-stop Corridor		✓	Adjacent – no assessment required.
Traffic Generating Development	✓		The Project is compliant with all requirements.
Hazards Overlays			
Hazards (Flooding)	✓		The Project is non-complying. Impact assessment identifies mitigations.
Hazards (Flooding – General)	✓		
Rural and Primary Production Overlays			
Limited Land Division	✓		No land division is proposed.
Natural Resource and Environment Overlays			
Native Vegetation	✓		The Project requires the consent of the Native Vegetation Council to clear vegetation.
Regulated and Significant Tree	✓		
Prescribed Wells Area	✓		The Project is able to comply with all requirements.
Water Resources	✓		The Project is able to comply with all requirements.

Part 4 of the Code contains the GDPs. The GDPs apply to all areas of the State and their relevance to a development is determined by the nature of development activity. Table 5-3 identifies the GDPs relevant to the Project, which are subsequently assessed in Table 5-7. In the majority of instances, detailed assessment of the Project against identified Performance Outcome Categories occurs within the relevant Impact Assessment chapters. The requirements of the GDPs have been considered in the relevant impact assessments.

Table 5-3: Planning and Design Code: General Development Policies

General Development Policies	Performance Outcome Category
Clearance from Overhead Powerlines	All
Design (All Development) Design in Urban Areas	External Appearance Safety Landscaping Water Sensitive Design Onsite Waste Treatment Carparking Appearance Earthworks and Sloping Land Overlooking / Visual Privacy Wash-down and Waste Loading / Unloading
Infrastructure and Renewable Energy Facilities	Visual Amenity Water Supply Wastewater Services
Interface Between Land Uses	General Land Use and Compatibility Hours of Operation Overshadowing Noise or Vibration Air Quality Light Spill Solar Reflectivity / Glare Interface with Rural Activities
Transport, Access and Parking	Movement Systems Sightlines Vehicle Access Vehicle Parking Rates Vehicle Parking Areas
Waste Treatment and Management Facilities	Soil and Water Protection Amenity Major Wastewater Treatment Facilities

5.4 Assessment Against State Planning Policies

The SPPs must be taken into consideration when an EIS is prepared to accompany an impact assessed development application. The EIS must evaluate the extent to which the expected effects of a Project would be consistent with relevant SPPs. It also needs to provide any necessary commitments regarding avoidance, mitigation or management of potentially adverse effects on any matter that may be directly relevant to a special legislative scheme.

The SPPs relevant to the Project, in addition to specific performance outcomes and the aspects of the Project requiring assessment are provided in Table 5-4.

Table 5-4: Assessment Against Relevant State Planning Policies

SPP and Relevant Policies	Assessment
SPP 1 – Integrated Planning **Objective**: To apply the principles of integrated planning to shape cities and regions in a way that enhances liveability, economic prosperity and sustainability. Policies: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9	• The Project facilitates the colocation of employment generating activity with communities, freight routes, existing infrastructure and land identified for future redevelopment through the City of Salisbury's Strategic Growth Framework – Waterloo Corner and Bolivar Corridor (SGF). • The Project site has been strategically selected to maximise the benefits of colocation of the Project with infrastructure and freight routes. Site selection focused on adequate land availability to facilitate future expansion, and adequate service and infrastructure capacity to support the development without prejudicing current or future land use in the locality of the Project (See Section 2.4.2 Site Selection). • Proximity to residential communities of Adelaide's metropolitan suburbs presents the opportunity to connect local communities to new employment options. • Separation distance of the Project from zones primarily intended to accommodate sensitive receivers is sufficient; residents of metropolitan areas to the east and south of the Project are unlikely to experience any adverse impacts from the Project. Specific sensitive receptors which exist in proximity to the Project are identified in Section 3.4.5 Sensitive receptors. • Impacts to adjacent sensitive receptors potentially include construction and operational noise (both traffic and process-related), odour emissions, and alterations to the visual character of the locality. These impacts are addressed in respective impact assessment chapters identified at the start of this Chapter. • The Project supports the diversification of land use types in the locality as expressed in the City of Salisbury's SGF (See Section 8.3.3 Known future land uses changes). The Project's alignment with the SGF also supports the policies of SPP 1 relevant to the regeneration of the built environment, creation of mixed use activity centres and the orderly sequence of land development. Alignment with this aspect of SPP 1 and the SGF also supports the Project's alignment with the principles of CPTED, as discussed in Section 16.3 (Urban Design and Placemaking). • The proximity of intensive horticultural business activity to the Project is the subject of rigorous study to identify, quantify and assess potential impacts of the Project. The SGF supports the proposed staged future redevelopment of land in proximity to the Project currently used for horticultural purposes. • The Project is consistent with the objectives and policies of SPP 1.
SPP 2 – Design Quality **Objective**: To elevate the design quality of South Australia's built environment and public realm. Policies: 2.1, 2.2, 2.3, 2.5, 2.8, 2.9, 2.10, 2.11	• Plant design will be industrial in nature, utilising finishes and visual treatments consistent with similar development in the broader locality. The use of natural colours and high-quality, low-reflective finishes assists to minimise visual impact. • As an industrial facility, the site will not be accessible as a space for the general public. This is consistent with the conditions of the site currently. • The Project site is currently undeveloped and has historically been used for cropping and grazing. The Project represents an increased activation of the site through the introduction of passive surveillance and movement to the locality through construction and operational phases. This supports of the City of Salisbury's objective to elevate the quality of public open spaces and streetscapes in the locality and facilitate the staged, orderly redevelopment of the area, as described in the SGF. • The Project supports the objectives of the Principles of Good Design, delivering an integrated, high-quality development which facilitates investment and economic benefit to the local area, the region and the State. The Project has been developed with a long-

SPP and Relevant Policies	Assessment
	term focus to align with the envisaged future land use in the locality, and promotes the activation of currently under-utilised land for the benefit of the State and local communities. • Detailed design of the Project is ongoing, in order to maintain flexibility to adapt to the findings of impact assessment. Detailed design will incorporate best practice design, with the principles of universal design, crime prevention through environmental design, water sensitive design, and access and inclusion integrated into the final plant design. This is proposed to be achieved primarily through adherence with the relevant policies and statutory planning frameworks which have been developed to capture these principles. • Renascor has identified the key physical, biological and socioeconomic attributes of the Project site and its surroundings, which have been articulated through study of the baseline conditions into which the Project is proposed to be constructed**.** The visual impact of the development has been carefully considered through visual impact assessment (See Section 11.5 (Visual Amenity)). • The BAM Facility aligns strongly with the desired future context of the locality as expressed through the SGF. • The eastern boundary of the Project site (adjacent Robinson Road) interfaces with existing development of a different scale and intensity. The potential for land use interface impacts has been considered through the Project design and impact assessment process (See Chapter 8 (Land Use and Site Conditions), Chapter 11 (Amenity and Environmental Quality). This is addressed through siting of buildings and setbacks from site boundary ensuring that visual privacy and interface impacts are effectively managed.
	• The Project is consistent with the objectives and policies of SPP 2.
SPP 4 – Biodiversity **Objective**: To maintain and improve our state's biodiversity and its life supporting functions. Policies: 4.1, 4.2, 4.3, 4.4, 4.5, 4.7, 4.8	• The Project requires the clearance of native vegetation. • The Project site is modified from its natural state, having been used historically for primary production (grazing and cropping). Small areas of remnant and emergent native vegetation exist on the site, in addition to planted native vegetation. • Emergent and planted native vegetation across the site is not of high or significant biodiversity value, however locally indigenous overstorey vegetation, while planted, is noted to have habitat value (Native Vegetation Clearance Report, Appendix 9B). • Clearance of trees classified as significant and/or regulated is expected to be required to facilitate construction of the Project. Vegetation will be retained to the greatest extent practicable. • Ecological surveys (in-field and desktop) have been undertaken and have concluded that while several listed flora and fauna species, migratory birds and threatened ecological communities (TEC) may occur within a 5 km buffer of the Project site, none have been directly observed within the Project site. Furthermore, the nature of planted and emergent vegetation within the Project site broadly provides poor habitat for listed / migratory fauna species (See Chapter 10 (Biological Environment). • The proximity of the Project site to Winaityinaityi Pangkara / Adelaide International Bird Sanctuary has been considered. The likelihood of impacts to the Sanctuary is considered to be negligible. • The majority of the Project site will be cleared to facilitate the construction of the Project. Vegetation clearance will occur in a staged manner which will minimise the potential for dust, erosion, sedimentation and other impacts. • Vegetation clearance will be undertaken subject to approval by the Native Vegetation Council, and an appropriate Significant Environmental Benefit (SEB) will be undertaken. • The Project will return treated process water to the SA Water outfall channel. Water will be sourced from the outfall of the HSP, one source for the SA Water outfall channel, mitigating the potential for the Project to impact on other water resources. Treated process

SPP and Relevant Policies	Assessment
	water quality from the Project is the subject of detailed environmental assessment (refer Chapter 9 Physical Environment and 15 Hazard and Risks). • Treated process water from the Project will enter the SA Water outfall channel and blend with wastewater from other users of the 11 km outfall channel before being released to the marine environment at Freshwater Creek. Treated process water quality, monitoring frameworks and impact assessment are discussed in Chapter 9 (Physical Environment), Chapter 10 (Biological Environment) and Appendix 18 (Discharge Criteria Management Plan).
	• Impacts from the Project can be effectively minimised and / or mitigated through appropriate management strategies. The Project is consistent with the objectives and policies of SPP 4.
SPP 5 – Climate Change **Objective**: Provide for development that is climate ready so that our economy, communities and environment will be resilient to climate change impacts. Policies: 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10	• The Project includes the construction and maintenance of infrastructure to manage and control stormwater and has regard to the principles of Water Sensitive Urban Design (WSUD) captured with the Planning and Design Code (General Development Policies). (See Section 5.6). WSUD considers changing rainfall intensity, frequency and quantity as a result of climate change. • A climate change risk assessment has been conducted for the Project (See Chapter 14 Climate Change and Resource Efficiency). • The Project includes vegetation screening, amenity plantings and stormwater management designed to WSUD guidelines. • PSG production supports increased utilisation of green technologies and industries through the manufacture of materials which are critical to the renewable energy sector. • Although impacts to the Project due to climate change are not considered to be substantial, plant design and configuration is iteratively developed to be resilient and responsive to climate change and has regard to the potential for climate change-related hazards affecting the locality.
	• The Project is consistent with the objectives and policies of SPP 5.
SPP 7 – Cultural Heritage **Objective**: To protect and conserve heritage places and areas for the benefit of present and future generations. Policies: 7.1, 7.2, 7.3, 7.5, 7.7	• Aboriginal heritage identified within the Project site are appropriately managed through compliance with the relevant legislation and guidelines. (See Chapter 6 Stakeholder and Community Engagement). • The findings of the cultural heritage investigations discussed in Chapter 13 (Cultural Heritage) confirm that the development is unlikely to adversely impact on any known places of Aboriginal and non-Aboriginal heritage value. Any sites discovered through Project activities will be protected from damage by the requirements set out in cultural heritage management plan to be finalised with input from the Kaurna Yerta Aboriginal Corporation (KYAC). • Early and ongoing engagement with the KYAC is being conducted, to ensure that impacts to Aboriginal heritage are avoided. • Design of the Project takes into consideration the context of its locality, noting that the Project will alter the visual character of the area.
	• The Project is consistent with the objectives and policies of SPP 7.
SPP 8 – Primary Industry	• The location of the Project within the Rural Horticulture Zone, in proximity to land which is used for agricultural and horticultural purposes, is considered by impact assessment (See Chapter 8 Land Use and Site Conditions). • The Project site has been utilised for primary production purposes in the past, however is presently not used for this purpose. Intermittent, small-scale grazing continues, predominantly for land management purposes. Since the site is within the buffer zone of

SPP and Relevant Policies	Assessment
Objective: A diverse and dynamic primary industry sector making best use of natural and human assets. Policies: 8.1, 8.2, 8.3, 8.4	the Bolivar WWTP, the Project is not considered to constitute encroachment on agricultural / horticultural land. No displacement of existing or predicted future primary production land use is anticipated. The Project site was selected to avoid disturbance to, or encroachment on, land which supports (or is capable of supporting) commercial primary industries. • The interface between the Project and adjacent land uses (including horticultural and agricultural activities) is managed through engagement with neighbouring land owners, and through the use of appropriate building setbacks, screening treatments, site layout and plant design, which is ongoing. • Impacts to adjacent land uses relating to visual amenity, traffic impacts, noise and Project-related hazards are able to be managed to ALARP levels.
	• Impacts from the Project can be effectively minimised and / or mitigated through appropriate management strategies. The Project is consistent with the objectives and policies of SPP 8.
SPP 9 – Employment Lands **Objective:** To provide sufficient land supply for employment generating uses that supports economic growth and productivity. Policies: 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.12, 9.13	• The Project is a resource project aligning strongly with the objectives of SPP 9. • Future encroachment by more sensitive / incompatible land uses is addressed through existing and predicted future land use planning frameworks, including the Planning and Design Code and the City of Salisbury's SGF. The suitability of the Project site for the Project was a key parameter in the site selection process. • The City of Salisbury through the SGF anticipates the staged redevelopment of the area west of Port Wakefield Road, which includes the locality of the Project, to facilitate an intensification of land use and a higher density of clustered employment generating development. • The Project contributes to the potential for future related employment types, commercial and industrial activities to establish operations in the locality, which aligns with the objective to create diverse, dynamic employment clusters well-connected with communities and infrastructure. • The Project provides an employment-generating land use that directly supports economic growth, productivity, and diversification of the State's economy and is co-located with critical freight and utility networks.
	• The Project is consistent with the objectives and policies of SPP 9.
SPP 10 – Key Resources **Objective**: To protect key resources that contribute to our state's economy and provide valued employment opportunities. Policies: 10.1, 10.2, 10.3, 10.5	• Over the anticipated 40-year life of the Project and the mining activity on the Eyre Peninsula which will supply raw materials, the Project will contribute significantly to the State economy (See Chapter 12 Social and Economic Impact). • Graphite, identified as a critical mineral by the Australian Government, is processed by the BAM Facility into a value-added product to support the manufacture of lithium-ion batteries. • Staged redevelopment of the locality of the Project site is stated as an objective through the City of Salisbury's SGF, to facilitate development with which the Project is compatible. • The Project will provide a range of employment opportunities at all stages (Chapter 12 Social and Economic Impact), and is part of Renascor's vertically integrated in-State graphite mining and downstream processing strategy.
	• The Project is consistent with the objectives and policies of SPP 10.

SPP and Relevant Policies	Assessment
SPP 11 – Strategic Transport Infrastructure **Objective**: To integrate land use policies with existing and future transport infrastructure, services and functions to preserve and enhance safe, efficient and reliable connectivity for people and business. Policies: 11.2, 11.4, 11.8	• Impacts to transport networks arising from the Project including freight deliveries, construction movements and the movement of employees are assessed in Section 11.4 (Transport and traffic). Impacts to the transport network are assessed as low and impacts manageable through standard management practices. • The proximity of the Project to critical transport networks including the North-South Motorway, Port Wakefield Road and marine freight infrastructure at Port Adelaide was a critical parameter considered through the site selection process. • The Project strongly aligns with Policy 11.8, being a development that is specifically intended to support sustainability, economic productivity, renewable energy and electric vehicles. • The Project is consistent with the objectives and policies of SPP 11.
SPP 12 – Energy **Objective**: To support the ongoing provision of sustainable, reliable and affordable energy options that meet the needs of the community, business and industry. Policies: 12.1, 12.2, 12.5, 12.6	• Production of PSG in South Australia facilitates the expansion of lithium-ion battery manufacture, building capacity for local sources of renewable energy supply. • The Project will utilise electricity sourced from the State electricity network. Stage 1 is projected to require approximately 30 – 40 MW, increasing potentially up to 120 MW at the peak of Stage 2 production (subject to change). See also, Chapter 3 (Description of the proposed Project) and Chapter 14 (Climate Change and Resource Efficiency). • Due to electricity being sourced from the State electricity network, emissions from electricity use will improve in line with State emissions reduction targets. • The Project is consistent with the objectives and policies of SPP 12.
SPP 13 – Coastal Environment **Objective**: To protect and enhance the coastal and marine environment and ensure that development is not at risk from coastal hazards. Policies: 13.1, 13.2, 13.3, 13.4, 13.9, 13.10	• The Project is located inland from the Bolivar WWTP evaporation ponds, which separate the Project site from the coastal environment. The Project is not being constructed within an area defined as coastal land. • The return of treated process water to the SA Water outfall channel, which combines with wastewater from a range of contributors along the length of the channel, eventually enters the marine environment at Freshwater Creek. The potential for treated process water from the Project to cause impacts to the coastal environment is the subject of detailed study as described in Chapter 9 (Physical Environment) and Chapter 10 (Biological Environment). • Studies and impact assessment have concluded that there is a low likelihood of impacts to the coastal environment resulting from treated process water originating at the Project. • The Project is expected to have no measurable impacts on the coastal environment as defined by the Code (see Chapter 9 Physical Environment). • No removal or modification to coastal habitats including high carbon-storage areas such as mangroves or saltmarsh are proposed, as the Project's construction footprint is entirely outside of coastal habitat. • A surface water assessment and associated flood modelling has been prepared for the Project (Appendix 10 Flood modelling) and has been used to inform mitigation measures relating to changes to surface water flows and potential flood depths during construction and operation of the Project (see Chapter 9 (Physical Environment), Chapter 10 (Biological Environment) and Chapter 15 (Hazard and Risks)). • The Project is consistent with the objectives and policies of SPP 13.

SPP and Relevant Policies	Assessment
SPP 14 – Water Security and Quality **Objective**: To ensure South Australia's water supply is able to support the needs of current and future generations. Policies: 14.1, 14.2, 14.3, 14.5, 14.6	• Water for the Project will be sourced from a water stream associated with the Bolivar WWTP (specifically from the High Salinity Plant (HSP) outfall), and returned as treated process water back to the outfall channel after use as process water. • Utilising treated Bolivar WWTP water as source water means that the Project has no impact on South Australia's potable or pre-treated water supply. • The volume of water available within the SA Water outfall channel is adequate to supply the Project over its expected 40-year life. • The Project will not rely on or deplete South Australia's potable water supply. • The Project will not discharge to groundwater. • A Stormwater Assessment and associated flood modelling has been prepared for the Project (Appendix 10 Flood modelling) and has been used to inform mitigation measures to avoid the runoff of sediment, nutrients and contaminants from the Project site during construction and operation of the Project (see Chapter 15 (Hazard and Risks)). Impacts are manageable through standard management protocols, including the integration of WSUD into plant design, and compliance with all regulatory requirements such as bunding, stormwater management and flood resilience. • The Project may intersect groundwater during construction activities. The quality of groundwater within the Project site and the potential for the discovery of contamination has been investigated (Appendix 7 – Preliminary Site Investigation). • The return of treated process water to the SA Water outfall channel is the subject of impact assessment. Treated process water quality, monitoring frameworks and impact assessment are discussed in Chapter 9 (Physical Environment), Chapter 10 (Biological Environment) and Appendix 18 (Discharge Criteria Management Plan). The SA Water outfall channel, as a manmade treated wastewater channel, is not considered a surface water receiver for the purposes of this EIS. • Impacts from the Project can be effectively minimised and / or mitigated through appropriate management strategies. The Project is consistent with the objectives and policies of SPP 14.
SPP 15 – Natural Hazards **Objective**: To build the resilience of communities, development and infrastructure from the adverse impacts of natural hazards. Policies: 15.1, 15.2, 15.4, 15.6	• Potential hazards identified applying to the Project site are discussed in Chapter 15 (Hazard and Risks). • A risk assessment has been undertaken which identifies site-specific and general hazards with the potential to interact with the Project, including consideration of the impact of climate change (See Chapter 14 Climate Change and Resource Efficiency). • Key natural hazards considered include flooding, fire events and the impact of climate change in altering the frequency, intensity and duration of such events. This is captured through the EIS where applicable. The potential for bushfire has also been considered, in addition to the impact of natural hazards on increasing hazards posed by the Project such as loss of containment of hazardous substances. • The interaction of natural and Project-specific hazards has been considered in Chapter 15 (Hazard and Risks), with management and mitigation strategies identified to be incorporated into applicable management plans. • The risk of natural hazards to the Project are able to be mitigated through standard management procedures. • The Project is consistent with the objectives and policies of SPP 15.

SPP and Relevant Policies	Assessment
SPP 16 – Emissions and Hazardous Activities **Objective:** To protect communities and the environment from risks associated with emissions, hazardous activities and site contamination, whilst industrial development remains viable. Policies: 16.1, 16.2	• The suitability of the Project site to facilitate the Project is discussed in Chapter 2 (Project Justification). • The Project, as an industrial development, involves the receival and use of dangerous substances, whose handling, storage and disposal is subject to appropriate licensing and controls (See Section 4.4.3 Prescribed Activities of Environmental Significance). • Industrial emissions from the Project to air and water including stack emissions, odour, noise, dust, treated process water, stormwater runoff, as well as the potential for the spillage or emission of dangerous substances due to containment failure are the subject of detailed environmental study, and are addressed in the relevant sections of the EIS, with potential impacts found to be able to be effectively managed. • The proximity of dwellings (within the Rural Horticulture Zone, Agriculture / Horticulture land use) is acknowledged. The presence of dwellings on those properties classifies them as sensitive receivers. • A conservative approach has been adopted with regard to sensitive receivers in the locality. Where uncertainty exists, sensitive receivers have been considered residential for the purpose of impact assessment. • Hazardous activities including the storage and use of fuels and chemicals will be managed according to industry standard practice and appropriately licensed. • Project-specific management plans will be developed for the Project. • Impacts from the Project can be effectively minimised and / or mitigated through appropriate management strategies. The Project is consistent with the objectives and policies of SPP 16.

5.5 Assessment Against 30-Year Plan for Greater Adelaide

The 30YPGA (DPTI, 2017) is the relevant regional plan for the Project. It identifies 6 key targets, describing outcomes to which policies are tailored:

1. Containment of the urban footprint and protection of resources,
2. Increasing the availability and adjacency of public transit to communities,
3. Promoting active transport through infrastructure provision,
4. Promoting walkable neighbourhoods,
5. Increasing the urban canopy to increase the liveability of the city, and
6. Promoting increased choice of housing style.

By applying these principles through Policy Themes that precipitate Actions to be taken through the appropriate strategic and statutory pathways, the 30YPGA delivers a holistic and measurable framework for achieving the objectives it describes.

Table 5-5 provides an assessment of Renascor's BAM Facility against the relevant Policy Themes and, where applicable, specific policies of the 30YPGA.

Table 5-5: Assessment Against the 30-Year Plan for Greater Adelaide

Policy Themes, Objectives and Specific Policies	Project Alignment
Design Quality Facilitate good design outcomes that ensure new development positively contributes to existing neighbourhoods. P25 Encourage urban renewal projects that take an all-inclusive approach to development by including streetscapes, public realm, public art and infrastructure that supports the community and responds to climate change. P30 Support the characteristics and identities of different neighbourhoods, suburbs and precincts by ensuring development considers context, location and place. P31 Recognise the unique character of areas by identifying their valued physical attributes.	The locality into which the Project is to be built is one which has experienced infrastructure-related fragmentation in recent years. The establishment of the North-South Motorway necessitated the severance of numerous smaller roads which have traditionally connected the locality to suburbs to the east and south. As a result, the receiving environment is one through which at present there is comparatively little connectivity. The Project, as an industrial development of scale, provides the opportunity to contribute to the positive redevelopment of the locality, a stated objective indicated in the City of Salisbury SGF, by activating currently under-utilised land with respect to the established character and physical attributes of the broader locality, including the St Kilda township. The Project, once constructed, will be visible from the St Kilda boat ramp, the North-South Motorway, and from other vantage points. From the St Kilda boat ramp, the Project will be of a similar visual scale to existing development associated with the Bolivar WWTP, and is not expected to visually detract from the landscape. The presence of the Mt Lofty Ranges means that from the St Kilda viewpoint, the Project does not affect the horizon. The locality of the Project site is physically open, flat and dominated by low density, low rise development. However, larger scale industrial and infrastructure elements also exist within a 5 km radius of the Project site. High quality industrial development is not expected to negatively affect the amenity of the broader locality, and final detailed design will include all EIS commitments and be to a high standard in keeping with all relevant guidelines and codes of practice. It is proposed to retain existing tree and vegetation screening where possible/practicable. If existing screening is required to be cleared, planted vegetation screening will be incorporated into Project design. Building materials, finishes and colours will be chosen according to the principles of good design to blend with the receiving environment, be of a low reflectivity and high quality. See also: Chapter 3 (Description of the proposed Project) Chapter 11 (Amenity and Environmental Quality) Chapter 16 (Design Quality)
Health, Wellbeing and Inclusion Create healthy neighbourhoods that promote cycling, walking and public life. P53 Encourage the integration of green infrastructure in the public and private realms to support positive physical, mental and social health outcomes.	The City of Salisbury's SGF and the 30YPGA indicate that the implementation of integrated green infrastructure in the public realm in the locality of the Project is a desirable outcome for the progressive redevelopment of the Project locality. The Project, while not a publicly accessible development, indirectly supports this objective by contributing to the proposed redevelopment discussed in the SGF and aligning with the envisaged future land use of the locality. Green infrastructure in the form of amenity and screening vegetation using appropriately selected flora species, stormwater management infrastructure designed to WSUD principles, and appropriate management of streetscape interface contribute to the Project's integration with the public realm. See also: Section 15.4 (Flooding) and Chapter 16 (Design Quality)

Policy Themes, Objectives and Specific Policies	Project Alignment
The Economy and Jobs Support economic development and unlock investment. P55 Promote certainty to undertake development while at the same time providing scope for innovation. P56 Ensure there are suitable land supplies for the retail, commercial and industrial sectors. P60 Ensure land use planning in and around the Virginia horticulture district aligns with projects for industry growth and revitalisation anticipated by the Northern Economic Plan. P65 Identify and protect the high-pressure gas pipelines and other key infrastructure services. P70 Ensure planning controls for employment lands are flexible to allow new green technologies and industries to emerge and grow. P73 Provide sufficient strategic employment land options with direct access to major freight routes to support activities that require separation from housing and other sensitive land uses.	The Project represents a substantial investment in employment for the State, in establishing new advanced industry in proximity to established, emerging, and planned future urban development. The Project's location in the buffer zone of the Bolivar WWTP provides certainty that encroachment of more sensitive land uses in the future can be effectively managed and the Project will not prejudice the ongoing or future envisaged use of land in the locality, while maintaining the convenient co-location of a major employment source with communities (See Chapter 12 Social and Economic Impact). The Project supports the strategic land use objectives of the City of Salisbury's SGF, which articulates potential patterns of redevelopment for the area west of Port Wakefield Road, including the area proximal to this Project. The SGF identifies areas of land for progressive redevelopment, with a focus on diversification and intensification of land use in proximity to major freight routes. The Project site is within the area indicated as the Virginia Horticulture District, but does not fall within the area of the Northern Adelaide Plains Environment and Food Production Area (EFPA). Chapter 8 (Land Use and Site Conditions) discusses the potential for the Project site to be used in the future for primary production purposes. Given the location and tenure of the Project site, it is considered that no horticultural or agricultural use of the land is prejudiced by the presence of the Project. The Project represents strong potential for employment growth in the locality, and is appropriately sited on land which supports the provision of strategic employment opportunities without adversely affecting existing or future compatible land uses. See also: Chapter 2 (Project Justification) Chapter 4 (Statutory Framework) Chapter 8 (Land Use and Site Conditions) Chapter 12 (Social and Economic Impact)
Transport Deliver a more connected and accessible Greater Adelaide. P74 Ensure development does not adversely impact the transport function of freight and/or major traffic routes and maintains access to markets.	The Project is strategically located in close proximity to major freight corridors which have the capacity to carry the projected volumes of traffic generated by the Project. Robinson Road, which forms the main access point to the Project site, whilst currently requiring upgrade in order to be suitable for heavy vehicle use, will be upgraded by third parties prior to, or in parallel with, the construction of this Project. Small numbers of heavy vehicles are already present on Robinson Road, in association with the SA Water Bolivar WWTP, and commercial activities in the locality including horticultural businesses. The Traffic and Transport studies undertaken in support of this EIS (Appendix 13 and Appendix 14) have been conducted assuming that necessary upgrades to Robinson Road have been executed prior to the commencement of construction of the Project.

Policy Themes, Objectives and Specific Policies	Project Alignment
	See Also: See Section 11.4 (Transport and traffic).
Infrastructure Maximise the efficient use of infrastructure. P85 Provide for adequate buffer zones around water and waste treatment plants and identify complementary activities that generate economic or community benefits that can occur in these areas.	The Project is sited within the buffer zone around the Bolivar WWTP. In accordance with the City of Salisbury's SGF and the objectives of the 30YPGA, the Project constitutes a compatible and complementary activity that does not adversely affect, and nor is not adversely affected by, its co-location with major wastewater treatment infrastructure. The Project will utilise wastewater sourced from the SA Water Outfall Channel as raw source water, such that the Project will not draw water from Adelaide's potable water supply. Treated process water will be returned to the SA Water Outfall Channel downstream from the offtake location. The Project is also co-located with the South East Australia Gas (SEAGas) high-pressure natural gas pipeline, which maximises the efficiency of connection to the pipeline as a fuel source. Connection to the SEAGas pipeline will be addressed in a separate approval process. The City of Salisbury SGF contains objectives for the installation of green infrastructure in the vicinity of the Project site, including constructed wetlands and waterways to the north, where at present an open stormwater channel exists. Surface water modelling undertaken for the EIS (Appendix 10) indicates a range of potential stormwater management scenarios. The establishment of stormwater channels and bunding within the Project site will be required. The majority of stormwater is assumed to run off to the existing stormwater channel to the north of the Project site, as discussed in Chapter 9 (Physical Environment). Co-location with electricity generation or transmission infrastructure was a key parameter of the site selection process, as discussed in Chapter 2 (Project Justification). See also: Chapter 3 (Description of the proposed Project)
Biodiversity Valuing our natural environment and enhancing biodiversity. P91 Protect coastal features and biodiversity including: • habitats that are highly sensitive to the direct impacts of development • important geological and/or natural features of scientific, educational or cultural importance • landscapes of very high scenic quality. • P97	The site of the Project is, at present, a modified environment with limited biodiversity as compared to comparatively undisturbed coastal and supratidal environments in the broader locality, including the nearby Winaityinaityi Pangkara / Adelaide International Bird Sanctuary. On-ground and desktop ecological surveys (Appendix 9 – Ecology Assessment and Chapter 10 Biological Environment) confirm that the majority of native vegetation within the Project site is either planted or emergent, and includes vegetation not indigenous to the location. The habitat value of some vegetation within the Project site has been described. A self-assessment in relation to the provisions of the EPBC Act has been conducted to identify MNES in the vicinity of the Project site, and to assess the likelihood that the Project will be a controlled action for the purposes of the EPBC Act. No significant impacts to MNES were identified by the self-assessment, and resultantly no referral under the EPBC Act is proposed. The Project will involve the clearance of native vegetation within the Project site. In accordance with the *Native Vegetation Act 1991* and associated clearance regulations, a Significant Environmental Benefit (SEB) will be paid by Renascor to offset this clearance. Vegetation will be retained to the greatest extent practicable. The Project site is separated from the coastal environment, including Winaityinaityi Pangkara / Adelaide International Bird Sanctuary, by the Bolivar WWTP evaporation ponds.

Policy Themes, Objectives and Specific Policies	Project Alignment
Minimise or offset the loss of biodiversity where this is possible and avoid such impacts where these cannot be mitigated	Proximity to valuable coastal habitat is recognised. Potential impacts on coastal environments are unlikely, as detailed in the relevant technical studies and impact assessment. Where impacts are possible, they are able to be addressed through appropriate construction and operational controls. See also: Chapter 9 (Physical Environment) Chapter 10 (Biological Environment)
Climate Change Mitigate against and adapt to our changing climate. P109 Support a zero waste culture by reducing the waste footprint of new development. P113 Promote energy efficiency, the use of renewable energy sources and neighbourhood level alternative energy supplies and storage in new developments to reduce energy costs and carbon footprint. P114 Encourage the provision of electric vehicle charging points in new higher-density developments, large public and private car parks, activity centres and employment lands.	The BAM Facility supports the transition to alternative and renewable forms of energy by producing value-added products critical to the manufacture of lithium-ion batteries. The Project seeks to minimise and beneficially reuse by-products and waste products in a variety of ways, in accordance with the waste hierarchy (See Chapter 14 Climate Change and Resource Efficiency). See also: Chapter 2 (Project Justification) Chapter 3 (Description of the proposed Project) Chapter 14 (Climate Change and Resource Efficiency)
Water Protect and secure our water resources. P115 Incorporate water-sensitive urban design in new developments to manage water quality, water quantity and water use efficiency and to support public stormwater systems.	The Project avoids the use of Adelaide's potable water supply for industrial use, by utilising a wastewater stream (from the SA Water Outfall Channel – HSP outfall) as source water. Source water will be demineralised through a reverse osmosis water treatment plant within the site of the Project prior to entry to the process, and treated prior to return back to the SA Water outfall channel. Both the operation of the demineralisation plant and process water treatment are activities of environmental significance as described in Schedule 1 of the EP Act and will be licensed appropriately. The Project does not propose the use of potable mains water for industrial processes.

Policy Themes, Objectives and Specific Policies	Project Alignment
P116 Protect and secure water resources in the region, including: • The Mount Lofty Ranges Watershed • Prescribed water resources • Recycled wastewater networks • Stormwater harvesting • P117 Increase the provision of stormwater infrastructure (including water sensitive urban design) to manage and reduce the impacts of: • Run-off from infill development, • Urban flooding from increased short-duration intense rainfall events associated with climate change, and • Pollution from roads and other developed areas.	Treated process water quality, monitoring frameworks and impact assessment are discussed in Chapter 9 (Physical Environment), Chapter 10 (Biological Environment) and Appendix 18 (Discharge Criteria Management Plan). Minimal net change in the quality of water in the SA Water outfall channel will result from the presence of the Project, indicating that the Project has a low likelihood of impact on coastal waters (See Chapter 9 (Physical Environment), Chapter 10 (Biological Environment)). The Project will, through its design and layout, assist in addressing the current propensity of the Project site to be inundated by stormwater following rainfall events. Inundation occurs due to the low-lying and flat topography of the site, combined with development to the east and north which directs stormwater to the Project site. The integration of WSUD principles into the design of the Project will assist to mitigate this tendency through the construction of new, dedicated stormwater infrastructure. Stormwater from the Project will be managed through integrated stormwater management infrastructure (including separation of stormwater streams where appropriate) and directed towards new stormwater channels to be constructed on the boundaries of the site, with the intention of directing stormwater to the existing northern channel. See also: Chapter 9 (Physical Environment) Chapter 10 (Biological Environment) Section 15.4 (Flooding) Chapter 16 (Design Quality)
Emergency Management and Hazard Avoidance Build resilience to hazards and disasters. P118 Minimise risk to people, property and the environment from exposure to hazards (including bushfire, terrestrial and coastal flooding, erosion, dune drift and acid sulphate soils) by designing and planning for development in accordance with a risk hierarchy of: • Avoidance	The Project will address the risk to people, property and the environment from bushfire, terrestrial flooding and erosion through appropriate plant design, site layout, and hazard management incorporated into construction and operational procedure. The Project is not located within any Hazards (Bushfire) Overlay identified by SAPPA. The Project is located within the Adelaide Mount Lofty Ranges Bushfire Management Area (AMLR BMA) as defined by the Country Fire Service (CFS), and is in an area excluded from the Mount Lofty Ranges Fire Ban District. The Hazards (Flooding) and Hazards (Flooding – General) Overlays identified by SAPPA both apply to the Project site. Fire management, including avoidance, suppression, evacuation and associated emergency response procedures will be designed in accordance with all relevant guidelines and legislation (See Chapter 15 Hazard and Risks). Terrestrial flooding potential is addressed as described above in ***Water.*** Project-specific Management Plans will be developed which address emergency procedures in the event of a range of hazards, including terrestrial flooding.

Policy Themes, Objectives and Specific Policies	Project Alignment
• Adaptation • Protection P121 Ensure risk posed by known or potential contamination of sites is adequately managed to enable appropriate development and safe use of land.	See also: Chapter 9 (Physical Environment) Chapter 15 (Hazard and Risks) Chapter 16 (Design Quality)

5.6 Assessment against the Planning and Design Code

The Project is assessed against relevant zones and overlays, including the specific Desired Outcomes (DOs) and Performance Outcomes (POs) that apply in the context of the Project site, identified through spatial analysis utilising SAPPA and Part 2 of the Code. Relevant General Development Policies (GDPs) identified in Part 4 of the Code are also assessed. The purpose of this section is to establish the extent to which the Project aligns with the outcomes for development envisaged by the Code, as required by Practice Direction 17 and the formal Assessment Requirements issued by the SPC.

Renascor's BAM Facility occurs in the Rural Horticulture Zone on land whose current use is defined by the South Australian Property and Planning Atlas (SAPPA) through the Land Use – Generalised 2021 Layer as Utilities / Industry (Figure 5-2). Water intake and outfall pipelines which are ancillary to the BAM Facility occur within the Rural Horticulture Zone and extend into the adjacent Infrastructure Zone, within which the Bolivar WWTP is located.

Further detail on land use, land tenure, access, site conditions and existing environment is provided in Chapter 8 (Land Use and Site Conditions).

The SAPPA identifies zones and overlays which apply to the broader SA Water-owned landholding within which the Project is located. The applicable zones and overlays to the Project, including those which are relevant through their adjacency, are provided in Table 5-2, along with a summary of the assessment outcome for each zone and overlay. No subzones apply to the Project site.

Technical studies and related impact assessment sections are referenced where applicable, in addition to assessment of the Project against each relevant GDP, zone and overlay. Overlays which are considered as part of relevant impact assessment due to adjacency, but which do not apply directly to the Project site are also discussed.

5.6.1 Nature of Development

BAM Facility – Main Development Site

The BAM Facility is a development which will receive, process and treat mineral concentrates. This aligns with the definition of Industry within the Code:

The carrying on, in the course of a trade or business, of any process (other than the generation of electricity using a renewable source or a process in the course of farming or mining) for, or incidental to:

a. The making of any article, ship or vessel, or of part of any article, ship or vessel; or
b. The altering, repairing, ornamenting, finishing, assembling, cleaning, washing, packing, bottling, canning or adapting for sale, or the breaking up or demolition, of any article, ship or vessel; or
c. The getting, dressing or treating of materials.

The Code classifies industrial developments into Light Industry, Special Industry and General Industry, according to a prescribed description of an activity's likely scale, intensity, and impact on its receiving environment. Table 5-6 contains the stipulated definitions of each category of Industry as defined by the Code.

Table 5-6: Industrial Development Classification

Development Classification	Definition
Light Industry	Means an industry where the process carried on, the materials and machinery used, the transport of materials, goods or commodities to and from the land on or in which (wholly or in part) the industry is conducted and the scale of the industry does not: a. Detrimentally affect the amenity of the locality or the amenity within the vicinity of the locality by reason of the establishment or the bulk of any building or structure, the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit, oil, spilled light or otherwise howsoever; Or; b. Directly or indirectly cause dangerous or congested traffic conditions in any nearby road.
Special Industry	Means an industry where the processes carried on, the methods of manufacture adopted or the particular materials or goods used, produced or stored, are likely to: a. Cause or create dust, fumes, vapours, smells or gases; or b. Discharge foul liquid or blood or other substance or impurities liable to become foul, And thereby: c. Endanger, injure or detrimentally affect the life, health or property of any person (other than any person employed or engaged in the industry); or d. Produce conditions which are, or may become, offensive or repugnant to the occupiers or users of land in the locality of or within the vicinity of the locality of the land on which (whether wholly or partly) the industry is conducted.
General Industry	Means any industry other than a light industry or a special industry.

The Project is likely to impact on the visual landscape character and amenity within and in proximity to the Project site both due to its scale, intensity and the bulk of constructed elements, and in the form of emissions to air (noise, odour, dust, stack emissions) and production of solid by-products and liquid waste streams. Due to the Project's substantial built infrastructure, scale, and use of hazardous materials, the **Light Industry** classification does not apply.

The **Special Industry** classification refers to activities which are likely to create dangerous, repugnant or repulsive conditions that are unable to be entirely mitigated in the locality or the vicinity of the locality. The Project is considered unlikely to meet the prescribed definition for Special Industry. The expected, predicted or potential impacts of the Project identified through impact assessment are able to be minimised or satisfactorily managed to mitigate potential or likely adverse effects, and resultantly the Special Industry classification does not apply.

The **General Industry** classification applies to all industrial development which does not meet the conditions to be classified as either Light or Special Industry.

Industry (with the exception of Special Industry) is classified as Performance Assessed Development by the Code within the Rural Horticulture Zone. Part 2 of the Code, Table 3 provides an indicative list of applicable policies. Additional analysis of the Code has identified additional policies relevant to the Project, having regard to the nature of the BAM Facility as an Impact Assessed Development.

Water Intake and Outfall Pipelines

Source water to support the BAM Facility will be extracted from the HSP outfall associated with the Bolivar WWTP via above ground HDPE pipeline with occasional below ground road crossings where required. Water will be conveyed to the demineralisation plant within the BAM Facility site. Treated process water in combination with brine from the demineralisation plant will be returned to the SA Water outfall channel via a pipeline similar to, and parallel to the supply pipeline, with the outfall location downstream from the intake point.

The pipelines and associated infrastructure (such as pumps, monitoring equipment and safety / maintenance equipment) are ancillary to an industrial development and are proposed to be installed entirely within the SA Water landholding on which it operates the Bolivar WWTP.

As a result, no specific assessment of the pipelines against the provisions of the Code is required. In the interest of completeness, however, an assessment of the pipelines' alignment with the provisions of the Code is included, as appropriate.

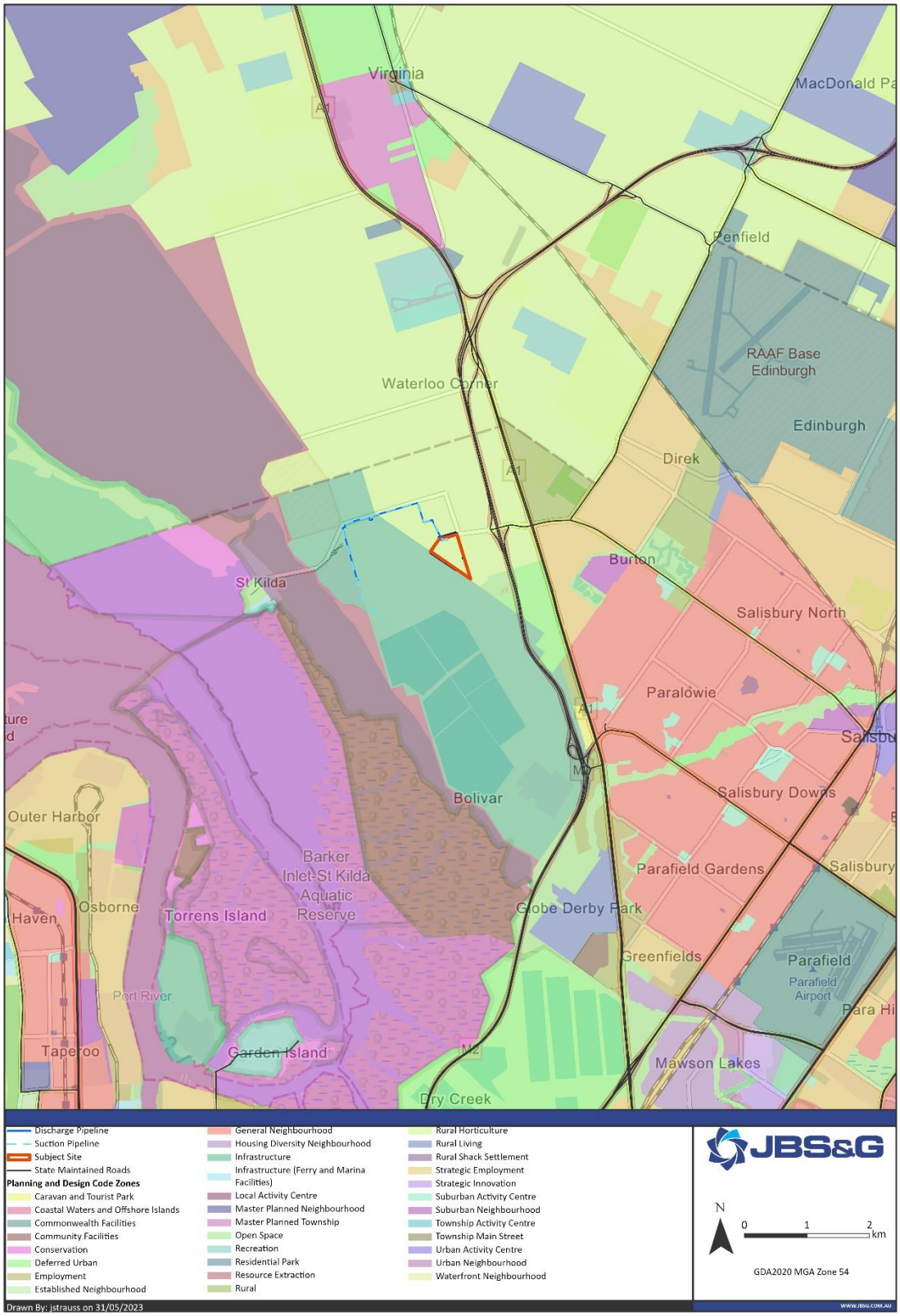


Figure 5-1: Planning and Design Code – Zoning (Local Area)

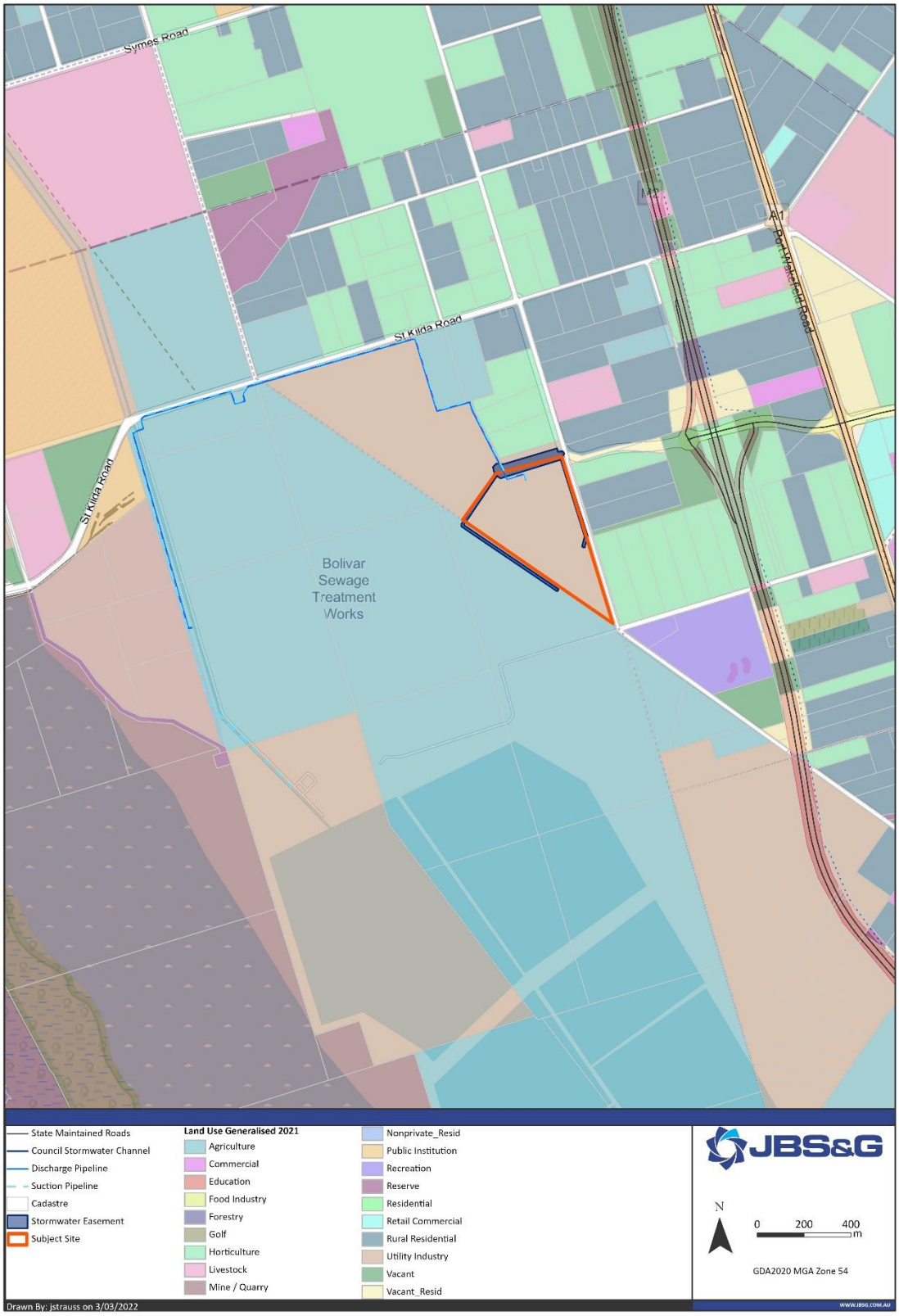


Figure 5-2: Land Use (Generalised) 2021 - SAPPA

5.6.2 General Development Policies

Table 5-7 assesses the Project against relevant GDPs. The identification of relevant GDPs is based on Part 2, Table 3 of the Code—Performance Assessed Development – Industry within the Rural Horticulture Zone. Additional GDPs have been identified and assessed as necessary based on their relevance to the Project.

Table 5-7: General Development Policies

Desired & Performance Outcomes	Planning Assessment
Clearance from overhead Powerlines DO 1: Protection of human health and safety when undertaking development in the vicinity of overhead transmission powerlines.	
PO 1.1 *Buildings are adequately separated from above ground powerlines to minimise potential hazard to people and property.*	• High voltage overhead powerlines are present on the eastern boundary of the Project site adjacent to Robinson Rd. • Appropriate separation distances will be maintained between activities associated with the construction and operation of the Project, and the overhead powerlines along Robinson Rd. • A declaration stating that the Project will not be contrary to the regulations prescribed for the purposes of section 86 of the *Electricity Act 1996* was provided with the Scoping DA (submitted 2 March 2023).
Design [All development] DO 1: Development is: a) contextual - by considering, recognising and carefully responding to its natural surroundings or built environment and positively contributes to the character of the immediate area, b) durable - fit for purpose, adaptable and long lasting, c) inclusive - by integrating landscape design to optimise pedestrian and cyclist usability, privacy and equitable access, and promoting the provision of quality spaces integrated with the public realm that can be used for access and recreation and help optimise security and safety both internally and within the public realm, for occupants and visitors, d) sustainable - by integrating sustainable techniques into the design and siting of development and landscaping to improve community health, urban heat, water management, environmental performance, biodiversity and local amenity and to minimise energy consumption.	
External Appearance	
PO 1.4 *Plant, exhaust and intake vents and other technical equipment is integrated into the building design to minimise visibility from the public realm and negative impacts on residential amenity by:* *a. Positioning plant and equipment in unobtrusive locations viewed from public roads and spaces* *b. Screening rooftop plant and equipment from view* *c. When located on the roof of a non-residential development, locating the plant and equipment as far as practicable from adjacent sensitive land uses.* **PO 1.5** *The negative visual impact of outdoor storage, waste management, loading and service areas is minimised by integrating them into the building design and screening them from public view (such as fencing,*	• Where practicable, plant design responds to the requirement to integrate, screen and position plant equipment unobtrusively. • Vegetation screening is incorporated in the form of remnant and/or planted screening along site boundaries. • The height, scale and visual mass of the Project means that visibility of industrial buildings and equipment is unable to be entirely avoided. • Most buildings associated with the Project will be set back within the Project site to minimise visibility from the public realm, with the exception of services located on the eastern boundary (such as the primary access point, gatehouse and HV electrical switchyard). • A Visual Impact Assessment has been conducted with regard to the EIS Assessment Requirements (See Appendix 15, and Section 11.5 Visual Amenity). • Visualisations of the Project (including long view visualisations) utilising photomontages of the existing environment taken from identified sensitive receptors in

Desired & Performance Outcomes	Planning Assessment
landscaping and built form) taking into account the form of development contemplated in the relevant zone.	the locality have been prepared and are attached in Appendix 15 (Visual Amenity Impact Assessment). • Outdoor storage, waste management, loading and service areas will be integrated into overall Project design in a manner that minimises their visibility. • Consideration of perimeter fencing treatments, screening vegetation and the final surface treatments and schedule of materials will be explored through the finalisation of the detailed design phase, to ensure visual impact of the Project is minimised. • Materials, colours, surface treatments, exterior lighting and the interface of the Project with its local environment will be considered in the finalisation of the detailed project design. Materials and colours will be chosen to blend in with the local environment and present a low-glare, low-reflectivity finish (See Chapter 16 Design Quality).
Safety	
PO 2.1 *Development maximises opportunities for passive surveillance of the public realm by providing clear lines of sight, appropriate lighting and the use of visually permeable screening wherever practicable.* **PO 2.2** *Development is designed to differentiate public, communal and private areas.* **PO 2.3** *Buildings are designed with safe, perceptible and direct access from public street frontages and vehicle parking areas.*	• The Project is not a publicly accessible development and incorporates gated access control at the point of entry on Robinson Road. • The increased traffic and presence of personnel on site during construction and operation of the Project will naturally increase passive surveillance of the public realm. • Exterior lighting within the Project site will be designed to maximise passive surveillance within the site, safety and visibility for staff and visitors, while maintaining regard for the need to minimise light spill and comply with the lighting control requirements of Concept Plan 81. • Vehicle parking areas will be integrated within the Project site.
Landscaping	
PO 3.1 *Soft landscaping and tree planting is incorporated to:* *d. Minimise heat absorption and reflection,* *e. Maximise shade and shelter,* *f. Maximise stormwater infiltration,* *g. Enhance the appearance of land and streetscapes,* *h. Contribute to biodiversity.* **PO 3.2** *Soft landscaping and tree planting maximises the use of locally indigenous plant species, incorporates plant species best suited to current and future climate conditions and avoids pest plants and weed species.*	• Landscaping in the form of amenity and screening vegetation planting will be incorporated into the Project, subject to finalisation through the detailed design phase of the Project. • Plant and tree species chosen will reflect best-practice approaches to the role of landscaping in assisting development to integrate with its local context. • Locally indigenous plant species will be utilised wherever practicable, having regard to present and future climatic conditions in the locality.

Desired & Performance Outcomes	Planning Assessment
Water Sensitive Design	
PO 5.1 *Development is sited and designed to maintain natural hydrological systems without negatively impacting:* *a. The quantity and quality of surface water and groundwater,* *b. The depth and directional flow of surface water and groundwater,* c. *The quality and function of natural springs.*	• The impacts of the Project on surface water and relevant mitigation and controls are discussed in Section 9.4 (Surface Water and Groundwater). • In the event of groundwater intersection during construction, all necessary steps will be taken to avoid negatively impacting on ground or surface water quality as a result of Project activities. This is expected to be managed within the bounds of SA EPA Water Quality Guideline *Environmental management of dewatering during construction activities* (updated June 2021). • No natural springs or natural watercourses are present within or in the vicinity of the Project site. • Impacts of the Project on the depth and directional flow of surface water are discussed in Section 15.4 Flooding. • Project design has regard to the principles of WSUD (See Chapter 16 Design Quality).
Onsite Waste Treatment Systems	
PO 6.1 *Dedicated onsite treated wastewater disposal areas do not include any areas to be used for, or could be reasonably foreseen to be used for, private open space, driveways or car parking.*	• Human wastewater (including sewage) generated onsite during the operational phase of the Project will report to an onsite septic wastewater service, which will be subject to a Wastewater Works Approval under the *Public Health Act 2011* and the *Public Health (Wastewater) Regulations 2013.* • No onsite disposal of treated human wastewater is proposed. Human wastewater reporting to the onsite wastewater service, in addition to other wastewater streams unable to be treated to acceptable quality (such as oil separator waste, or wastewater contaminated with oils or fuels) will be collected by a licensed company for removal to a licensed facility.
Carparking Appearance	
PO 7.2 *Vehicle parking areas are appropriately located, designed and constructed to minimise impacts on adjacent sensitive receivers through measures such as ensuring they are attractively developed and landscaped, screened fenced and the like.* **PO 7.4** *Street level vehicle parking areas incorporate tree planting to provide shade and reduce solar heat absorption and reflection.* **PO 7.5** *Street level parking areas incorporate soft landscaping to improve visual appearance when viewed from within the site and from public places.* **PO7.6** *Vehicle parking areas and associated driveways are landscaped to provide shade and positively contribute to amenity.* **PO 7.7** *Vehicle parking areas and access ways incorporate integrated stormwater management techniques such as permeable or porous surfaces, infiltration systems, drainage swales or rain gardens that integrate with soft landscaping.*	• The Project includes a dedicated car parking area to be utilised by staff and visitors to the facility, which is separated from service areas within the site, other than the shared access point on Robinson Road. • Open space around car parking and driveway areas, which will retain permeable surface and be appropriately landscaped, are integrated into the design of the Project, consistent with the principles of WSUD. • Screening vegetation to be planted or retained along the eastern boundary of the Project site will assist to soften the appearance of, and screen from public view the parking area. • A surface water assessment has been conducted as part of the EIS with controls and mitigation strategies identified. A Stormwater Management Plan that considers WSUD and engineered stormwater controls will be developed for the Project.

Desired & Performance Outcomes	Planning Assessment
Earthworks and Sloping Land	
PO 8.1 *Development, including any associated driveways and access tracks, minimises the need for earthworks to limit disturbance to natural topography.*	• The site of the Project will be elevated via clean fill importation to raise the finished floor level of the Project above the 1% AEP flood level as indicated by flood modelling (Appendix 10). • The 2 m contour map of the area indicates a variance of less than 2 m elevation across the entire Project site. Any fill activities required to ensure the BAM Facility is constructed above the 1% AEP flood level are unlikely to result in any significant change to the natural topography of the site. • The proposed access point to the Project site is located in an area that is predominantly flat, such that the installation of the proposed entry curtilage will not unduly disturb the natural topography of the site.
Overlooking / Visual Privacy (in building 3 storeys or less)	
PO 10.1 *Development mitigates direct overlooking from upper level windows to habitable rooms and private open spaces of adjoining residential uses.*	• Buildings associated with the Project which will be 3 storeys or less in height include an Administration building, access control gatehouse, workshop, samples laboratory, ablutions block, staff changing rooms, and warehouse. • The siting and setbacks of these buildings is sufficient to mitigate the potential for overlooking. • The orientation of buildings less than 3 storeys in height within the Project site will take into account the requirement to preserve visual privacy of adjoining land uses, having regard to the placement of upper level windows and external stairways and platforms (where applicable).
Wash-down and Waste Loading and Unloading [All non-residential development]	
PO 32.1 *Areas for activities including loading and unloading, storage of waste refuse bins in commercial and industrial development or wash-down areas used for the cleaning of vehicles, vessels, plant or equipment are:* *a) designed to contain all wastewater likely to pollute stormwater within a bunded and roofed area to exclude the entry of external surface stormwater run-off,* *b) paved with an impervious material to facilitate wastewater collection,* *c) of sufficient size to prevent 'splash-out' or 'over-spray' of wastewater from the wash-down area,* *d) designed to drain wastewater to either:* *i) a treatment device such as a sediment trap and coalescing plate oil separator with subsequent disposal to a sewer, private or Community Wastewater Management Scheme, or* *ii) a holding tank and its subsequent removal off-site on a regular basis.*	• The Project will be designed to comply with all relevant regulatory requirements regarding bunding and spill management, including but not limited to SA EPA Liquid Storage Guideline *Bunding and Spill Management* (updated May 2016). • The Project includes car parking areas and workshop facilities (including wash pad). • Wastewater generated onsite during the operational phase of the Project (other than Process Water) will report to an onsite septic wastewater service, which will be subject to a Wastewater Works Approval under the *Public Health Act 2011* and the *Public Health (Wastewater) Regulations 2013.* • Septic wastewater reporting to the onsite wastewater service, in addition to other wastewater streams unable to be treated to acceptable quality (such as oil separator waste, or wastewater contaminated with oils or fuels) will be collected by a licensed company for removal to a licensed facility. • Stormwater within the Project site will be captured onsite to ensure all runoff from operational areas can be treated, reused or appropriately released.

Desired & Performance Outcomes	Planning Assessment
Design in Urban Areas (where policies vary from Design) DO 1: Development is: a) contextual - by considering, recognising and carefully responding to its natural surroundings or built environment and positively contributes to the character of the immediate area, b) durable - fit for purpose, adaptable and long lasting, c) inclusive - by integrating landscape design to optimise pedestrian and cyclist usability, privacy and equitable access, and promoting the provision of quality spaces integrated with the public realm that can be used for access and recreation and help optimise security and safety both internally and within the public realm, for occupants and visitors, d) sustainable - by integrating sustainable techniques into the design and siting of development and landscaping to improve community health, urban heat, water management, environmental performance, biodiversity and local amenity and to minimise energy consumption.	
Overlooking / Visual Privacy [All non-residential development]	
PO 16.1 *Development mitigates direct overlooking of habitable rooms and private open spaces of adjacent residential uses in neighbourhood-type zones through measures such as:* *a) appropriate site layout and building orientation,* *b) offsetting the location of balconies and windows of habitable rooms or areas with those of other buildings so that views are oblique rather than direct to avoid direct line of sight,* *c) building setbacks from boundaries (including building boundary to boundary where appropriate) that interrupt views or that provide a spatial separation between balconies or windows of habitable rooms,* d) *screening devices that are integrated into the building design and have minimal negative effect on residents' or neighbours' amenity.*	• The Project includes the construction of buildings and plant structures greater than 3 storeys in height, including kiln buildings, purification plant buildings, bagging plant buildings, product storage structures, process water treatment areas and external plant equipment (such as silos) including exterior stairways and platforms for emergency egress. • External stairways and platforms associated with purification circuit buildings may be up to 21.5 m above the finished floor level of the building. • Separation distance of Project buildings, plant and structures from habitable buildings and private open space on adjacent properties contributes to the mitigation of the potential for overlooking. • External stairways and platforms are primarily for emergency egress or maintenance purposes and will not be continuously accessed during operations. • To mitigate the potential for overlooking from external stairways and platforms, construction of external stairways and platforms will not occur on the eastern side of buildings where practical.
Water Sensitive Design [All non-residential development]	
PO 42.1 *Development likely to result in risk of export of sediment, suspended solids, organic matter, nutrients, oil and grease include stormwater management systems designed to minimise pollutants entering stormwater.* **PO 42.2** *Water discharged from a development site is of a physical, chemical and biological condition equivalent to or better than its pre-developed state.* **PO 42.3** *Development includes stormwater management systems to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure that development does not increase peak flows in downstream systems.*	• The Project will address the risk of export of pollutants to stormwater, in an appropriately developed Project-specific Stormwater Management Plan. • Oil, grease and other pollutants present on internal roadways, car parking areas and other paved or trafficked areas of the Project site will be managed through the design of drainage infrastructure, which will include appropriately positioned and designed oil separators and collection equipment, in accordance with the requirements in the *Public Health (Wastewater) Regulations 2013*. • Stormwater run off from the site will be managed having regard to the principles of WSUD, and will be collected within the site prior to release.

Desired & Performance Outcomes	Planning Assessment
Infrastructure and Renewable Energy Facilities DO 1: Efficient provision of infrastructure networks and services, renewable energy facilities and ancillary development in a manner that minimises hazard, is environmentally and culturally sensitive and manages adverse visual impacts on natural and rural landscapes and residential amenity.	
Visual Amenity	
PO 2.3 *Surfaces exposed by earthworks associated with the installation of storage facilities, pipework, penstock, substations and other ancillary plant are reinstated and revegetated to reduce adverse visual impacts on adjacent land.*	• Project elements which involve earthworks will be managed in accordance with best-practice guidelines and all relevant regulatory requirements. • Revegetation of disturbed areas will be addressed in the Project specific CEMP and Landscape Plan.
Water Supply	
PO 11.1 *Development is connected to an appropriate water supply to meet the ongoing requirements of the intended use.*	• The BAM Facility is expected to require up to 4.8ML/day of source water for use in industrial processes (at Stage 2). • Discussions with SA Water have confirmed the supply of water from the SA Water High Salinity Plant (HSP) for the Project. The HSP is a treated wastewater stream and has no effect on the availability of water supply to other consumers. • Flow rates in the SA Water outfall channel have been modelled for a variety of seasonal scenarios and are adequate to support the ongoing requirements of the Project (See Section 9.5 Coastal and Marine). • Water supply to the Project will occur via fixed pipeline connected to the HSP outfall pipeline associated with the Bolivar WWTP, reporting to the demineralisation plant associated with the Project. The pipeline will be installed at surface level for the majority of its alignment, and will include maintenance points and pump stations as required. • Return of treated process water and brine from the demineralisation plant to the SA Water outfall channel will occur via fixed pipeline parallel to the supply pipeline. The outfall location will be downstream from the supply point. The outfall pipeline will include monitoring equipment subject to licensing requirements.
Wastewater Services	
PO 12.1 *Development is connected to an approved common wastewater disposal service with the capacity to meet the requirements of the intended use. Where this is not available an appropriate onsite service is provided to meet the ongoing requirements of the intended use in accordance with the following:* *a) It is wholly located and contained within the allotment of the development it will service* *b) In areas where there is a high risk of contamination of surface, ground or marine water resources from onsite disposal of liquid wastes, disposal systems are included to minimise the risk of pollution to those water resources* *c) Septic tank treated wastewater drainage fields and other wastewater disposal areas*	• The BAM Facility will generate several streams of wastewater from discrete sources. ○ Treated process water, ○ Human wastewater and wastewater from workshop/washpad and car park oil separators, ○ Shut down flush water, and ○ Reverse Osmosis (RO) brine. • Wastewater from the workshop / wash pad, in addition to the car parking area and other trafficked areas, will be directed through appropriately designed industry standard oil-water separators prior to treatment and/or release. Separated oils and contaminants will be collected for release to a licensed facility. • An onsite wastewater service will be incorporated into the plant to process human wastewater generated onsite, pursuant to the requirements of Part 4 of the *Public Health (Wastewater) Regulations 2013*.

Desired & Performance Outcomes	Planning Assessment
are located away from watercourses and flood prone, sloping, saline or poorly drained land to minimise environmental harm. **PO 12.2** *Treated wastewater drainage fields and other wastewater disposal areas are maintained to ensure the effective operation of waste systems and minimise risks to human health and the environment.*	○ No connection to a common wastewater disposal service is available within the Project site. ○ Wastewater from the onsite Wastewater Service (septic) will be removed to an appropriately licensed facility. No onsite disposal of treated human wastewater from an onsite wastewater service is proposed. • Process water will be treated onsite in the dedicated process water treatment plants as an integrated part of plant design. Two separate processes are required to neutralise caustic and acidic process water using appropriate chemical reagents. This process is subject to licensing as a prescribed activity of environmental significance under Schedule 1 of the EP Act, in addition to the operation of the demineralisation plant and subsequent return of treated process water to the SA Water outfall channel. • Treated process water will be returned as a combined stream with demineralisation brine reporting to the SA Water outfall channel via fixed pipeline.
Interface between Land Uses DO 1: Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.	
General Land Use and Compatibility	
PO 1.2 *Development adjacent to a site containing a sensitive receiver (or lawfully approved sensitive receiver) or zone primarily intended to accommodate sensitive receivers is designed to minimise adverse impacts.*	• Sensitive receptors in proximity to the Project site have been identified in Section 3.4 Existing Environment Overview). • Adjacent zoning and land use is not of a neighbourhood type, or of a type primarily intended to accommodate sensitive receivers. • The potential impacts of the Project on sensitive receivers have been explored through the impact assessment process. • Key impacts and their ability to be mitigated or effectively managed are presented in Chapter 8 (Land Use and Site Conditions). • The Project includes a range of impact minimisation, avoidance and mitigation strategies. Impacts are considered to be manageable.
Hours of Operation	
PO 2.1 *Non-residential development does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers) or an adjacent zone primarily for sensitive receivers through its hours of operation having regard to:* *a) the nature of the development* *b) measures to mitigate off-site impacts* *c) the extent to which the development is desired in the zone* *d) measures that might be taken in an adjacent zone primarily for sensitive receivers that mitigate adverse impacts without unreasonably compromising the intended use of that land.*	• Industry is an envisaged form of development in the area of the Project site, although the Project is of a larger scale and intensity than the Rural Horticulture zone generally predicts. • Hours of operation of the Project are to be 24/7 (see Project Description chapter for construction operating hours). • Options are available for the mitigation of potential impacts relating to the hours of operation, which will be further assessed in consultation with plant engineers and stakeholders to determine the best outcome. • The relevant work tasks, safety standards, procedures and equipment will be detailed in the CEMP and OEMP. • Impacts are considered to be manageable.

Desired & Performance Outcomes	Planning Assessment
Overshadowing	
PO 3.1 *Overshadowing of habitable room windows of adjacent residential land uses in:* *a) a neighbourhood-type zone is minimised to maintain access to direct winter sunlight* b) *other zones is managed to enable access to direct winter sunlight.* **PO 3.2** *Overshadowing of the primary area of private open space or communal open space of adjacent residential land uses in:* *a) a neighbourhood-type zone is minimised to maintain access to direct winter sunlight* b) *other zones is managed to enable access to direct winter sunlight.*	• Adjacent land uses are not neighbourhood-type zones or zones primarily intended to accommodate sensitive receivers. • Shadow diagrams for the Project have been generated to inform the impact assessment process (Appendix 15 Visual Amenity Impact Assessment). Assessment of the potential for overshadowing of adjacent agricultural land has been conducted in accordance with the relevant guidelines. • The Project will not prejudice the accessibility of direct winter sun to adjacent properties (including agricultural land) between the hours of 9:00 am and 3:00 pm on 21 June (winter solstice). • Shadow diagrams have been produced for the Summer solstice, in addition to the Winter solstice.
Activities Generating Noise or Vibration	
PO 4.1 *Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers).* **PO 4.2** *Areas for the onsite manoeuvring of service and delivery vehicles, plant and equipment, outdoor work spaces (and the like) are designed and sited to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers due to noise and vibration by adopting techniques including:* *a. locating the openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers* *b. When sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers* *c. Housing plant and equipment within an enclosed structure or acoustic enclosure* *d. Providing a suitable acoustic barrier between the plant and/or equipment and the adjacent sensitive receiver boundary or zone.* **PO 4.4** *External noise into bedrooms is minimised by separating or shielding these rooms from service equipment areas and fixed noise sources located on the same or an adjoining allotment.*	• The Project involves noise-generating activities identified in Section 11.3 (Noise). • A noise assessment including associated modelling has been conducted (Appendix 12), considering the contribution of the Project to background noise already present in the locality. • Minor exceedances of the stipulated noise limits expressed through the *Environment Protection (Commercial and Industrial Noise) Policy 2023* have been identified, which have the potential to impact on the nearest sensitive receivers to the Project site. • Options are available for the mitigation of potential noise impacts, which will be further assessed in consultation with plant engineers and stakeholders to determine the best outcome. • The relevant work tasks, safety standards, procedures and equipment will be detailed in the CEMP and OEMP. • Impacts are considered to be manageable.

Desired & Performance Outcomes	Planning Assessment
Air Quality	
PO 5.1 *Development with the potential to emit harmful or nuisance-generating air pollution incorporates air pollution control measures to prevent harm to human health or unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers) within the locality and zones primarily intended to accommodate sensitive receivers.* **PO 5.2** *Development that includes chimneys or exhaust flues (including cafes, restaurants and fast food outlets) is designed to minimise nuisance or adverse health impacts to sensitive receivers (or lawfully approved sensitive receivers) by:* *a) Incorporating appropriate treatment technology before exhaust emissions are released* b) *Locating and designing chimneys or exhaust flues to maximise the dispersion of exhaust emissions, taking into account the location of sensitive receivers*	• The Project will emit combustion gases and small concentrations of particulate matter to the air, identified in Section 11.2 (Air Quality). • An air quality assessment including associated modelling has been conducted (Appendix 11). • Air quality modelling indicates that the Project at all stages of development will comply with the relevant criteria for the protection of human health, the environment, and the amenity of the locality. • Air pollution control measures which comply with industry standards will be adequate to mitigate air quality impacts from the Project.
Light Spill	
PO 6.1 *External lighting is positioned and designed to not cause unreasonable light spill impact on adjacent sensitive receivers (or lawfully approved sensitive receivers).* **PO 6.2** *External lighting is not hazardous to motorists or cyclists.*	• External lighting will be installed within the Project site (see Chapter 3 Description of the proposed Project). • External lighting incorporated into the Project will be designed and positioned in accordance with relevant guidelines and policies to minimise impacts to the environment or sensitive receptors, including Australian Standard 4282 --- Control of the obtrusive effects of outdoor lighting. • The Project site is within the Controlled Lighting Zone of the Edinburgh RAAF Base, expressed through the Building Near Airfields Overlay and Concept Plan 81. External lighting will additionally have regard for the provisions of Australian Defence Force Publication 602 (ADFP 602). • Factors such as energy efficiency, building setbacks, screening and separation distance of the Project from sensitive receptors are anticipated to be important in mitigating the effects of light spill. • External lighting is entirely contained within the boundaries of the Project site. No hazard to motorists or cyclists in the adjacent public realm is likely. • Signage associated with the Project will be unobtrusive and will not be illuminated.
Solar Reflectivity / Glare	
PO 7.1 *Development is designed and comprised of materials and finishes that do not unreasonably cause a distraction to adjacent road users and pedestrian areas or unreasonably cause heat loading and micro-climatic impacts on adjacent buildings and land uses as a result of reflective solar glare.*	• Buildings and structures associated with the Project will be constructed and finished in materials and finishes which are low-reflectivity, and in a schedule of colours which blend in with the surrounding environment and local context (See Chapter 16 Design Quality).

Desired & Performance Outcomes	Planning Assessment
Interface with Rural Activities	
PO 9.7 *Urban development does not prejudice existing agricultural and horticultural activities through appropriate separation and design techniques.*	• The Project is separated from existing horticultural and agricultural activities as far as reasonably practicable, having regard to the likely sources of impacts to sensitive receptors (including visual amenity, noise and stormwater). • The Project incorporates a range of industry standard impact-mitigation technology and devices including air emissions scrubbing equipment, dust containment and mitigation, stormwater management infrastructure, which have been modelled as adequate to mitigate identified potential impacts to within acceptable limits. • The Project is adequately separated from existing agricultural and horticultural activities with appropriate mitigation measures so as not to prejudice their ongoing operations.
Transport, Access and Parking DO 1: A comprehensive, integrated and connected transport system that is safe, sustainable, efficient, convenient and accessible to all users.	
Movement Systems	
PO 1.1 *Development is integrated with the existing transport system and designed to minimise its potential impact on the functional performance of the transport system.* **PO 1.3** *Industrial, commercial and service vehicle movements, loading areas and designated parking spaces are separated from passenger vehicle car parking areas to ensure efficient and safe movement and minimise potential conflict.* **PO 1.4** *Development is sited and designed so that loading, unloading and turning of all traffic avoids interrupting the operation of and queuing on public roads and pedestrian paths.*	• The Project necessitates an increase in heavy vehicle movements to and from the Project site both during construction and operations, identified in Section 11.4 (Transport and traffic), including the transport of dangerous substances (See Section 15.6 Dangerous Substances). • A traffic impact assessment and Heavy Vehicle Route Assessment including associated modelling have been conducted (Appendix 13, Appendix 14). • Impacts of the Project on public safety and the transport system have been modelled and are described as being as low as reasonably practicable (ALARP). • Heavy vehicle movements within the Project site are separated from light vehicle parking areas. The Project site is designed to allow the efficient and safe movement of heavy vehicles within the site. • No queuing on public roads is anticipated to occur during construction or operation of the Project, with all heavy vehicle movements associated with the delivery, loading, unloading and export of materials able to be conducted onsite.
Sightlines	
PO 2.1 *Sightlines at intersections, pedestrian and cycle crossings, and crossovers to allotments for motorists, cyclists and pedestrians are maintained or enhanced to ensure safety for all road users and pedestrians.* **PO 2.2** *Walls, fencing and landscaping adjacent to driveways and corner sites are designed to provide adequate sightlines between vehicles and pedestrians.*	• Sightlines at the crossover from the Project site to Robinson Road are good, and will remain uninterrupted. No dedicated pedestrian or cycle infrastructure is present, however pedestrians may be present around adjacent horticultural land uses. • The traffic impact assessment has been undertaken assuming that the planned upgrades to Robinson Road are executed prior to construction of the Project commencing.

Desired & Performance Outcomes	Planning Assessment
Vehicle Access	
PO 3.1 *Safe and convenient access minimises impact or interruption on the operation of public roads.* **PO 3.3** *Access points are sited and designed to accommodate the type and volume of traffic likely to be generated by the development or land use.* **PO 3.4** *Access points are sited and designed to minimise any adverse impacts on neighbouring properties.* **PO 3.8** *Driveways, access points, access tracks and parking areas are designed and constructed to allow adequate movement and manoeuvrability having regard to the types of vehicles that are reasonably anticipated.* **PO 3.9** *Development is designed to ensure vehicle circulation between activity areas occurs within the site without the need to use public roads.*	• Access point to the Project site is proposed approximately 150 m south of the intersection of Robinson Road and Waterloo Corner Interchange Road. • The access point is designed to handle the type and volume of vehicle movements expected to occur in association with the Project, and no impact or interruption to the operation of public roads, including queuing, interruption of sightlines, or use of public roads to move between activity areas of the Project is anticipated.
Vehicle Parking Rates	
PO 5.1 *Sufficient onsite vehicle parking and specifically marked accessible car parking places are provided to meet the needs of the development or land use having regard to factors that may support a reduced onsite rate such as:* • *Availability of on-street car parking* • *Shared use of other parking areas* • *In relation to a mixed-use development, where the hours of operation of commercial activities complement the residential use of the site, the provision of vehicle parking may be shared* • *The adaptive reuse of a State or Local Heritage Place.*	• Transport, Access and Parking General Development Policies, Table 1 - General Off-Street Car Parking Requirements require that development classified as Industry provides off-street car parking at a rate of 1.5 spaces per 100m^2 of total development floor area. • Following Stage 2 expansion of the Project, the BAM Facility's total floor area will be approximately 140,000m^2, meaning that the Project would require 2,100 onsite car parking spaces (Appendix 13 – Traffic Impact Assessment). This is considered substantially in excess of operational requirements. • The Project will incorporate the provision of ~120 onsite car parks at Stage 2, which is considered satisfactory for the expected number of personnel onsite during ongoing operations. • Car parking areas will be designed to comply with AS2890.1 Off-Street Parking.
Vehicle Parking Areas	
PO 6.1 *Vehicle parking areas are sited and designed to minimise impact on the operation of public roads by avoiding the use of public roads when moving from one part of a parking area to another.* **PO 6.2** *Vehicle parking areas are appropriately located, designed and constructed to minimise impacts on adjacent sensitive receivers through measures such as ensuring they are attractively developed and landscaped, screen fenced, and the like.* **PO 6.5** *Vehicle parking areas that are likely to be used during non-daylight hours are provided with*	• All car parking will be sited within the boundary of the Project site. Internal roadways, loading areas and designated parking spaces for service vehicles will be provided entirely within the site boundary. • No use of public roads to move from one part of the Project to another is proposed or expected. • The layout and orientation of car parking spaces is subject to final plant design, and will be designed to comply with AS2890.1. • Loading areas for service vehicles associated with Project activities are integrated into plant design, and are entirely within the boundary of the Project site.

Desired & Performance Outcomes	Planning Assessment
sufficient lighting to entry and exit points to ensure clear visibility to users. **PO 6.6** *Loading areas and designated parking spaces for service vehicles are provided within the boundary of the site.*	
Waste Treatment and Management Facilities DO 1: Mitigation of the potential environmental and amenity impacts of waste treatment and management facilities.	
Soil and Water Protection	
PO 2.1 *Soil, groundwater and surface water are protected from contamination from waste treatment and management facilities through measures such as:* *a) containing potential groundwater and surface water contaminants within waste operations areas* *b) diverting clean stormwater away from waste operations areas and potentially contaminated areas* c) *providing a leachate barrier between waste operations areas and underlying soil and groundwater.*	• Process water treatment will occur in appropriately contained structures separated from groundwater and surface water, including stormwater (See Chapter 3 Description of the proposed Project, and Chapter 9 Physical Environment). • Human wastewater (per Water Quality EPP definition) will be subject to containment required by the Wastewater Regulations. • Stormwater catchments have been divided into area which divert clean stormwater areas and operations areas, incorporating industry standard oil water separators and pollution containment. Operations area stormwater will be treated onsite in appropriately contained structures separated from groundwater and clean stormwater, with contaminants collected for removal to licensed facilities in accordance with the requirements of the Water Quality EPP and the *Public Health (Wastewater) Guidelines 2013.*
Amenity	
PO 3.1 *Waste treatment and management facilities are screened, located and designed to minimise adverse visual impacts on amenity.*	• Equipment and structures associated with the Process water treatment plants will be screened appropriately and designed to minimise adverse impacts to the amenity of the locality, commensurate with other structures associated with the Project. Waste treatment and management areas of the Project site are set back from property boundaries to the greatest extent practicable. • Solid process by-products (principally in the form of chemical precipitates from the process water treatment plants) will be stored in appropriate containment structures constructed to meet all relevant standards.
Major Wastewater Treatment Facilities	
PO 8.1 *Major wastewater treatment and disposal systems, including lagoons, are designed to minimise potential adverse odour impacts on sensitive receivers, minimise public and environmental health risks and protect water quality.*	• The Project includes the treatment of process water (See Chapter 3 Description of the proposed Project, and Chapter 9 Physical Environment). • Treated process water generated by the Project is not hazardous to the environment/humans or liable to become foul, and does not contain organic or putrescible material. • The treatment of process water in the volumes required to support the Project is a prescribed activity of environmental significance as defined by Schedule 1 of the EP Act (see Section 4.4 *Environment Protection Act)* and will be a licensed activity, subject to ongoing monitoring and controls.

Desired & Performance Outcomes	Planning Assessment
	• Process water treatment associated with the Project will not involve the use of lagoons. Treated process water will be returned to the SA Water outfall channel via dedicated pipeline, subject to all appropriate licences and monitoring programs.

5.6.3 Zones

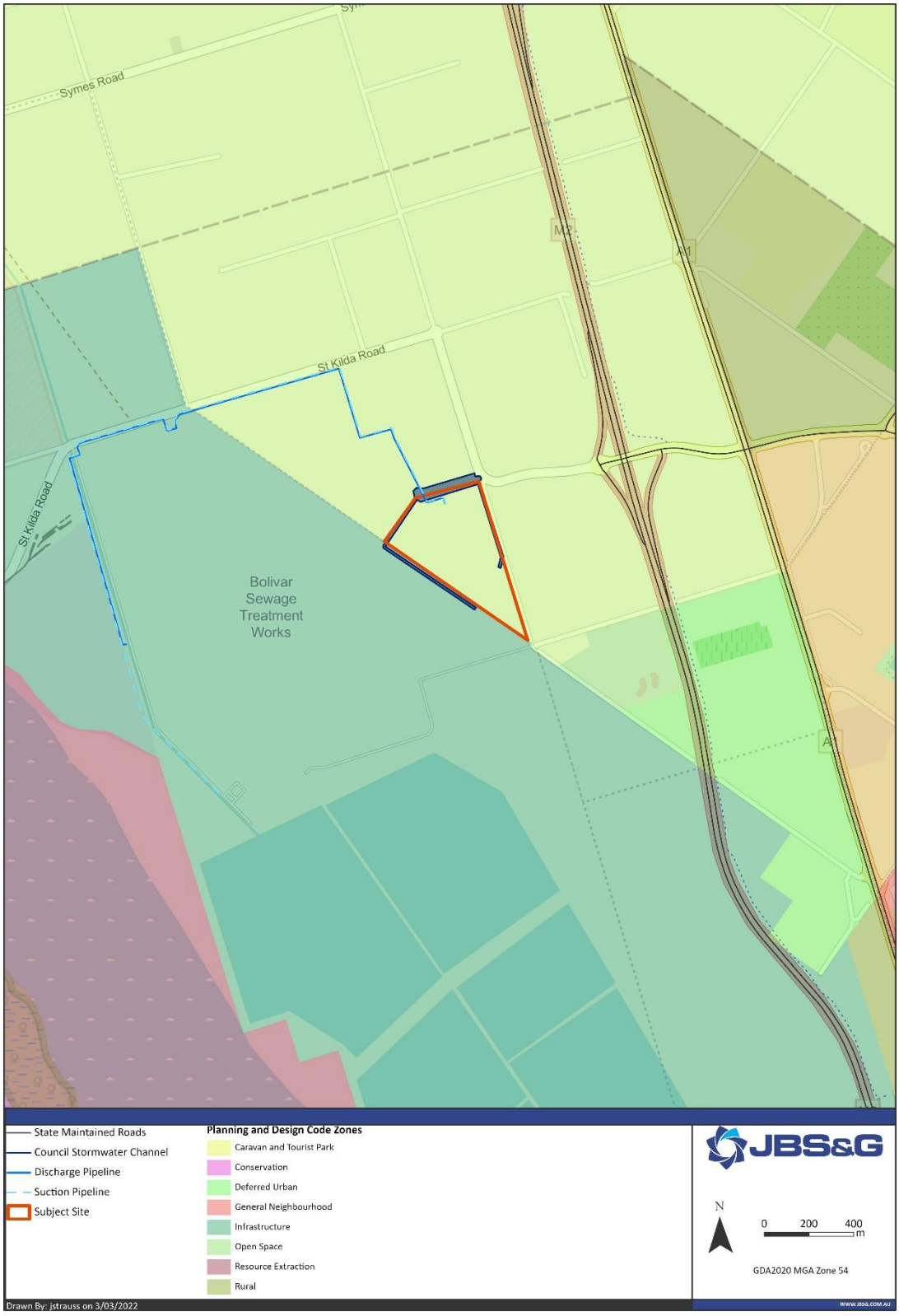


Figure 5-3: Planning and Design Code – Zoning – Project Area

Rural Horticulture Zone

The Rural Horticulture Zone is principally a food production zone which envisages intensive agriculture or horticulture, along with appropriately scaled and related industrial development. The Zone also envisages that incompatible land uses which would be adversely impacted by adjacent agricultural or horticultural activities be minimised, but allows for the on-merit development of compatible, non-sensitive land uses which do not prejudice the envisaged horticultural use of land. Renascor's BAM Facility aligns with this definition.

The Desired Outcomes of the Zone are;

- DO 1: Intensive agriculture in the form of horticulture and associated value-adding enterprises and activities.
- DO 2: The establishment of appropriately scaled industries for washing, processing, bottling and packaging primary produce and servicing and supporting horticulture.
- DO 3: Manage interface conflict between horticulture and other land uses.

The Project represents a land use (Industry) which is of a lesser sensitivity as compared to horticultural activities in the locality, by the definition provided in Table 1 of Practice Direction 14. Adjacent sensitive receptors identified in Section 3.4.5 (Description of the proposed Project – Sensitive receptors) have conservatively been assumed to include occupied dwellings.

While Renascor's BAM Facility is an industrial development and may be categorised as an envisaged form of development within the Rural Horticulture Zone (as per Performance Outcome (PO) 1.1), it is not associated with an agricultural or horticultural enterprise. The scale and intensity of the Project is substantial, and not envisaged by the Code to occur within the Rural Horticulture Zone. Thus, the Project does not align with the Desired Outcomes of the zone. However, the Project is not significantly at variance with the relevant Performance Outcomes, and impact assessment shows that the expected, predicted or potential impacts of the Project are able to be satisfactorily managed.

No displacement of existing agricultural or horticultural activity at the Project site will occur, nor will the Project displace or prevent the ongoing or future use of the immediate vicinity for horticultural purposes. Interface conflict with adjacent horticultural land uses is the subject of impact assessment, discussed throughout this EIS, including in Chapter 8 (Land Use and Site Conditions) and Chapter 11 (Amenity and Environmental Quality). The potential of the Project to displace future horticultural land use was considered during the site selection process. The location of the Project site within the buffer zone of the Bolivar WWTP, the land use of the Project site (Utilities / Industry) and SA Water's ownership of the land indicates that the Project site is unlikely to be useable for intensive horticulture or primary production purposes. The Project does not amount to a loss of agricultural or horticultural land.

The City of Salisbury's SGF articulates anticipated future land uses in the locality, which includes the future establishment of green industry and an intensification of commercial activity in the area. Renascor's BAM Facility is a commensurate development with the stated objectives for redevelopment of the locality.

The built form of the Project once completed is likely to be the dominant landscape feature in the immediate vicinity. Development of a similar scale exists within the broader locality, including the Torrens Island power station complex, the Bolivar WWTP and associated buildings, and the Iberdrola peaking power station. A detailed investigation of the visual impact of the Project is provided in

Section 11.5 (Visual Amenity), with visualisations (including long view visualisations) of the Project in the context of its receiving environment presented in Appendix 15 (Visual Amenity Impact Assessment).

Access to the Project site is broadly in alignment with the Performance Outcomes of the Zone, with primary access occurring from Robinson Road via the Waterloo Corner Interchange Connector Road to the North South Motorway and Port Wakefield Road.

Figure 5-3 shows the location of the Project site in relation to the Rural Horticulture Zone and adjacent zones. Table 5-8 provides assessment of the Project against the relevant Performance Outcomes for Industry within the Rural Horticulture Zone, identified using Part 2, Table 3 of the Code.

Table 5-8: Performance Outcomes – Industry within Rural Horticulture Zone

Performance Outcome	Planning Assessment
Land Use and Intensity	
PO 1.1 *The productive value of horticultural land for a range of agricultural, intensive horticultural activities and associated value adding, processing, warehousing and distribution activities is supported, protected and maintained. The proliferation of other land uses that may be sensitive to those activities is avoided.*	• The Project does not prejudice the existing or ongoing use of agricultural, horticultural or associated value-adding activities in the Waterloo Corner locality. The current land use of the Project site is Utilities / Industry. The Project site is freehold land owned by the SA Water Corporation. • The likelihood of the Project site being utilised for agriculture or intensive horticulture in the absence of the Project is considered low, given the site's adjacency to the Bolivar WWTP and its tenure. • The Project is not a land use which is sensitive to the ongoing use of adjacent land for agricultural and horticultural activities.
Siting and Design	
PO 2.1 *Development is provided with suitable vehicle access.*	• The Project site has good frontage and interconnectivity to Robinson Road and the Waterloo Corner Interchange Connector which links directly to the North South Motorway and Port Wakefield Road. • Sightlines at the Robinson Road / Waterloo Corner Interchange Connector intersection are good in both directions from all approaches. • Access to the Project site is to be via a purpose-built crossover approximately 150 m south of the Robinson Road / Waterloo Corner Interchange Connector intersection, and will be engineered to handle the volume and type of traffic envisaged by the Project.
PO 2.2 *Buildings are generally located on flat land to avoid cut and fill and the associated visual impacts.*	• The existing topography of the Project site is generally flat, varying in elevation between 4 m to 6 m AHD (Australian Height Datum). Due to the relatively flat nature of the site, minimal cut or surface levelling is expected. • Some filling of the Project site will be required to elevate finished floor level to greater than 300 mm above the level of a 1% AEP flood event to manage and mitigate potential flood risks. • Importation of fill will not alter the natural topography of the site unduly, and will be appropriately landscaped, screened and vegetated.
Built Form and Character	
PO 11.1 *Large buildings are designed and sited to reduce impacts on scenic and rural vistas by:* *a. Having substantial setbacks from boundaries and adjacent public roads* *b. Using low-reflective materials and finishes that blend with the surrounding landscape* c. *Being located below ridgelines.*	• The Project may be a dominant feature in the local landscape during construction and operational phases. The receiving environment is predominantly open, flat land displaying low topographic relief. • Industrial and commercial activity on a comparable scale and intensity to the Project exists in the broader locality in a scattered pattern of development. Industrial buildings including the Torrens Island and Iberdrola power stations, the Bolivar WWTP and the Viterra grain silos on LeFevre Peninsula are visible from the locality of the Project site. • The Project will be visible from receptors including the North South Motorway, the St Kilda Township and boat ramp, and potentially from parts of the coastal mangroves at St Kilda. Visual impact assessment including associated modelling and digital visualisations has been conducted, with results presented in Section 11.5 (Visual Amenity). • The Project will utilise materials and finished that blend with the surrounding landscape and local context.

Infrastructure Zone

The Infrastructure Zone is principally intended to accommodate utilities infrastructure and supporting services. The Infrastructure Zone captures the Bolivar WWTP. Water intake and outfall pipelines associated with the Project interact with the Infrastructure Zone adjacent the SA Water Outfall Channel and evaporation ponds.

The Desired Outcomes of the Infrastructure Zone are:

- DO 1: The protection, provision, maintenance and expansion of infrastructure services and facilities that support orderly development and vehicular movements.
- DO 2: Infrastructure services and facilities manage environmental impacts.

Pipelines are proposed to be above ground for the majority of their alignment (shown in Figure 5-3) with sections to be installed underground where required to cross road reserves. Pipeline installation will also include pumping, monitoring, maintenance and safety equipment as necessary. Installation of pipelines is expected to occur in accordance with appropriate land access arrangements between Renascor and SA Water as the landowner. Micro siting of pipelines will be undertaken during installation to minimise environmental impacts. Some minor clearance of vegetation may be required to provide access to the pipeline corridor adjacent St Kilda Road. Installation is expected to occur following a hierarchy of *avoid, minimise, mitigate, offset* with regard to vegetation clearance and soil disturbance.

The entirety of the water intake and outfall pipeline alignment is proposed to occur within land owned by SA Water, and as a result does not propose to convey water leaving infrastructure used for the treatment of sewage outside of property boundaries.

As water conveyance infrastructure supporting an industrial development which do not prejudice the water availability of other consumers, or the intended use of land on which they are constructed, the water intake and outfall pipelines associated with the Project are compliant with the Desired Outcomes and Performance Outcomes of the Infrastructure Zone.

5.6.4 Infrastructure and Transport Overlays

Building Near Airfields

The Desired Outcome of the Building Near Airfields Overlay is that development should:

- Maintain the operational and safety requirements of certified commercial and military airfields, airports, airstrips and helicopter landing sites through management of non-residential lighting, turbulence and activities that may attract or result in the congregation of wildlife.

The Project is approximately 4.3 km west-southwest of the Edinburgh RAAF base. The relative positions of the airfield and the Project relative to the relevant overlays are shown in Figure 5-4 and Figure 5-5. The Project will incorporate exterior lighting, which will be designed and managed so as not to pose a hazard to commercial or military aircraft operations in accordance with the relevant sections of Australian Defence Force Publication 602 (ADFP 602). Assessment against the Performance Outcomes of the Overlay is provided in Table 5-9.

Figure 5-5 demonstrates indicative flightpaths for aircraft during take-off from or on final approach to the Edinburgh RAAF Base, as shown in Concept Plan 81 – Edinburgh Defence Airfield Lighting

Constraints. The Project site is approximately 300 m to the west of the greatest extent of Zone D associated with aircraft egress from Runway 22, and final approach to Runway 04. While the Project exists within the Controlled Light Installation Area (6 km buffer from runways), it is outside of the designated Light Intensity Zones.

Installation of exterior lighting will be undertaken having regard to ADFP 602 and AS 4282 (Control of the obtrusive effects of outdoor lighting). The Project is able to comply with all requirements of the Overlay.

Table 5-9: Performance Outcomes – Building Near Airfields Overlay

Performance Outcome	Planning Assessment
Outdoor Lighting	
PO 1.1 *Outdoor lighting associated with a non-residential use does not pose a hazard to commercial or military aircraft operations.*	• External lighting incorporated into the Project will be designed and positioned in accordance with relevant guidelines and policies such as ADFP 602 and AS 4282 to minimise impacts to the environment or sensitive receivers, and to not pose a hazard to the operation of commercial or military aircraft.
Attraction or Congregation of Wildlife	
PO 1.2 *Development likely to attract or result in the congregation of wildlife is adequately separated from airfields to minimise the potential for aircraft wildlife strike*.	• The Project is not of a nature which is likely to attract or cause the congregation of wildlife which can pose a threat to aviation safety.
Separation Distance of Buildings from Airfields	
PO 1.3 *Buildings are adequately separated from runways and other take-off and landing facilities within certified or registered aerodromes to minimise the potential for building-generated turbulence and windshear that may pose a safety hazard to aircraft flight movement*.	• The Project site is approximately 4.3 km west-south-west from the RAAF Base Edinburgh, and is located outside the Extraneous Lighting Control Zones as described in Concept Plan 81 – Edinburgh Defence Airfield Lighting Constraints. • The Project site is within the 6 km Controlled Light Installation Area buffer zone, necessitating lighting controls as per the requirements of ADFP 602. • The Project is located with adequate separation distance from the nearest runway centreline to satisfy building-generated windshear prevention requirements.



Figure 5-4: Building Near Airfields Overlay

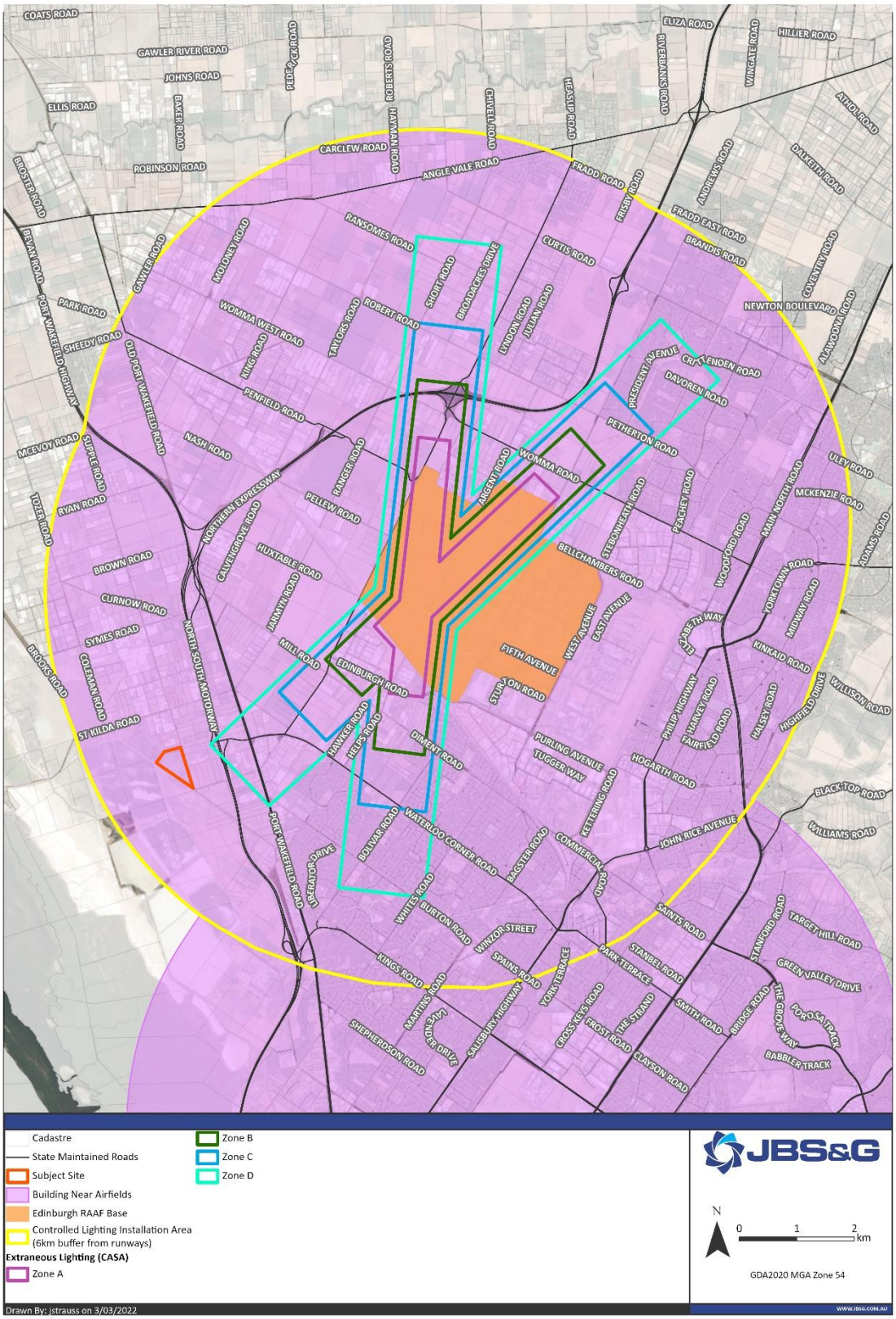


Figure 5-5: Concept Plan 81: Edinburgh Defence Airfield Lighting Constraint

Defence Aviation Areas

The Defence Aviation Areas Overlay applies to the Project site, on the border between the 45 m and 90 m maximum building height zones identified by the SAPPA. The Project site is within the 45 m maximum building height zone. The Desired Outcome of the overlay is that development should achieve:

- Management of potential impacts of buildings on the operational and safety requirements of Defence Aviation Areas

No part of the BAM Facility is expected to exceed 45 m in height during ongoing operations. In the event that the height of construction equipment may temporarily exceed 45 m in height, Renascor will liaise with the Civil Aviation Safety Authority (CASA) to obtain the necessary permits / clearances to undertake construction work.

Table 5-10: Performance Outcomes – Defence Aviation Areas Overlay

Performance Outcome	Planning Assessment
PO 1.1 *Building height does not pose a hazard to the operations of Defence Aviation Areas.* PO 1.2 *Exhaust stacks are designed and sited to minimise plume impacts on aircraft movements associated with Defence Aviation Areas.*	Building Height
	• No permanent constructed element of the Project is expected to exceed the 45 m height limit (including exhaust stacks). • In the event that mobile construction equipment (for example, cranes) is expected to exceed 45 m in height, all appropriate permits will be sought.
	Exhaust Stack Plume Impacts
	• The separation distance of the Project from the nearest airfield, and the position of the Project site (off-set from the centreline of the nearest approach corridor) minimise the potential for exhaust plume impacts to aircraft movements. Expected stack emission velocities and temperatures, as well as stack heights, are presented in Appendix 11 (Air Quality Impact Assessment).

Gas and Liquid Petroleum Pipelines

The Gas and Liquid Petroleum Pipelines Overlay applies to the Project, due to the adjacency of the SEAGas pipeline to the southern boundary of the Project site and the presence of the Moomba-Adelaide Gas Pipeline which crosses the SA Water outfall channel near to the location of the water intake and outfall pipelines, as shown in Figure 5-6. The Desired Outcome of the overlay is that development should achieve:

Management of risk to public safety, the environment and security of energy supply from the encroachment of development on strategic gas and liquid petroleum pipelines.

Colocation with the SEAGas pipeline was considered to be of significant potential benefit to the BAM Facility and was a key secondary constraint during the site selection process. The Performance Outcomes of the overlay aim to avoid unacceptable risk resulting from the failure of a gas or liquid petroleum pipeline by ensuring adequate separation distance between pipelines and forms of development which:

- Accommodate or result in large congregations of people
- Involve the manufacture, collection, handling or bulk storage of flammable, explosive, or otherwise hazardous materials.

The overlay also seeks to restrict forms of development which may pose additional or unacceptable risk to the community or environment in the event of a pipeline failure, or forms of development which may in themselves risk causing pipeline damage or failure. General Industry is the primary form of development associated with the Project, which is listed as development warranting referral under Schedule 9 (3)(9B) of the PDI Regulations. The Project also includes waste treatment as a licensed activity. The referral body in this instance is the Department of Energy and Mining.

The main development site of the Project (the BAM Facility site) interacts with the Gas and Liquid Petroleum Pipelines Overlay only in the far southern corner of the site. It is recognised that as a development likely to be classified as General Industry, the Project would, under the provisions of the Code (DTS/DPF 1.3 (b)) be required to occur in accordance with an agreement under Section 123 of the Act if being assessed through the standard Development Application pathway.

Installation of water intake and outfall pipelines will be conducted having regard to all industry standard safety procedures and protocols, particularly where excavation is required for underground installation of a water pipeline.

Table 5-11: Performance Outcomes - Gas and Liquid Petroleum Pipelines Overlay

Performance Outcome	Planning Assessment
PO 1.1 *Community exposure to a potential hazard from the failure of a gas or liquid petroleum pipeline is mitigated by locating development that may accommodate or result in large congregations of people, buildings for housing and / or caring for vulnerable people and community facilities outside areas that pose an unacceptable risk to protect life.* **PO 1.3** *Development involving the manufacture, collection, handling or bulk storage of flammable, explosive, or otherwise hazardous materials is located and designed to avoid escalating the potential for and effects of a gas or liquid petroleum pipeline failure.*	Class of Development & Community Exposure to Risk • The Project will involve the presence of up to several hundred persons in association with the construction, operation and expansion of the Project, however most activity will occur outside the Gas and Liquid Petroleum Pipelines Overlay. • The Project contains industrial buildings of 3 or more building levels, however the nature of the development is such that no congregation of persons defined as vulnerable under DTS/DPF 1.1 will occur in connection with the Project. Class of Development & Potential for Risk Escalation • The Project involves the handling of hazardous materials, however no such materials nor the activities they are utilised for are expected to be carried out within the Gas and Liquid Petroleum Pipelines Overlay. • The Project, being General Industry, is at variance with DTS/DPF 1.3 and may require referral under Schedule 9 of the PDI Regulations.

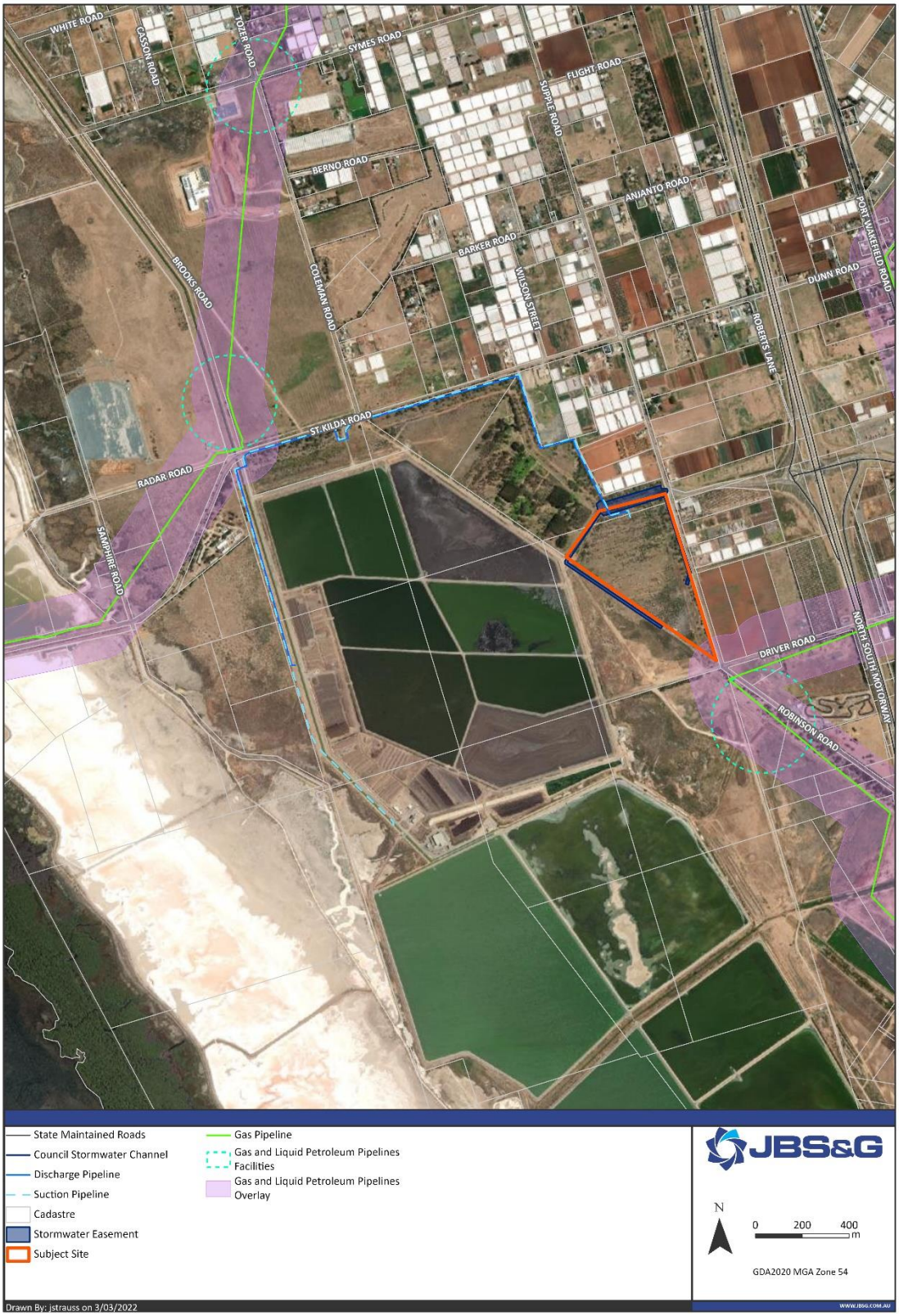


Figure 5-6: Gas and Liquid Petroleum Pipelines Overlay

Major Urban Transport Routes

The Major Urban Transport Routes Overlay applies to the Project site. The overlay seeks to ensure that development does not negatively affect the operation of nearby State Maintained Roads. The Project site occurs primarily adjacent to Robinson Road and Waterloo Corner Interchange Connector, both of which are local roads connecting to State Maintained Roads.

The Desired Outcomes of the Major Urban Transport Routes Overlay state that development should ensure:

- DO 1: Safe and efficient operation of Major Urban Transport Routes for all road users.
- DO 2: Provision of safe and efficient access to and from Major Urban Transport Routes.

The Project will utilise the North South Motorway and Port Wakefield Road for inward and outward movement of heavy vehicles in association with construction and operations. A traffic impact assessment and Heavy Vehicle Route Assessment (HVRA) has been conducted (see Section 11.4 Transport and traffic).

Figure 5-7 shows the relationship between the Project site and the Major Urban Transport Routes Overlay. Performance Objectives have been constrained for the purposes of this assessment by excluding those which relate directly to development which interfaces with a State Maintained Road, or those which relate to forms of development not relevant to the Project.

The BAM Facility is proposed to be accessed via a single primary entry constructed on the eastern boundary of the site, forming a crossover with Robinson Road approximately 150 m south of the intersection of Robinson Road and Waterloo Corner Interchange Connector. This entry is designed to accommodate heavy vehicles and for ongoing operations will include access control in the form of a securitised gate. The impact of the Project on State Maintained Roads has been modelled to be low (Appendix 13 – Traffic Impact Assessment).

Construction of the BAM Facility will be contained within the Project site. No significant impacts to the operability of adjacent roads is expected to occur, and no statistically significant change to traffic volumes on nearly State maintained roads is expected.

Installation of water intake and outfall pipelines will occur internally from within land owned by SA Water, utilising existing private access roads. Access via these roads would be negotiated with SA Water and would mitigate impacts of construction on the operation of St Kilda Road. In the event of access via St Kilda Rd, traffic control requirements would be articulated in the Project-specific CEMP and applicable Traffic Management Plan, having regard to all relevant traffic control standards and practices.

The Project is able to comply with all relevant requirements of the Overlay. Assessment against the Performance Outcomes of the Overlay is provided in Table 5-12.

Table 5-12: Performance Outcomes - Major Urban Transport Routes Overlay

Overlay	Planning Assessment
PO 2.1 *Sufficient accessible onsite queuing adjacent to access points is provided to meet the needs of development so that all vehicle queues can be contained fully within the boundaries of the development site, to minimise interruption of the functional performance of the road and maintain safe vehicle movements.*	• Movement of vehicles within the Project site is integral to the operation of the BAM Facility. Internal roadways connected to the primary access point allow for the queuing of vehicles (if necessary) entirely within the boundaries of the Project site. • Traffic volumes along Robinson Road are low. Upgrades to Robinson Road are scheduled to occur which will render the road suitable for heavy vehicle traffic associated with the Project, and other operations in the locality.
PO 4.1 *New access points are spaced apart from any existing access point or public road junction to manage impediments to traffic flow and maintain safe and efficient operating conditions on the road.*	• The proposed primary access point to the Project site is located approximately 150 m south of the intersection of Waterloo Corner Interchange Connector Rd and Robinson Rd. • The location of site access has taken into consideration the volume of traffic likely to be generated by the BAM Facility and the size of vehicles, modelled by Heavy Vehicle Route Assessment (HVRA – Appendix 14), to ensure that impacts to the road network are effectively minimised. • Access points to adjoining properties exist in the vicinity of the proposed access point to the Project site, and are generally in the form of unsealed driveways. • The proposed access point associated with the Project is offset from existing access points.
PO 5.1 *Access points are located and designed to accommodate sight lines that enable drivers and pedestrians to navigate potential conflict points with roads in a controlled and safe manner.*	• The north-south alignment of Robinson Road provides good sightlines from the proposed access point to the Project site. • The proposed access point is designed having regard to all relevant provisions and will establish and maintain safe sightlines. • The intersection of Robinson and Waterloo Corner Interchange Connector Roads is elevated relative to the Project site, and the alignment of Waterloo Corner Interchange Connector is such that sight lines from this intersection in both directions are excellent for vehicles egressing towards the North-South Motorway.
PO 6.1 *Access points constructed to minimise mud or other debris being carried or transferred onto the road to ensure safe road operating conditions.*	• Entry curtilage and turning areas within the Project site will be sealed, and all other vehicle access within the Project site will be treated with all-weather trafficable surfaces, commensurate with the industrial nature of the development and necessity to accommodate heavy vehicles in all weather conditions. Resultantly, no mud or debris drag-out is anticipated during operations. • Management of drag-out during construction and commissioning will be through standard industry practice and detailed in the Project-specific CEMP.
PO 7.1 *Access points designed to minimise negative impact on roadside drainage of water.*	• The Project will incorporate integrated stormwater management, including drainage and consideration of stormwater outflows from the Project site. • At present, no constructed roadside drainage infrastructure is present and the EIS has been developed assuming that Robinson Road will have been upgraded prior to construction of the Project commencing. The site access point will be constructed to comply with all relevant standards.
PO 10.1 *Development is located and designed to maintain sightlines for drivers turning into and out of public road junctions to contribute to driver safety*.	• The Project is set back a significant distance from the nearest public road junction. Buildings associated with the Project present a low risk of interference to sight lines.

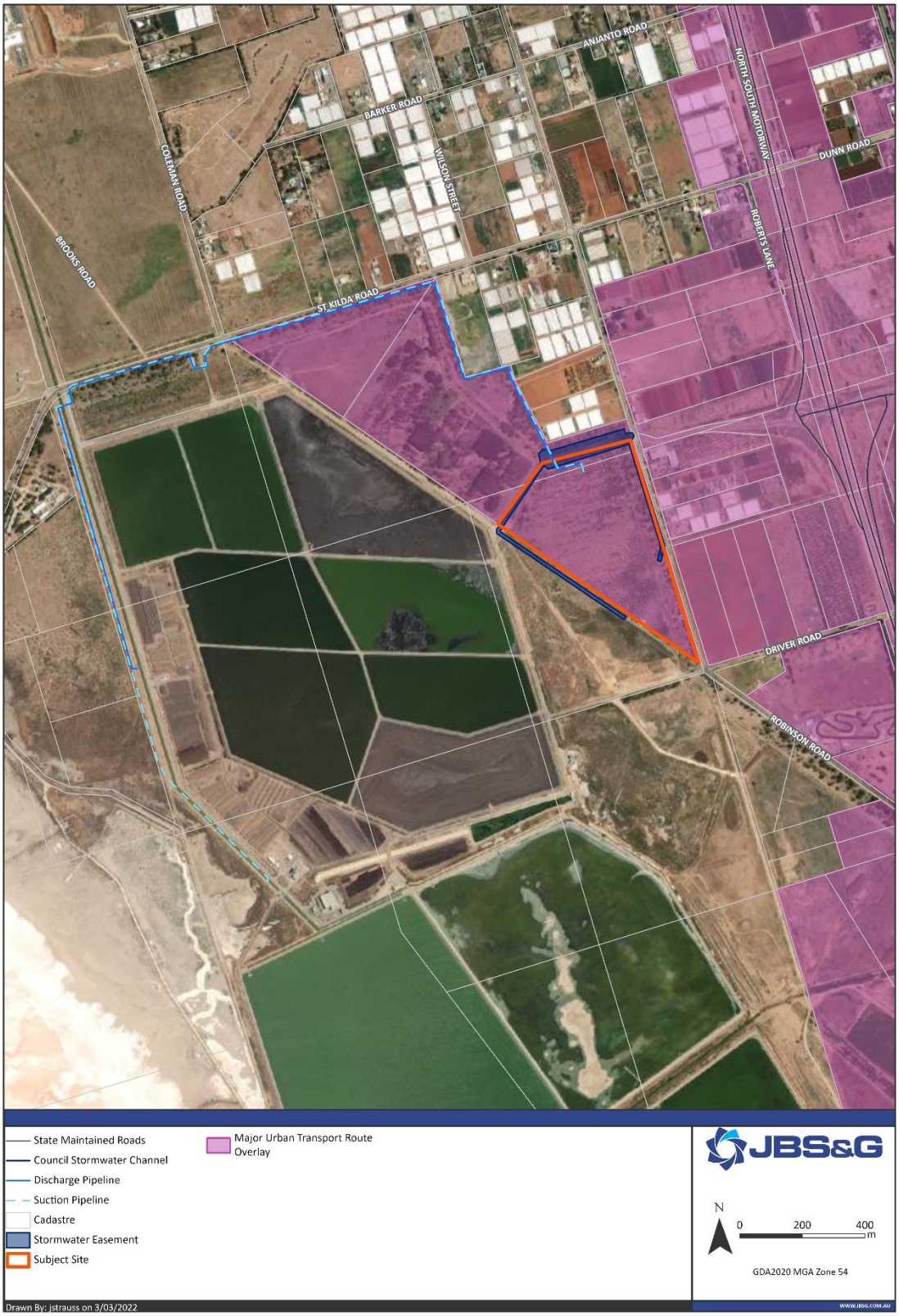


Figure 5-7: Major Urban Transport Routes Overlay

Traffic Generating Development

The Traffic Generating Development Overlay seeks to supplement the Major Urban Transport Routes Overlay and the Non-Stop Corridor Overlay in the context of the locality of the Project to regulate the interface between development and State Maintained Roads to ensure safe and equitable access.

The Desired Outcomes of the Traffic Generating Development Overlay seek to ensure:

- DO 1: Safe and efficient operation of Urban Transport Routes and Major Urban Transport Routes for all road users.
- DO 2: Provision of safe and efficient access to and from Urban Transport Routes and Major Urban Transport Routes.

The Project will result in an increase in traffic volumes on surrounding local and State roads during construction and operation, consisting of both light and heavy vehicle movements (See Appendix 13 – Traffic Impact Assessment). Although the Project site does not directly interface with an Urban Transport Route or Major Urban Transport Route, traffic generated by the Project utilises these roads to gain access to the site.

Figure 5-8 shows the interaction of the Project site with the Traffic Generating Development Overlay. An assessment of the Project against the Performance Outcomes of the Traffic Generating Development Overlay is provided in Table 5-13.

Table 5-13: Performance Outcomes - Traffic Generating Development Overlay

Overlay	Planning Assessment
PO 1.1 *Development designed to minimise its potential impact on the safety, efficiency and functional performance of the State Maintained Road network.*	• The Project does not occur in a location necessitating direct interface between a State Maintained Road and the site. • State Maintained Roads in the broader locality – the North South Motorway and Port Wakefield Road – will be the primary transport routes utilised by vehicles gaining access to the Project site during all phases of construction and operation. • Modelling undertaken to support the traffic impact assessment (Appendix 13) indicates that the Project poses a low risk of adverse impacts to the functional performance of the State Maintained Road network.
PO 1.2 *Access points sited and designed to accommodate the type and volume of traffic likely to be generated by the development.*	• See Major Urban Transport Routes, above.
PO 1.3 *Sufficient accessible onsite queuing provided to meet the needs of the development so that queues do not impact on the State Maintained Road network.*	• The site of the Project is a significant distance from the nearest State Maintained Road, and resultantly no impacts on State Maintained Roads caused by queuing in and around the Project are anticipated. • See Major Urban Transport Routes, above.

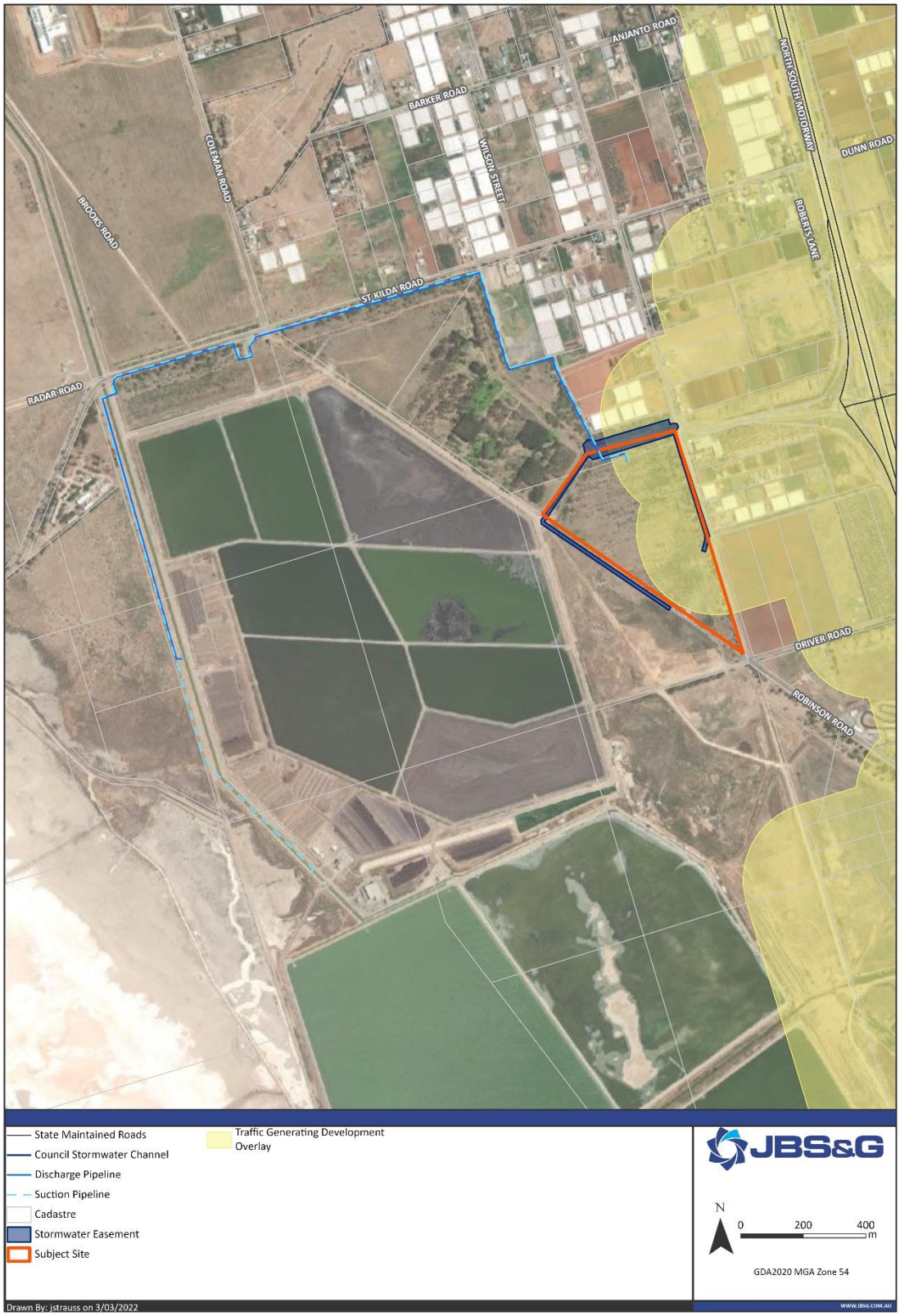


Figure 5-8: Traffic Generating Development Overlay

Non-Stop Corridor (Adjacent)

The Non-Stop Corridor Overlay does not interact directly with the Project site, however it is directly adjacent to the eastern edge of the Robinson Road reserve, and captures the Waterloo Corner Interchange Connector.

Assessment of the impacts of the Project on traffic and transport networks has been conducted and has concluded that the Project represents a low risk of adverse impacts to the safety, efficiency and accessibility of the road network (See Section 11.4 Transport and traffic and Appendix 13 Traffic Impact Assessment). The adjacency of the Non-stop Corridor Overlay was considered in the impact assessment.

Limited Land Division

The Desired Outcome of the Limited Land Division Overlay states that development should seek to ensure:

The long-term use of land for primary production is maintained by minimising fragmentation through division of land.

No land division is proposed as part of the Project, and resultantly no further assessment of the Project against the Limited Land Division Overlay is required.

5.6.5 Hazards Overlays

Flooding

The Desired Outcome of the Hazards (Flooding) Overlay states:

Impacts on people, property, infrastructure and the environment from high flood risk are minimised by retaining areas free from development, and minimising intensification where development has occurred.

The Desired Outcome of the Hazards (Flooding – General) Overlay states:

- Impacts on people, property, infrastructure and the environment from general flood risk are minimised through the appropriate siting and design of development.

Both the Hazards (Flooding) and Hazards (Flooding – General) Overlays apply to areas of the Project site. The potential for, and impacts of, site inundation are discussed in Section 9.4 Surface Water and Groundwater and Section 15.4 (Flooding). Associated flood modelling has been conducted, having regard to risk mitigation during a 1% AEP flood event (Appendix 10 – Flood Modelling). No minimum finished floor level (FFL) for the Project site is indicated in the relevant Technical Numerical Values (TNV) table in the Code. In this instance, the Code specifies that minimum FFL should be 300mm above the height of a 1% AEP flood event.

Upstream development east of the Project site has exacerbated the tendency of the Project site to experience inundation following rainfall events, in combination with the flat topography and limited drainage infrastructure existing in the locality of the site. This has been a focus of the Salisbury Council and various offsite works are being planned for and implemented by Council to progressively upgrade stormwater infrastructure. The majority of flooding risk to the Project site is external, in the form of

stormwater flowing towards and through the site from upstream. As a result, mitigation efforts have focused on two parameters:

- Diversion of floodwater from upstream sources around the boundaries of the Project site, utilising dedicated stormwater channels and drainage infrastructure, and
- Retention of stormwater accumulating within the site in appropriately designed detention basins and other stormwater management infrastructure, to separate any contaminants originating onsite prior to utilisation of captured stormwater in the process, or release via the stormwater infrastructure.

The Project will include importation of clean fill to elevate the ground level of the site such that the FFL of buildings will be greater than 300 mm above the level of a 1% AEP flooding event. The site will also be graded as appropriate to assist with the internal drainage of stormwater towards dedicated stormwater infrastructure. Process materials stored onsite which have the potential to be mobilised by floodwaters will be stored in accordance with all relevant policies and guidelines regarding bunding and spill management, including but not limited to SA EPA Liquid Storage Guideline *Bunding and Spill Management* (updated May 2016). Bunding and appropriate design of containment structures will be carried out according to industry best practice, to ensure that substances stored onsite (including process reagents) are precluded from emission to land or water in the event of site inundation.

The Project involves the receival and containment of dangerous goods which have the potential to be mobilised by floodwaters if not appropriately contained (See Chapter 3 Description of the proposed Project and Chapter 15 Hazard and Risks). The importance of water sensitive design and appropriate flood mitigation controls is recognised with relation to stormwater management.

Flood risk is addressed through the design and siting of buildings, hardstand areas, reagent containment areas and plant equipment, and through importation of clean fill to the Project site in accordance with EPA guidelines to elevate the finished floor level (FFL) of development to at least 300mm above the height of a 1% AEP flood event, as modelled in Appendix 10 (flood modelling). Project design has regard to the surface water assessment conducted as part of flood modelling, and impact assessment presented in Chapter 15 (Hazard and Risks).

The water intake and outfall pipeline alignment interacts with both the Hazards (Flooding) and Hazards (Flooding – General) Overlays, most notably adjacent to St Kilda Road, as shown in Figure 5-9. Above-ground sections of pipeline will be installed in a way that ensures they are neither dislodged by floodwaters, nor impede existing stormwater flow characteristics. Micro siting of pipeline locations and construction methods will be utilised to minimise the potential impacts of the pipelines on stormwater flows.

Figure 5-9 shows the Hazards (Flooding) and Hazards (Flooding – General) Overlays in relation to the Project site. A planning assessment against the Performance Outcomes of the Overlays is provided in Table 5-14 and Table 5-15. Figure 5-10 shows the location of prescribed activities of environmental significance as defined in Schedule 1 of the EP Act with relation to the Hazards (Flooding) and Hazards (Flooding – General) Overlays. The depth of floodwaters modelled to a 1% AEP event are discussed in Section 15.4 (Flooding) with associated modelling presented in Appendix 10 (Flood modelling).

The Project is broadly non-compliant with the Desired Outcomes of the Overlay, however impacts are considered able to be managed and mitigated to ALARP levels through appropriate siting and design of Project elements and the integration of stormwater infrastructure designed to WSUD principles.

Table 5-14: Performance Outcomes - Hazards (Flooding) Overlay

Performance Outcome	Planning Assessment
Land Use	
PO 2.1 *Development sited and designed to minimise exposure of people and property to unacceptable flood risk.*	• *Unacceptable* flood risk in the context of this assessment is taken to align with the definition of a *Moderate or greater* environmental or socio-economic impact event or consequence in the event of a 1% AEP flood, as discussed in Chapter 7 (Impact Assessment Methodology): • The Project is the subject of detailed flood and stormwater modelling. • Development associated with the Project is sited partially within the Hazards (Flooding) Overlay, in an area which at present is known to experience inundation following intense rainfall. The frequency and severity of inundation is partly driven by intensification of development upstream, resulting in stormwater directed from developed areas into the Project site, in the absence of adequate infrastructure to convey stormwater to appropriate drainage. • The development of the Project site, including integrated engineered stormwater management, addresses the risk of exposure of people and property (including neighbouring properties) to floodwaters. This is achieved through engineered stormwater management and the implementation of WSUD principles in Project design, which seek to redirect stormwater originating upstream around the boundaries of the Project site without exacerbating flooding risk to neighbouring properties, while also constructing appropriate onsite stormwater retention and control to prevent the export of pollutants (including sedimentation) from the Project site.
Flood Resilience	
PO 3.1 *Development avoids the need for flood protection works.*	• Flood protection works are not proposed as part of the Project, where such flood protection works comprise elevated earthworks or constructed flood barriers to exclude stormwater flows entirely from the Project site. Primary mitigation relating to raising finished floor levels to 300mm about the 1% AEP, internal site surface water drainage and management and compliance with EPA bunding requirements are effective for protection of the environment. • Flood-sensitive elements of the Project including hazardous or dangerous goods storage will be constructed in accordance with all relevant guidelines and requirements, including containment, roofing, bunding and secure storage. • Stormwater channels around the boundaries of the Project site are intended to divert stormwater around the site and have been shown in flood modelling (Appendix 10) to be effective.
PO 3.2 *Development does not cause unacceptable impacts on any adjoining property by the diversion of flood waters or an increase in flood velocity or flood level.*	• Stormwater drainage and management will be incorporated as a part of final plant design to address stormwater flow and velocity through the allotment, and direct velocity-mitigated stormwater from the site towards engineered stormwater drainage infrastructure north of the Project site, which is planned to be upgraded external to the Project. • Subsurface drainage may be incorporated within the site to carry stormwater safely into the engineered drainage system (subject to detailed engineering design). • Stormwater will be segregated, with stormwater likely to contain surface contaminants (such as oils or sediment) directed through industry standard oil-water separation equipment.
PO 3.3 *Development does not impede the flow of floodwaters through the allotment or the surrounding land, or cause an unacceptable loss of flood storage.*	• Surface water modelling has been conducted (See Appendix 10) • The Project necessarily alters the flow of floodwaters through the allotment. This alteration is unable to be completely avoided, due to the nature of the Project and the necessity to exclude floodwaters from parts of the site, and to build up the ground level of the site to align with the objectives of the Code. The construction of hardstand areas also alters the dynamics of stormwater flows by increasing the impervious area of the site and increasing runoff. • The impacts of alteration of stormwater flows are addressed in Section 9.4 (Surface Water and Groundwater) and Section 15.4 (Flooding). • The Project has been assessed to not cause an unacceptable loss of flood storage.

Performance Outcome	Planning Assessment
PO 3.4 *Development avoids frequently flooded or high velocity areas, other than where it is part of a flood mitigation scheme to reduce flood impact.*	• The Project site is low-lying and contains areas prone to inundation following intense rainfall events, with shallow groundwater depths and development in the broader locality to the east and north contributing to the inundation risk through increased stormwater runoff. • No specific drainage exists on the Project site at present other than open swales from adjoining land uses and the surrounding road reserves which exit onto the Project site. • The risks and potential impacts of constructing the Project in a flood-prone area, in addition to mitigation measures, have been assessed in Chapter 9 (Physical Environment), and Chapter 15 (Hazard and Risks). • The risks of constructing the Project in an area known to become inundated are considered to be manageable without prejudicing the existing or future use of land in the vicinity of the Project, by means of the integration of engineered stormwater management infrastructure not presently in place on the undeveloped site.
PO 3.5 *Buildings are sited, designed and constructed to prevent the entry of floodwaters in a 1% AEP flood event where the entry of floodwaters is likely to result in undue damage to, or compromise ongoing activities within, buildings.*	• Final FFL for development on the subject land is not specified by the Code, however the standard provisions of DTS/DPF 3.5 specify; ○ …(e) a building with a finished floor level that is at least 300mm above the height of a 1% AEP flood event. • Flood modelling conducted to support impact assessment of the flooding risk relevant to the Project has informed the design and layout of the Project. • Floodwaters predicted to occur during a 1% AEP flood event will be prevented from causing damage to the Project via the elevation of the site utilising clean fill, and the integration of appropriate stormwater management which diverts upstream-generated stormwater around the Project site in appropriately designed stormwater infrastructure.
Environment Protection	
PO 4.1 *Buildings and structures used either partly or wholly to contain or store hazardous materials are designed to prevent spills or leaks leaving the confines of the building during a 1% AEP flood event to avoid potential environmental harm.*	• The Project involves the receival and containment of caustic and acidic process reagents associated with an industrial process, in addition to other dangerous goods identified by the *Dangerous Substances (General) Regulations 2017*. • Reagents will be contained in appropriate tankage within the Project, including appropriate bunding and elevation of floor levels to preclude the risk of inundation during a 1% AEP flood event. • Hazardous material containment is addressed through consideration of building design and siting, and the incorporation of appropriate stormwater management.
PO 4.2 *Development does not create or aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood.*	**Construction** • The primary source of erosion and siltation associated with the Project is likely to be from rainfall during construction, while surface soils in the Project site are exposed. • Construction of the BAM Facility is proposed to be staged. In this way, exposure of surface soil across the site can be managed to minimise the potential for erosion and siltation resulting from construction activities. • Standard construction management techniques to control siltation and erosion during construction will be applied through the Project specific CEMP, which will be developed prior to the commencement of construction. **Operations** • The Project will be appropriately landscaped when complete, incorporating screening vegetation (both remnant and planted) which will also serve to stabilise soils around the Project site. • The incorporation of engineered drainage and within the Project mitigate the potential for erosion effects created or aggravated by new hardstand areas in association with the Project.

Performance Outcome	Planning Assessment
	• The Project includes the clearance of native vegetation across the Project site. Planted vegetation will be selected having regard to site conditions.
Site Earthworks	
PO 5.1 *The depth and extent of filling required to raise the finished floor level of a building does not cause unacceptable impact on any adjoining property by diversion of flood waters, an increase in flood velocity or level, or an unacceptable loss of flood storage.*	• Responsive to surface water modelling undertaken to determine the appropriate FFL of the Project in accordance with 1% AEP flood height regulations, it is considered that; • Engineered stormwater drainage will divert floodwaters to the north into the existing (and planned to be upgraded) stormwater channel, and south, into vacant land. • The nature of adjoining properties, being predominantly of a horticultural nature or largely vacant land, means that flood storage loss caused by the Project will not be unacceptable. • Flood velocity will be appropriately mitigated and minimised through the incorporation of engineered drainage. The low topographic relief of the site also contributes to the natural mitigation of floodwater velocity.
PO 5.2 *Driveways, access tracks and parking areas are designed and constructed to minimise excavation and filling.*	• The topography of the site means that minimal excavation and filling will be required in order to create level areas for driveways, access points and parking areas which incorporate a graded finish to control stormwater flow direction. • The Project site requires the importation of fill to elevate FFL above the level of a 1% AEP flood event.
Access	
PO 6.1 *Development does not occur on land:* *From which evacuation to areas not vulnerable to flood risk is not possible during a 1% AEP flood event* *Which cannot be accessed by emergency services vehicles or essential utility service vehicles during a 1% AEP flood event.*	• The Surface Water Assessment (Appendix 10) and impact assessment (Chapter 15 Hazard and Risks) conducted for the Project indicates that the Project is able to comply with the PO through effective flood mitigations incorporated into Project design, including elevation of the site and integrated stormwater management.
PO 6.2 *Access driveways and tracks to significant development (i.e. dwellings, places of work etc) consist of a safe, all-weather trafficable surface that is accessible during a 1% AEP flood event.*	• All-weather trafficable access, parking areas and internal roadways are integral to Project design, to facilitate the access and egress of heavy vehicles associated with Project operations. • Primary access is proposed via a dedicated, sealed curtilage from Robinson Road, approximately 150 m south of the intersection of Robinson Road and Waterloo Corner Interchange Connector. The entrance curtilage will be sufficiently wide to allow access by articulated trucks and will incorporate a gradient appropriate for this type of traffic.

Table 5-15: Performance Outcomes - Hazards (Flooding - General) Overlay

Performance Outcome	Planning Assessment
Flood Resilience	
PO 2.1 *Development is sited, designed and constructed to prevent the entry of floodwaters where the entry of floodwaters is likely to result in undue damage to or compromise ongoing activities within buildings.*	• See PO 3.5, Hazards (Flooding) Overlay, above.
Environment Protection	
PO 3.1 *Buildings and structures used either partly or wholly to contain or store hazardous materials are designed to prevent spills or leaks leaving the confines of the building during a 1% AEP flood event to avoid potential environmental harm.*	• See PO 4.1, Hazards (Flooding) Overlay, above.

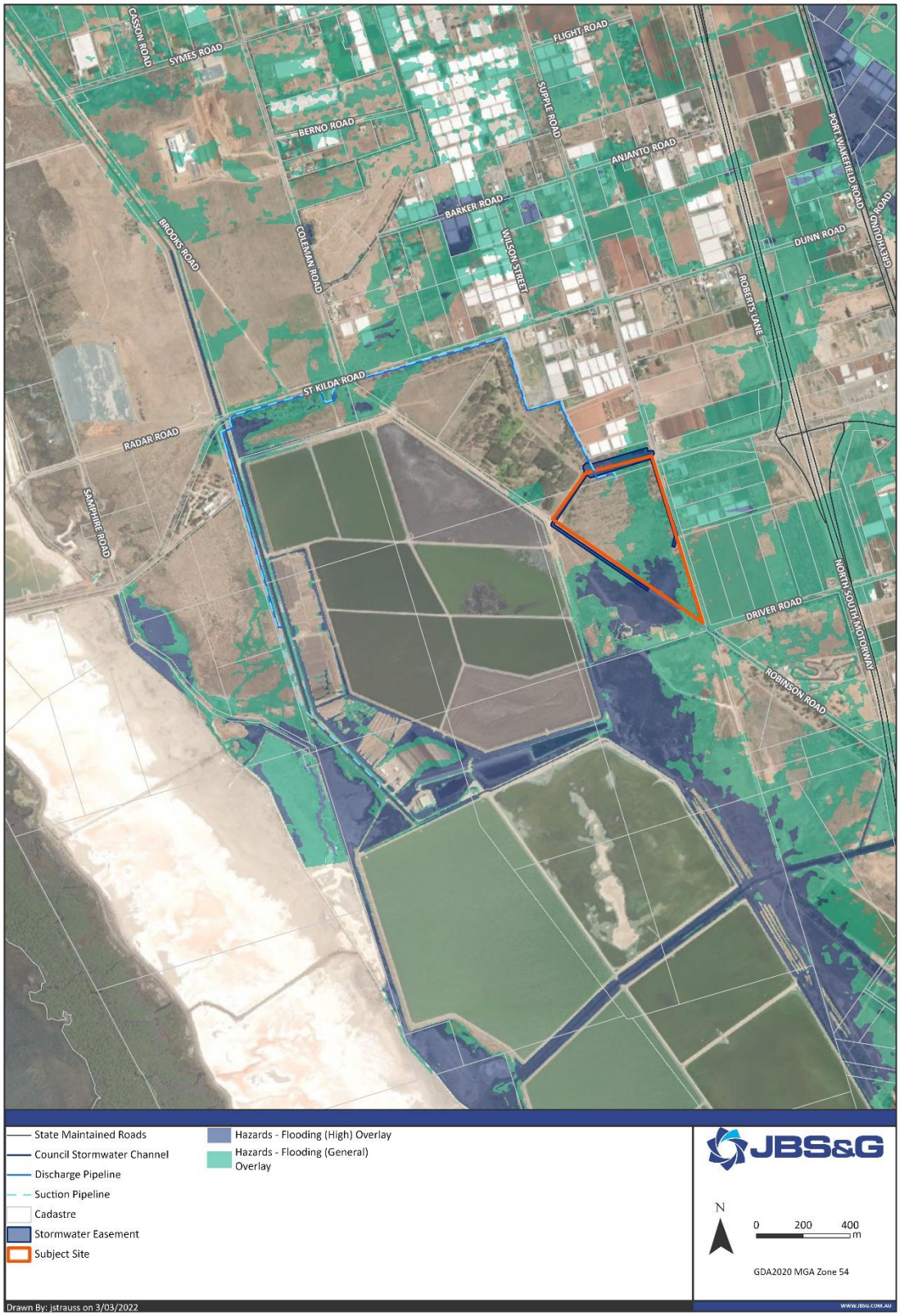


Figure 5-9: Hazards (Flooding) and Hazards (Flooding - General) Overlays



Figure 5-10: Prescribed Activities of Environmental Significance and Flooding overlays

5.6.6 Natural Resources and Environment Overlays

Native Vegetation

The Native Vegetation Overlay applies to the majority of the terrestrial area of the State, including the Project site. The Project includes the clearance of native vegetation within the Project site. The extent and nature of clearance is discussed in Chapter 10 (Biological Environment) and Appendix 9B (Native Vegetation Clearance Report). To support the impact assessment, associated desktop and in-field ecological surveys have been conducted, which have identified and categorised vegetation present within the Project site (see Appendix 9B – Native Vegetation Clearance Report).

Given the historical use of the Project site for broadacre grazing and agricultural activity, a large proportion of the vegetation within the site is either planted, exotic or re-emergent, with small pockets of remnant vegetation along the eastern boundary, which will be retained to the greatest practicable extent.

The Desired Outcome of the Native Vegetation Overlay states that:

- Areas of native vegetation are protected, retained and restored in order to sustain biodiversity, threatened species and vegetation communities, fauna habitat, ecosystem services, carbon storage and amenity values.

Clearance of native vegetation associated with the Project is unable to be avoided. Emergent and planted native vegetation across the site is not of high or significant biodiversity value (Appendix 9B – Native Vegetation Clearance Report), however some habitat value has been observed. The majority of the Project site will be cleared to facilitate the construction of the Project. Vegetation clearance will occur in a staged manner which will minimise dust, erosion, sedimentation and other impacts.

Some minor clearance of vegetation may be required to facilitate the construction of the water intake and outfall pipelines. Clearance associated with pipeline installation is expected to be able to be mitigated through micro-siting of the pipeline alignment.

Vegetation clearance will be undertaken subject to approval by the Native Vegetation Council, and an appropriate Significant Environmental Benefit (SEB) will be undertaken.

Table 5-16 provides an assessment of the Project against the relevant Performance Objectives of the Native Vegetation Overlay.

Table 5-16: Performance Outcomes - Native Vegetation Overlay

Overlay	Planning Assessment
PO 1.1 *Development avoids, or where it cannot be practically avoided, minimises the clearance of native vegetation taking into account the siting of buildings, access points, bushfire protection measures and building maintenance.*	• The Project will involve the clearance of native vegetation. • Vegetation clearance will be undertaken in a staged manner, to delay clearance for as long as possible throughout the staged Project delivery timeframe. Erosion and siltation effects caused by removal of vegetation will be partly managed by minimising the amount of exposed earth at any given time. • The quality of vegetation across the Project site has been noted to be average to poor and modified from its natural state, and includes introduced (exotic as well as non-locally-indigenous) species, particularly in the understorey (Appendix 9 – Ecology Assessments). • The densest and most well-established vegetation on the site occurs along the eastern boundary adjacent to Robinson Road. This vegetation will be retained to the greatest extent practicable as natural screening. • SEB payment will be made commensurate with the level of native vegetation clearance determined to be necessary to facilitate the Project.
PO 1.2 *Native vegetation clearance in association with development avoids the following:* • *Significant wildlife habitat and movement corridors* • *Rare, vulnerable or endangered plant species* • *Native vegetation that is significant because it is located in an area which has been extensively cleared* • *Native vegetation that is growing in, or in association with, a wetland environment.*	• A self-assessment under the provisions of the EPBC Act has been conducted for the Project to identify MNES (TECs and threatened flora and / or fauna). • Based on the ecological assessment and desktop investigations undertaken, the self-assessment concluded that the Project is not likely to have a significant impact on any MNES. • This conclusion was supported by in-field and desktop ecological surveys (Appendix 9). • The Project represents a low risk of impacting on significant wildlife habitat, rare, vulnerable or endangered plant species. • Vegetation within the Project site is not considered significant on the basis of being present in an extensively cleared area. • Vegetation within the Project site is not within, nor associated with a listed wetland or TEC environment.

Regulated and Significant Trees

The Regulated and Significant Tree Overlay applies to the Project site, in addition to the Native Vegetation Overlay. The desired outcome of the Regulated and Significant Tree Overlay is:

Conservation of Regulated and Significant Trees to provide aesthetic and environmental benefits and mitigate tree loss.

In-field ecological surveys (Appendix 9) have identified trees within the Project site which are within the size range identified in Regulation 3F (1) and (2). Clearance of several of these trees is required to facilitate the construction of the Project.

Under the PDI Act, any activity that damages a regulated or significant tree is a form of development, and as such requires development approval.

A total of 18 (8 'regulated' and 10 'significant') trees have been identified within the Project site (See Chapter 10 (Biological Environment)). Up to 17 of these trees may require removal or have impacts to their root systems. Three of these trees (one Regulated and two Significant) are within the plant site

layout footprint and require removal. Fourteen significant or regulated trees are situated along the eastern boundary of the Project site (Figure 5-11).

The potential exists for the stormwater channel proposed for the eastern boundary of the site to overlap with up to fourteen significant or regulated trees. The design of the stormwater channel (i.e. siting and width of channel, location of drain, size of detention basin) will be optimised in the future design engineering phase, so as to minimise impact on existing vegetation as far as practicable. The affected regulated and significant trees would be retained as far as practicable. One significant tree is located in the north western corner of the intake and outfall water pipeline alignment and through engineering design and micro-siting of the pipelines, would be retained where practicable.

Removal of regulated or significant trees requires approval under the PDI Act, and involves either tree replanting (two replanted trees per regulated tree, three replanted trees per significant tree) or payment into an urban tree fund. For the removal of up to 8 regulated trees and 9 significant trees, payment will be made into an urban tree fund. It is also noted that juvenile plantings of appropriate species will be planted to provide screening amenity in this area.



Figure 5-11: Regulated and Significant Trees

Table 5-17 provides an assessment of these aspects of the development against the relevant Performance Outcomes of the Regulated and Significant Tree Overlay.

Table 5-17: Regulated and Significant Tree Overlay

Overlay	Planning Assessment
Tree Retention and Health	
PO 1.1 *Regulated trees are retained where they:* • *make an important visual contribution to local character and amenity* • *are indigenous to the local area and listed under the National Parks and Wildlife Act 1972 as a rare or endangered native species and / or* • *provide an important habitat for native fauna.*	• A range of development options and design solutions have been considered to retain regulated trees. • Regulated trees near to the eastern boundary of the Project site will be retained to the greatest practicable extent, noting their contribution to the character and amenity of the locality and their role in providing natural screening of the Project from adjacent development. • Regulated trees within the Project site are not listed as rare or endangered species under either the NPW or EPBC Acts. • Where removal is unavoidable, payment under the PDI Act (as trees are not native but are assessed as regulated or significant trees) will be undertaken as required by the approval. • The Project is not likely to have any interaction with significant wildlife habitats or movement corridors.
PO 1.2 *Significant trees are retained where they:* • *make an important contribution to the character or amenity of the local area* • *are indigenous to the local area and are listed under the National Parks and Wildlife Act 1972 as a rare or endangered native species* • *represent an important habitat for native fauna* • *are part of a wildlife corridor of a remnant area of native vegetation* • *are important to the maintenance of biodiversity in the local environment and / or* • *form a notable visual element to the landscape of the local area.*	• A range of development options and design solutions have been considered to retain significant trees. • Significant trees near to the eastern boundary of the Project site will be retained to the greatest practicable extent, noting their contribution to the character and amenity of the locality and their role in providing natural screening of the Project from adjacent development. • Significant trees within the Project site are not listed as rare or endangered species under either the NPW or EPBC Acts. • Where removal is unavoidable, payment under the PDI Act (as trees are not native but are assessed as regulated or significant trees) will be undertaken as required by the approval. • The Project is not likely to have any interaction with significant wildlife habitats or movement corridors.
PO 1.4 *A tree-damaging activity in connection with other development satisfies all the following:* • *it accommodates the reasonable development of land in accordance with the relevant zone or subzone where such development might not otherwise be possible* • *in the case of a significant tree, all reasonable development options and design solutions have been considered to prevent substantial tree-damaging activity occurring.*	• Industry is listed as an envisaged class of development within the Rural Horticulture Zone. • A range of development options and design solutions have been considered to prevent substantial tree-damaging activity. These have included: • Adaptation of site layout to avoid clusters or higher concentrations of significant trees, • Positioning buildings, internal roadways, car parking areas and other forms of development as far as practicable from clusters of significant trees • Designing to retain the largest practicable number of trees within the Project site, having regard to their amenity, carbon storage and ecological value.

Overlay	Planning Assessment
Ground work affecting trees	
PO 2.1 *Regulated and significant trees, including their root systems, are not unduly compromised by excavation and / or filling of land, or the sealing of surfaces within the vicinity of the tree to support their retention and health.*	• A range of development options and design solutions have been considered to avoid impacting the root systems of significant and regulated trees. • Where regulated and significant trees are able to be retained, development activity will retain adequate separation distance to avoid damaging canopies, trunks and root systems. • Most significant and regulated trees within the Project site are of a form and structure which precludes development occurring in close proximity without necessitating removal. • Where necessary, all development on site will occur in accordance with AS 4970-2009 *Protection of trees on development sites*.

Prescribed Wells

The Project is located within the Northern Adelaide Plains Prescribed Wells Area (DEW, 2022a). The desired outcome for the Overlay states that development should ensure:

Sustainable water use in prescribed wells areas.

The purpose of the Overlay is to preserve groundwater availability, and to avoid development which has adverse impacts on groundwater through contamination or unsustainable extraction.

It is noted that during site inspections (which included soil and groundwater sampling), the shallowest groundwater was observed to be of poor quality, exhibiting high salinity. No contamination of concern was discovered.

The possibility of intersecting groundwater during construction activity has been identified, on account of groundwater within the Project site occurring at shallow depths below ground level, and the necessity for elements of the Project to include the creation of foundations which may extend near to natural groundwater levels under particular circumstances, discussed in Section 15.5 (Site and Groundwater Contamination) and in a Preliminary Site Investigation report undertaken for the Project site (Appendix 7 – Baseline Site Investigation).

An assessment of the potential for the Project to mobilise contamination in soil or groundwater as a result of construction activity has concluded that the risk posed is low, and in the event of intersection with groundwater, standard groundwater containment and control standards will apply in accordance with the Water Quality EPP. Construction activities are expected to be managed within the bounds of SA EPA Water Quality Guideline *Environmental management of dewatering during construction activities* (updated June 2021). Table 5-18 assesses the Project against the relevant Performance Outcomes of the overlay.

Table 5-18: Prescribed Wells Area Overlay

Overlay	Planning Assessment
PO 1.1 *All development, but in particular involving any of the following:* *a. Horticulture* *b. Activities requiring irrigation* *c. Aquaculture* *d. Industry* *e. Intensive animal husbandry* *f. Commercial forestry* *Has a lawful, sustainable and reliable water supply that does not place undue strain on water resources in prescribed wells areas.*	• A sustainable and permitted source of water is critical to the success of the Project. Water supply to the Project is proposed from the adjacent SA Water Outfall Channel. • The possibility of intersecting groundwater during construction activities is discussed further in the relevant sections of the EIS, and is considered able to be managed effectively through standard mitigations and monitoring.

Water Resources

The Water Resources Overlay applies to land immediately adjacent the Project site, capturing the SA Water outfall channel associated with the Bolivar WWTP, to which the Project will return treated process water. The Overlay primarily seeks to ensure that the environmental values of watercourses, wetlands and floodplains are conserved or enhanced, taking into account the management of flood waters and stormwater, and projected reductions in rainfall resulting from climate change. It is noted the environmental values of watercourses are defined under the EP Act and subordinate legislation which excludes wastewater from the definition of surface water. Thus, while SA Water outfall channel is considered a 'watercourse' under the PDI Act it does not have an environmental value under the EP Act and impacts of water quality have been assessed based on the environmental value of Gulf St Vincent, the environmental value where the channel enters the marine environment.

The Desired Outcomes of the overlay are:

- DO 1: Protection of the quality of surface waters considering adverse water quality impacts associated with projected reductions in rainfall and warmer air temperatures as a result of climate change
- DO 2: Maintain the conveyance function and natural flow paths of watercourses to assist in the management of flood waters and stormwater runoff.

The Overlay does not apply directly to land occupied by the Project, however the above-ground pipelines conveying source water to the Project site, and treated process water from the site to the SA Water outfall channel interact with the overlay.

None of the watercourses identified by the overlay which will be affected by the Project are naturally occurring watercourses, nor are they wetlands of high ecological importance. Placement of an above-ground pipeline to extract outflow water from HSP line before it enters the SA Water outfall channel for use in the Project aligns with the Performance Outcomes of the overlay. Construction of the pipeline will have regard to the existing hydrology of the area to avoid interfering with stormwater runoff, which is modelled to move through the area where the pipelines are proposed. The Project will take into account the requirements of the Overlay to ensure that best practice is incorporated into plant design and infrastructure configuration.

Discussion of the Project's impacts on surface water and relevant mitigation strategies are presented in Chapter 9 (Physical Environment) and Chapter 15 (Hazard and Risks).

Figure 5-12 shows the location of the Project in relation to the Water Resources overlay. Table 5-19 provides a planning assessment of relevant Project elements against the Performance Outcomes of the overlay.

Table 5-19: Water Resources Overlay

Overlay	Planning Assessment
PO 1.1 *Watercourses and their beds, banks, wetlands and floodplains (1% AEP flood extent) are not damaged or modified and are retained in their natural state, except where modification is required for essential access or maintenance purposes.* **PO 1.2** *Development avoids interfering with the existing hydrology or water regime of swamps and wetlands other than to improve the existing conditions to enhance environmental values.* **PO 1.6** *a. Development resulting in the depositing or placing of an object or solid material in a watercourse or lake occurs only where it involves any of the following:* *b. the construction of an erosion control structure* *c. devices or structures used to extract or regulate water flowing in a watercourse* *d. devices used for scientific purposes* *e. the rehabilitation of watercourses.* **PO 1.7** *Watercourses, floodplains (1% AEP flood extent) and wetlands protected and enhanced by retaining and protecting existing native vegetation.* **PO 1.9** *Dams, water tanks and diversion drains are located and constructed to maintain the quality and quantity of flows required to meet environmental and downstream needs.*	• Flood modelling has been undertaken for the Project which considers a range of scenarios, including having regard to the impacts of climate change on regional hydrology and rainfall patterns (See Appendix 10 Flood Modelling). • Constructed elements of the Project within the boundaries of the main Project site will include the installation of new impermeable surface treatments (including ground-level hardstand as well as building roof area). The impacts of the Project on stormwater runoff flow rates, velocity and depth have been modelled to a 1% AEP event, and impacts assessed in Section 15.4 (Flooding). • Pipelines to extract source water from the SA Water outfall channel, and then to return treated process water to the channel, will occur within the Water Resources overlay aligning with Performance Objective 1.6. In the locality of the Project site, the overlay relates to constructed waterways, including the SA Water outfall channel and existing stormwater infrastructure in the area. As a man made channel containing wastewater, SA Water outfall channel does not have environmental values under the EP Act and assessment in Chapter 9 (Physical Environment) has considered the environmental values of the Gulf St Vincent where the SA Water outfall channel enters the marine environment. • The position and construction method of the pipeline will have regard to the existing hydrological conditions of the locality and will seek to avoid exacerbating erosion, sedimentation, scouring or other forms of adverse impacts to stormwater flows. • The pipelines align with Performance Objective 1.6, since the pipelines are to be installed to extract water from (and return water into) a man-made wastewater treatment plant outfall channel.



Figure 5-12: Water Resources Overlay

6 Stakeholder and Community Engagement

6.1 Introduction

This chapter summarises the stakeholder and community engagement that has been completed to date, provides an outline of identified stakeholders and outlines Renascor's plans for future consultation and engagement throughout the life of the Project.

6.2 EIS Content Requirements

Table 6-1: EIS Content Requirements – Stakeholder and Community Engagement

The EIS report should include the following:
• Community engagement plan including:
○ All legislated notification requirements to be undertaken by the Minister pursuant to the PDI Act and Practice Direction
○ The Proponent's overall engagement and collaboration strategy including scope and guiding principles.
○ Engagement undertaken to date on the proposed project
○ Engagement activities proposed throughout the EIS process including performance outcomes, level of public participation, techniques, indicative timeframes, responsibility and measures for measuring performance.
○ A list of affected stakeholders, interest groups and other relevant parties.

6.3 Better Together Approach to Stakeholder and Community Engagement

Renascor is committed to an open and honest stakeholder engagement process. It recognises that providing genuine opportunities for stakeholders to share local knowledge and give feedback on the proposed development will be crucial to its success. Further information is provided in the Stakeholder Engagement Strategy (Appendix 4).

Renascor's approach to engagement is underpinned through consideration of a range of industry standards and guidelines for community and stakeholder engagement including:

- State Planning Commission's Community Engagement Charter (SPC, 2018)
- The Government of South Australia's Better Together framework (Government of South Australia, 2022)
- International Association for Public Participation (IAP2) Quality Assurance Standard (IAP2, 2015).

Table 6-2 maps the State Planning Commissions (SPC) Community Engagement Charter Principles against the Better Together framework (SA Government, 2022). The Better Together Framework has been used to structure this chapter.

Table 6-2: Community Engagement Charter Principles

Community Engagement Charter Principle	Better Together Principle
1. Engagement is genuine	• 5 We are genuine
2. Engagement is inclusive and respectful	• 6 We are engaging
3. Engagement is fit for purpose	• 1 We know why we are engaging • 2 We know who to engage • 3 We know the history
4. Engagement is informed and transparent	• 3 We know the history • 4 We start Together • 5 We are genuine
5. Engagement processes are reviewed and improved	• Section 6.4 includes ongoing engagement. Renascor's Environmental and Social Management System involves a review function for continuous improvement (Chapter 17)

6.3.1 Principle 1: We know why we are engaging (Objectives)

Broadly, Renascor's stakeholder consultation and engagement approach and its objectives are to:

- Clearly identify communities and key stakeholders
- Provide clear and easily accessible information on the proposed development
- Be open and transparent in all engagement activities
- Establish and foster good working relationships with key stakeholders
- Ensure key stakeholders are well informed at all stages of development
- Identify local knowledge, values, assets and resources
- Provide opportunities to obtain stakeholder feedback and respond appropriately
- Discuss local employment and business opportunities.

6.3.2 Principle 2: We know who to engage (Stakeholder identification)

Stakeholder identification (Table 6-3) involved classification of the various stakeholders into tiers based on their degree of interest or potential impact from the Project. This allows a targeted approach to stakeholders to enable those who may be more significantly impacted by the Project to have a greater level of consultation in accordance with the IAP2 Public Participation Spectrum.

Tier 1 stakeholders were defined as the Project site landowner, adjacent landowners within 100 m, Traditional Owners, government agencies responsible for primary approvals, City of Salisbury and local politicians. These stakeholders are collaborators on the Project, given the opportunity to contribute to developing possible outcomes and decision making.

Government agencies responsible for secondary approvals and Federal politicians were classed as Tier 2 stakeholders. These stakeholders were engaged at the involve level of the IAP2 Spectrum.

Stakeholders within a 500 m zone from the Project site boundary (Figure 6-1) and special interest groups (including St Kilda Mangroves and St Kilda Progress Club) were considered as Tier 3

stakeholders as they still have the potential to be impacted by the Project but at a lesser degree. These stakeholders were engaged at the inform / consult level of the IAP2 Spectrum.

Table 6-3: Identified stakeholder groups

Stakeholder Group	Targeted Stakeholders
Directly impacted landowners (Tier 1)	• SA Water Corporation
Adjacent landowners (Tier 1)	Those who live within 100 m of the Project and may reasonably be expected to be impacted by the activities. They may hear, see or experience impacts associated with construction or operation and interact with traffic entering/exiting the site. These landowners include: • residences along Robinson Road (north and south)
Indirectly impacted landowners (Tier 3)	• Those who live within 500 m of the Project and may reasonably be expected to have be impacted by the activities.
Community (Tier 3)	• Landowners and stakeholders located further than 500m from the Project.
Traditional Owners (Tier 1)	• Kaurna Yerta Aboriginal Corporation (KYAC) as the Traditional Owners of the land.
Government agencies (Tier 1 and 2)	• Department for Trade and Investment, Planning and Land Use Services (DTI-PLUS) • Department of Infrastructure and Transport (DIT) • Department of Environment and Water (DEW) • Department for Energy and Mining (DEM) • Environment Protection Authority SA (EPA) • Aboriginal Affairs and Reconciliation (AAR) • Landscape South Australia – Green Adelaide • Department of Climate Change, Energy, the Environment and Water DCCEEW) (Cwth) • Regional Development Australia (RDA) Adelaide (Cwth)
Local government (Tier 1)	• City of Salisbury
State and Federal politicians (Tier 1 and 2)	• Nick Champion MP, State Minister for Planning, Housing and Urban Renewal, Trade and Investment. • Nick Champion MP, Member for Taylor (local member for the locality of the proposed development). • Susan Close MP, Deputy Premier, State Minister for Climate, the Environment and Water. • Tanya Plibersek MP, Commonwealth Minister for the Environment • Matt Burnell MP, Federal Member for Spence • Other Ministers and members of the Opposition
Special interest groups, business and industry groups (Tier 3)	• Special interest groups, local businesses, emergency services, health and education service providers
Service providers (Tier 2)	• SA Water, ElectraNet, SA Power Networks, SEA Gas



Figure 6-1: Stakeholder mapping – landowners

6.3.3 Principle 3: We know the history (Social Context)

The Project is located within the City of Salisbury Local Government Area (LGA). Significant previous developments involving community engagement in the area include:

- Upgrades to the North-South Motorway (DPLUS) – ongoing consultation 2016 - 2022
- Adelaide Plains Water Allocation Plan (DEW, 2022a)
- Draft Sustainability Strategy 2035 (City of Salisbury) – upcoming consultation (April 2023)
- Strategic Growth Framework Waterloo Corner and Bolivar Corridor (Holmes Dyer, 2022)
- Community Perceptions Survey – December 2020 (City of Salisbury)

Some of the key issues identified in the above engagements which may be relevant to the Project include:

- Encouraging more business growth
- Infrastructure provisions and/or upgrade including road services and arterial roads, sewer/wastewater/stormwater, street lighting, power supply and greenspace.
- Retaining residential land.
- Water allocation licences.
- Salinity of groundwater
- Waste management
- Safety and policing
- Traffic management.

6.3.4 Principle 4: We start together (engagement tools)

A range of communication tools and techniques are available to consult and engage with stakeholders, which will be employed selectively according to the intent of the interaction, level of interest and specific stakeholder group.

Table 6-4 sets out a range of potential communication tools and techniques, some of which may be utilised by Renascor at various times to engage its stakeholders in relation to the proposed development.

Table 6-4: Engagement tools and techniques

Engagement and Communication Tools	Purpose
Face-to-face meetings	Provide all potentially impacted landowners the opportunity to discuss their specific issues in person. Continue to build relationships based on trust, by engaging directly with potentially affected landowners as a matter of priority.
Targeted meetings	Provide a wide range of stakeholders (such as City of Salisbury, businesses and Government agencies) the opportunity to meet in person.
Fact sheets & Frequently Asked Questions Sheets	Provide stakeholders with information about the proposed development, upcoming plans and current development status. Ensure information is consistent and based on fact.
Government briefings	Local government and government agencies are often a point of contact for interested community members, so the provision of upfront and consistent information will support the Project, its communication and its reputation.
ASX releases	ASX releases to provide shareholders and potential investors with up to date information and progress reports.
Local newspaper advertisement	Advertise forthcoming community meetings or events.
Media	Particular events or updates are released to the media (e.g., newspapers). Print and radio interviews are held on an ad-hoc basis, usually in response to a milestone.
Meetings with local community groups/organisations	To address a particular community/interest group with a set agenda and specific areas of interest.
Community Drop-in sessions	Provide the wider community with opportunity to have their concerns heard or questions asked and answered.
Proposed development email (online communication channel)	Provide a highly accessible format for two-way communication between stakeholders and the Project team.
Dedicated information telephone line	Provide an alternative, highly accessible format for stakeholders to discuss their issues with a real person.
Record of Consultation Form	Maintain records of all in-person consultations with landowners or community members.
Website updates	Communicate progress updates, achievements and milestones using the Renascor website.
Participation in community initiatives and activities	Identify opportunities for Renascor to contribute and support local community groups. Builds reputation in the community as a supportive participant.

6.3.5 Principle 5: We are genuine (Feedback and responses)

Landholder (SA Water)

Ongoing discussions have been held with the owner of the Project site, South Australian Government-owned utility SA Water. Renascor has executed an option-to-lease the Project site from SA Water for the proposed BAM Facility. The option agreement with SA Water provides Renascor with lease options for 40 years over the site.

Traditional Owners

The Kaurna Yerta Aboriginal Corporation (KYAC) represents the Kaurna People, traditional owners and custodians of the Adelaide Plains and Fleurieu Peninsula. A cultural heritage survey of the Project site has been carried out by the Kaurna People and Renascor are consulting with the KYAC on the development of a Cultural Heritage Management Plan (CHMP).

Community (including indirectly impacted landholders and special interest groups)

Table 6-5: Feedback from the community

Date	Stakeholder	Comments & Concerns	Renascor Response
17 April 2023	Tier 1 and 3 stakeholders: Indirectly impacted landowners and community Save St Kilda Mangroves & the St Kilda Alliance Whale and Dolphin Conservation (WDC) Port River Dolphins Adelaide Dolphin Sanctuary Action Group Estuary Care Foundation SA Inc Australian Marine Wildlife Research and Rescue Organisation St Kilda & Surrounds Progress & Tourism Association Inc	Email / letter sent informing stakeholders about the project and inviting feedback	
19 April 2023	St Kilda & Surrounds Progress & Tourism Association Inc	Request meeting to discuss project further	Meeting organised for 1 June 2023.
23 May 2023	St Kilda Residents	Concern regarding the existing noise from wind turbines at Snapper Point Power Station (Outer Harbour) and Bolivar Treatment works and whether the Project will shield residents from the noise or further contribute.	Renascor are currently developing a model of the potential noise that will be generated from the proposed facility. The model will then guide further design, engineering and operational solutions to reduce the noise to a level which is unlikely to impact on the surrounding residents and broader community.
1 June 2023	St Kilda & Surrounds Progress & Tourism Association Inc	Concern regarding the noise and dust generated from the Project. Impacts of treated process water on Mangroves. Traffic safety and lighting along Waterloo Corner Road and Robinson Road.	The project is a significant distance from St Kilda which will limit the noise and dust experienced at this location. Additional Note: Air quality and noise modelling are being undertaken to understand the impacts on adjacent residents and inform future engineering design. Potential impacts of noise and dust on adjacent residents as well as traffic impacts have been assessed in Chapter 11 (Amenity and Environmental Quality). Potential impacts of treated process water are assessed in Chapter 9 (Physical Environment), potential impacts of the Project on the Mangroves has been assessed in Chapter 10 (Biological Environment).
9 October 2023	Mark Lee Fish Farms (industry)	Email sent identifying project followed up with phone call.	No response received.

No other feedback has been provided from the community.

State and Local Government

Table 6-6 summarises the various government meetings and feedback.

Table 6-6: Summary of Government Engagement and Feedback

Date	Attendees	Comments & Concerns	Renascor Response
28 February 2023	DCCEW Renascor JBS&G	Project briefing & presentation of EPBC self-assessment concluding project was not a controlled action. No issues raised.	n/a
24 January 2023	DPLUS EPA Renascor JBS&G	Disposal options and classification of solid waste outputs from process.	Waste options are currently being considered using the hierarchy of controls. Investigations are underway to identify potential sale to industrial users, if this is not possible waste will be managed in accordance with EPA requirements.
		GHG emissions and opportunities to reduce emissions.	The SA grid is predominantly supplied by renewable energy. Renascor are continuing to look at ways to optimise their ESG footprint.
		Treated process water and flooding concerns	Refer to Chapter 9 Physical Environment for full assessment.
		Dust impacts on Zoo fodder.	Minimal dust impacts may occur from traditional construction activities. Additional control measures are in place during operations to minimise ongoing dust (refer to Chapter 11 Amenity and Environmental Quality for a full assessment).
		Potential to trigger Hazardous Facility Licence Requirements.	Unlikely due to the low volumes stored onsite.
5 August 2022	EPA Renascor JBS&G	Concerns with location of water quality monitors and potential to influence compliance of existing licence users if water is not returned at same quality.	Acknowledged – refer to Chapter 9 Physical Environment for a full assessment and location of water quality monitoring points.
		Requirement for 12 months baseline water quality data.	Acknowledged – summary of water quality data and date ranges included in Chapter 9 Physical Environment.
21 March 2022	DEM DTI DTI-PLUS	Discussion of site selection process and considerations.	n/a
26 May 2023	DTI – PLUS EPA Renascor JBS&G	Discussion of noise and air quality modelling and proposed mitigation measures.	Acknowledged – refer to Chapter 11 Amenity and Environmental Quality for a full assessment.
15 June 2023	DTI-PLUS EPA Renascor JBS&G	Discussion of treated process water quality modelling and compliance triggers.	Acknowledged – refer to Chapter 9 Physical Environment for a full assessment.

6.3.6 Principle 6: We are engaging (Diversity considerations)

The stakeholder engagement program has been designed to elicit participation from a diverse group of stakeholders. Consultation with Traditional Owners has been culturally appropriate with updates to the KYAC Board throughout the Project development process undertaken to date.

6.4 Further opportunities to provide feedback

Public exhibition of the EIS

The Minister for Planning will place this EIS on public exhibition for a period of at least 30 business days. The public exhibition process is the government's formal consultation with stakeholders, providing an opportunity for all interested parties to read about the Project and submit questions or comments to government who make a decision on whether to approve the Project.

When published, there will be a variety of different ways for stakeholders to view, download and provide comment on the environmental, social and economic impact assessments that Renascor undertook as part of the EIS process. These include via:

- The SA government's SA Planning Portal
- The Renascor website

Hard copies of the EIS Executive Summary and a digital copy of the EIS and appendices on a USB will be made available on request by contacting the Project team directly on:

- community@renascor.com.au
- +61 8 8363 6989

In addition, during the public exhibition process DTI - PLUS may facilitate one or more community meetings to provide further opportunity for stakeholders to hear about the project. This meeting or meetings may be held in person or online and may comprise:

- A presentation on the Project by Renascor
- An overview of the Government assessment process by DTI - PLUS
- An opportunity to ask questions directly to representatives of Renascor and DTI - PLUS

If deemed by DTI - PLUS to be required, information on the date, time and location of the community meeting(s) will be advertised by DTI - PLUS prior to the event.

EIS Response phase

All submissions received on the EIS via any of the above sources during the public exhibition process will be reviewed by Renascor, and all matters addressed in a Response Document. Together, the EIS and Response Document will form the final application to government for the assessment and consideration of Project approval.

Ongoing community feedback

Renascor is committed to an open and honest stakeholder engagement process. It recognises that providing genuine opportunities for stakeholders to share local knowledge and give feedback on the

proposed development will assist with a smooth operation in the future. To facilitate ongoing stakeholder engagement, Renascor has:

- A dedicated email address for community members and stakeholders to make contact
- A detailed website with information including ASX announcements and presentations
- A Community Engagement Plan in place for its exploration and mining activities on the Eyre Peninsula and the BAM Facility and its corresponding stakeholders
- A Stakeholder Engagement Register to record conversations and correspondence from stakeholders.

7 Impact Assessment Methodology

7.1 Purpose of Impact Assessment

The purpose of the impact assessment process was to determine whether Renascor can undertake the Project in a way that meets regulatory requirements and stakeholder expectations. Impact assessment addresses the questions of whether the biophysical, social and economic impacts (both positive and negative) of the project will be acceptable to government regulators and community stakeholders, and what specific measures Renascor will need to take to ensure the Project is acceptable.

7.2 Relevant Environmental Matters

The assessment considered the following environmental and social matters:

- Air quality
- Biosecurity
- Climate change adaptation
- Coastal and marine environment and processes
- Cultural heritage (Aboriginal and non-Aboriginal)
- Greenhouse gas emissions
- Hazard and risk (including fire, flood, contamination and dangerous substances)
- Hydrogeology
- Hydrology
- Land use and site conditions
- Local, regional and state economies
- Marine flora and fauna
- Noise
- Social environment
- Soil and landform
- Sustainable use of resources
- Terrestrial flora and fauna
- Traffic and transport
- Urban design and placemaking
- Visual amenity
- Waste management

These matters were either specified in the EIS Assessment Requirements or determined through preliminary environmental and social investigations by Renascor.

7.3 Overview of the Impact Assessment Process

The process of impact assessment incorporated the following for each environmental and social matter:

- Assessment of the baseline condition of the existing environment. This identified the environmental values for each matter that could be impacted by the Project, and their condition.
- Review of aspects of the Project design to determine the ways in which the Project could potentially affect the environmental values. These are called the 'potential impact events'.
- Described the impacts that are expected to occur as part of the construction and operation of the Project. These are the impacts that are planned for, and a necessary consequence of carrying out the Project. These are described in conjunction with control and mitigation measures.
- Use of risk assessment tools to evaluate the uncertainty in the assessment of expected impacts, where appropriate.

These steps are discussed in detail below.

7.4 Assessing Baseline Environmental Conditions and Identifying Environmental Values

Environmental values are the physical characteristics and qualities of the environment that contribute to biodiversity conservation, and the social, spiritual and economic health of individuals and society. Implicit in this definition is that an environmental value has some degree of significance. For example, a groundwater aquifer would not be considered a value if sufficient reliable data was available to conclude its water quality precluded any use, it did not support any groundwater dependent ecosystems or stygofauna, or it had no cultural significance. If data gaps meant the significance of a value was uncertain, the assessment used a precautionary approach and the value included in the assessment.

Values that could be impacted by the Project were identified through desktop reviews of existing information, technical studies including field surveys, and as a result of stakeholder engagement. Details of stakeholder engagement are described in Chapter 6 Stakeholder and Community Engagement.

The values considered were those within the area of influence of the Project. The boundary for this varies for each environmental element depending on the type and severity of the impact being considered. It could, for example, be the air shed, water catchment or bioregion.

7.5 Identifying Potential Impact Events

The Project may impact directly or indirectly on environmental values in many ways. These are called the potential impact events. They include both events that are certain to occur (e.g. clearing of vegetation) and those that are not planned but may potentially occur (e.g. impacts on a fauna species that was not previously known to occur on site).

Direct impacts are those that are caused directly by the proposed activities (e.g. clearing of vegetation). Indirect impacts are those where a secondary event occurs that is substantially caused by activities associated with the Project (e.g. dust deposition from Project activities on agricultural land, which may result in reduced productivity).

Impact events were initially identified for the Project based on technical studies of receptors, review of engineering design to identify sources, consideration of stakeholder views, and professional expertise. These were subsequently refined into a list of credible and realistic potential impacts as Project detail was developed, and detailed investigations and stakeholder consultation were undertaken.

For an impact to occur there must be a connection between a source and a receptor.

- Source of the potential impact event means the source which alone or in combination has the potential to cause harm to an environmental receptor.
- Receptor is an environmental value that may reasonably be expected to be adversely impacted by the source.

Potential impact events were not considered further if the initial assessment demonstrated that an environmental receptor could not be adversely affected by a source. In the event that there remained a perceived link (or assigned value) from the perspective of stakeholders, an impact assessment was carried out.

7.6 Control and Mitigation Measures

Control measures are used to prevent or minimise adverse environmental or social impacts. They can include physical controls (design measures) and procedural controls (management controls). Renascor has considered both in the assessment process.

The impact assessment was an iterative process that considered each identified impact event and determined how it could affect environmental values. Where an impact on an environmental value was expected, the assessment considered whether there was an opportunity to redesign the Project to avoid the impact or use control measures to prevent or minimise the impact. Where physical controls could be implemented these were preferred in accordance with the hierarchy of controls.

Specific design measures for each aspect are detailed in the chapters of this report, and will be collated in the Environmental Management Plans (framework detailed in Chapter 17 (Environmental Management Framework).

7.7 Assessing Expected Impacts

An environmental impact is any change, positive or negative, to environmental, social and economic values expected as part of planned activities associated with the construction and operation of the Project. Unlike environmental risks, environmental impacts are certain to occur if the Project proceeds.

The impact assessment considered the scale, intensity, duration and frequency of impacts and the sensitivity of the receptor. Impacts were assessed with reference to the descriptors in Table 7-1. In carrying out the assessment, realistic worst-case assumptions were made in order to provide a conservative assessment.

Predicted impacts were reviewed to identify whether they were acceptable for the relevant environmental matters, taking into account the proposed control measures. Impacts were considered to be acceptable if they were in the 'Negligible' category as set out in in Table 7-1 while impacts that were in the 'Minor' category were considered acceptable if they were as low as reasonably practicable. This process was iterative and additional controls were considered, as necessary, to ensure impacts were as low as reasonably practicable.

Table 7-1: Categorisation of impact consequence – Environment

Category	Amenity (air quality and noise)	Listed flora and fauna species (terrestrial, aquatic and marine)	Other flora and fauna (terrestrial, aquatic and marine)	Habitat (terrestrial, aquatic and marine)	Contamination	Soil quality and quantity
Negligible	Recognised standards met at all times	Insignificant effect	Local short-term decrease in abundance of some species without reduction in local community viability	Insignificant effect	Insignificant effect	Minor soil disturbance with low erosion potential.
Minor	Isolated and localised exceedance of recognised standards. Complaints received that are resolved within days	Local short-term decrease in abundance with no lasting effects on local population	Local long-term decrease in abundance of some species resulting in little or no change to community structure	Disturbance of well-represented landforms / habitats	Local contamination that can be immediately remediated	Some soil disturbance with minor implications for offsite erosion which can be readily rectified with no significant loss of land capability
Moderate	Local minor ongoing exceedance of recognised standards. Widespread minor short-term exceedance of recognised standards Ongoing complaints	Local long-term decrease in abundance without reduction in regional population viability	Regional long-term decrease in abundance of some species and / or local loss of some species diversity resulting in some change to the community structure	Local loss of well-represented landforms / habitats.	Local contamination that can be remediated in less than 12 months. Widespread contamination that can be remediated in short-term	Soil disturbance with a high risk of offsite erosion potentially requiring months of remediation with short-term loss of land capability
Major	Widespread major short-term exceedance of recognised standards resulting in hospitalisation of members of the public	Regional long-term decrease in abundance and / or local loss resulting in reduction in regional viability	Regional long-term decrease in abundance of numerous species and / or some loss of species diversity resulting in significant changes to community structure	Local loss of a unique or critical landform / habitat.	Widespread contamination that requires a regional incident response and more than 12 months to remediate	Soil disturbance with a high risk of erosion potentially requiring years of remediation with long-term loss of land capability
Catastrophic	Public exposed to a major exceedance of recognised standards that results in severely debilitating chronic health impacts or life-threatening hazards	Regional extinction of the species	Regional long-term loss of numerous species resulting in the dominance of only a few species	Regional loss of unique or critical landforms / habitats	Widespread contamination that requires a State-level incident response with rehabilitation expected to take several years or more	Extensive impacts to surface soils with irreversible soil erosion and significant and widespread permanent decline in land capability

Table 7-1: Categorisation of impact consequence – Environment (continued)

Category	Water (ground, surface and marine)	Visual Landscape Character	Public health and safety	Heritage	Land use
Negligible	Minimal change with no significant loss of water quality or quantity	Insignificant effect	No injury or illness	No impact to items of cultural significance	No measurable impact to current or future land uses
Minor	Local minor short-term reduction in water quality or quantity.	Minor change in landscape with limited visibility, similar to existing landscape character	An injury or illness that does not require first aid or medical treatment	Isolated damage to locally significant natural, cultural or historic heritage that is readily rectified	Minor repairable damage to land or disruption to land use with no compromise to ongoing or future land use
Moderate	Local minor long term or widespread short-term reduction in water quality or quantity.	Widespread change or visibility of change with similar landscape character to existing character	Injury or illness requiring first aid or medical treatment	Damage to State or national listed / significant natural, cultural or historic heritage that does not alter its heritage significance	Damage to land and infrastructure that results in remediation costs and / or loss of income of up to $1 million.
Major	Widespread (regional) major short-term reduction in water quality or quantity	Major changes in landscape character with significant visibility, out of character to the area.	Injury or illness that results in hospitalisation or disablement	Permanent damage to State or nationally listed / significant natural, cultural or historic heritage that results in a loss of heritage significance	Damage to land and infrastructure that results in remediation costs and / or loss of income of up to $10 million.
Catastrophic	Regional major long-term reduction in water quality or quantity	Significant decrease in landscape character visible for a wide viewshed.	Injury or illness that results in fatality	Permanent damage to State or nationally listed / highly significant natural, cultural or historic heritage site resulting in the site no longer meeting the listing criteria where applicable	Extensive damage to land or disruption to land use that results in remediation costs and / or loss of income of over $10 million

7.8 Socio-economic impacts

Socio-economic impacts have been assessed using a qualitative assessment method based on whether they are positive (beneficial) or negative (Table 7-2). The assessment considers the extent or the number of properties and people impacted, scale of the impact, the duration of the impact and the resilience of the community to recover from the change. These impacts (positive and negative) could occur at a local, regional or state scale. Controls have been considered to reduce the negative impacts as well as ensuring or enhancing positive impacts.

Table 7-2: Categorisation of impact consequence – Socio-economics

Category	Social (negative)	Social (positive)	Economic & Land Use (negative)	Economic & Land Use (positive)
Minor	Barely perceptible negative impacts that won't increase or exacerbate other threats or impacts in the region.	Little change in the way of life, livelihoods and lifestyles in region.	Minor or short term impacts to the community that can be remedied as part of normal operations.	Little change in the way of life, livelihoods and lifestyles in region.
Moderate	Tolerable cumulative impacts requiring ongoing management.	Noticeable benefits across the region (including cumulative impacts) which suit culturally appropriate, sustainable development.	Substantial impacts to adjacent community or businesses, moderate to long term impacts.	Noticeable benefits in region via creation of jobs, increased revenue to local businesses or benefits to land uses.
Major	Intolerable social, cultural and economic cumulative impacts that are unlikely to be reduced via management.	Significant benefits across region that are likely to benefit future generations.	Serious impact to the community & businesses with long term impacts.	Significant benefits to region and economy with long lasting benefits.

7.9 Addressing Uncertainty

Risk assessment tools were used to evaluate the uncertainty in the assessment of expected impacts.

Sources of uncertainty create a risk that the impacts on environmental values may be greater than expected. Uncertainties in the impact assessment can derive from:

- quality of site-specific data available
- the reliability of any modelling undertaken in the impact assessment
- control measures not being as effective as expected.

Table 7-3 describes the factors that can affect the level of certainty in relation to each of these sources.

Table 7-3: Factors affecting level of certainty

Level of certainty	Quality of data	Extent to which modelling has been validated	Effectiveness of design measures	Effectiveness of management measures
High	Comprehensive data. Further studies are unlikely to generate additional information that would change the conclusions reached in the impact assessment.	Excellent baseline data available. Model has been run and provides accurate predictions over different seasons. Model has been extensively used and is regarded by discipline experts as leading practice and/or the impact assessment does not rely to any significant extent on the use of a model.	Widely used and demonstrated to be effective at a range of infrastructure sites including sites with similar topographical / climatic conditions. Requires minimal checking and failure risk has been shown to be low.	Management measures are considered routine and used effectively throughout industry. Reduction in the level of impact from an unmitigated level does not rely primarily on the management measures.
Medium	Some site-specific information available to provide ground-truthing of regional desktop information. Further studies could change some of the conclusions reached in the impact assessment.	Some baseline data available. Model shows a reasonable approximation of real conditions but relies on a number of assumptions and sufficient data not available to demonstrate the model accurately portrays seasonal conditions.	Has been used at sites with similar conditions but requires regular checking or maintenance to ensure performance. Has only been used at limited sites. OR Effectiveness has not been established in the long term or at sites similar to the Project site.	Management measures have been effectively used at a limited number of sites and have not been demonstrated at similar sites or in the long term and / or reduction in the level of impact from an unmitigated level relies primarily on the management measures.
Low	Minimal site-specific data available. Reliance on regional desktop studies that may not accurately reflect site conditions. Low level of confidence in the impact assessment.	Minimal baseline data. Model is unable to be validated with current data.	Measures are novel and have not been demonstrated in the field.	Management measures are novel and / or heavily reliant on specialised technical expertise.

The level of certainty for each impact event was classified using the factors outlined in Table 7-3. Risk assessment tools were then used to evaluate impact events with a 'Low' or 'Medium' level of certainty, and in all cases where there was no expected impact but a material impact could potentially occur.

The risk assessment considered the credible worst-case consequence (as defined in Table 7-1) that could occur if assumptions made in the impact assessment were found to be incorrect, as well as the likelihood of such a consequence occurring (as described in Table 7-4). The level of risk was then categorised using the matrix in Table 7-5.

This process was also iterative. 'Low' risks were generally accepted, and 'medium' and 'high' risks were reviewed to determine if each risk was as low as reasonably practicable. Where necessary, changes were made to the Project design and control measures or further studies undertaken to ensure risks were adequately minimised. 'Extreme' risks were regarded as unacceptable; however, no such risks were identified.

The evaluation of uncertainty (using the risk assessment tools) is discussed for each impact event (where relevant) in the impact assessment chapters (chapters 8 – 16) in this EIS. A summary of the evaluation of uncertainty for all impact events is contained in Appendix 6.

In addition, a number of potential impact events that have no expected impact but have a perceived or material level of risk (e.g. fire) have been specifically addressed in Chapter 15 Hazard and Risks, with cross-referenced discussion in the relevant impact assessment chapter where appropriate.

Table 7-4: Description of likelihood

Descriptor	General description	Probability per year
Almost certain	This event is expected to occur in most circumstances.	> 80%
	Expected to occur at least once each year.	
Likely	This event may occur in some given circumstances.	50 – 80%
	May occur during any given year.	
Possible	This event might occur at some time.	10 – 50%
	Not likely to occur in any given year but is possible.	
Unlikely	This event could occur at some time.	0.5 – 10%
	Very unlikely to occur in any given year.	
Rare	This event may only occur in very exceptional circumstances.	< 0.5%
	Examples of this have occurred historically but are not anticipated.	

Table 7-5: Risk rating matrix

Likelihood	Consequences				
	Negligible	Minor	Moderate	Major	Catastrophic
Almost Certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	Extreme	Extreme
Possible	Low	Low	Medium	High	Extreme
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

8 Land Use and Site Conditions

This chapter provides a summary of the existing conditions relating to land use within the footprint of the Project and in the locality of the Project, as well as the assessment of potential impacts the Project may have on existing and future (envisaged) land uses that overlap, adjoin and are in the region of the Project, with regard to the environmental, social and economic values of adjoining and affected land uses and land tenures. The City of Salisbury's *Strategic Growth Framework – Waterloo Corner and Bolivar Corridor* (SGF) is considered within assessments undertaken to inform this chapter.

8.1 Key findings

- The Project is considered a desirable land use under the current and proposed planning schemes.
- There may be minor benefits to adjacent land uses associated with the project including road upgrades.
- Amenity interface issues are minor and manageable under industry standard practice.
- The Project has been designed using the principles of circular economy to minimise competition for resources.
- Ancillary infrastructure has been sited to reduce impacts on the usability of adjacent land.

8.2 Setting the context

This section provides information to explain the context within which impact assessment is undertaken. It describes:

- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the Project to meet
- The assessment methodology used to identify baseline environmental values and to undertake the impact assessment.

8.2.1 EIS Assessment Requirements

The EIS Assessment Requirements for adjacent land uses are set out in Table 8-1.

Table 8-1: EIS Assessment Requirements – Land Use and Site Conditions

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
LUSC1	Land tenure, protected areas and land use	To ensure that the impacts of development on environmental, social and economic values of adjoining land uses, land tenures and protected areas are avoided or minimised.	Provide details of the development (activities or structures) with the potential to impact on existing land uses, land tenures and protected areas that overlap, adjoin or are in the region of the development. Provide an assessment of local impacts to adjoining land uses and describe any measures to mitigate these impacts. Assessment to consider the City of Salisbury's Strategic Growth Framework—Waterloo Corner and Bolivar Corridor.	Standard

8.2.2 Legislation, Policies and Other Standards

Development on the site is subject to the PDI Act supported by the Code and associated policies setting out specific requirements for various areas, which are expressed spatially through the SAPPA. The State Planning Policies which apply to the Project are assessed in Chapter 5 (Planning Assessment). The PDI Act and associated policies and documents set out a framework for how and where forms of development can occur and coexist to minimise interface conflict and impacts related to incompatible land uses.

Local strategic planning frameworks that apply to the project area and adjacent areas include:

- City of Salisbury's City Plan 2035
- City of Salisbury's Strategic Growth Framework (Holmes Dyer 2022)
- Future redevelopment and envisaged land use changes are set out in the Strategic Growth Framework (Holmes Dyer 2022) and indicate an objective for the land in the locality of the Project site to be progressively redeveloped to facilitate a range of activities including employment (including green industry), light industry, commercial, recreation, tourism, rural horticulture and open space for stormwater management and connectivity.

Authority to construct the BAM Facility on land owned by the South Australian Water Corporation (SA Water) has been secured by Renascor in the form of an option to lease agreement. The subject land remains the freehold property of SA Water. No other landowners are directly affected by the BAM Facility in terms of land acquisition, easements or encumbrances resulting from the Project elements presented for assessment in this EIS.

The subject site is located within the Kaurna Peoples Native Title determination area as provided for under the *Native Title Act 1993* (Cth) and *Native Title (South Australia) Act 1994.* As the Project is located on freehold land, native title has been extinguished over the subject site and a native title agreement or Indigenous Land Use Agreement is not required.

Consultation with the traditional owners, being the Kaurna People and their representative body, the Kaurna Yerta Aboriginal Corporation, in relation to Aboriginal cultural heritage has been undertaken

and is discussed in more detail in Chapter 13 (Cultural Heritage) and Chapter 6 (Stakeholder and Community Engagement).

8.2.3 Views of Stakeholders

No stakeholder feedback has specifically identified concerns of the Project impacting on adjacent land use. The recent Waterloo Corner and Bolivar Corridor Strategic Growth Framework (Holmes Dyer 2022) was open for public consultation April – May 2022 and is considered to represent the views of key stakeholders on the appropriate and desired land uses for this area. The key concern from the submissions received on this framework was the lack of infrastructure (including road, sewer and wastewater) and requirement for upgrades. Section 8.4.4 outlines the potential impact of the development on competition for resources, as described in Chapter 3 (Description of the proposed Project), new infrastructure to connect the Project to the electricity grid (and gas grid if required) will be developed to reduce pressure on the existing infrastructure. Infrastructure proposed to connect the Project to the electricity and/or gas network is outside the scope of this EIS and will be applied for under a separate approval process in due course.

8.2.4 Assessment Method

This chapter identifies the potential impacts of the Project on surrounding businesses and the ability to use the land for the current or proposed future land uses. Methodology associated with different assessment and modelling undertaken is described in the relevant chapters. Potential impacts on residents have been included in other chapters including:

- Impacts to property values as a result of increased demand from labour market or reduced amenity are addressed in Chapter 12 (Social and Economic Impact).
- Impacts to horticultural properties as a result of weed, pest or pathogens introduced from the project is addressed in Chapter 10 (Biological Environment).
- Impact of existing onsite contamination or management of hazardous substances restricting future land use development is addressed in Chapter 9 (Physical Environment).
- Change of surface water management causing or increasing the impact of flooding on surrounding lands is addressed in Chapter 15 (Hazard and Risks).
- Potential impacts to conservation areas as a result of releasing treated process water to SA Water outfall channel have been addressed in Chapters 9 (Physical Environment) and 10 (Biological Environment).

8.3 Description of Existing Environment

8.3.1 Zoning and land use

The Project site and land directly north and east has been zoned Rural Horticulture (refer Figure 8-1). This zone is dominated by market gardens (including both greenhouses and open air gardens). This zone also contains the Adelaide Zoo Feedlot north west of the Project site and the North South transport corridor which has recently been upgraded.

The infrastructure zone boundary runs along the south eastern boundary of the site. This zone contains the Bolivar WWTP owned by SA Water. The Dry Creek Salt fields on the other side (west) of the WWTP is zoned for resource extraction. A small Open Space zone is located approximately 200 m south east of the Project site and contains the South Australian Gun Club and the Southern Go Kart Club. Additional nearby tourism activities include the Tramway Museum (approximately 1.4 km west of the Project site within the infrastructure zone) and St Kilda playground and mangrove boardwalk (2.6 km west within Open Space and Conservation zones respectively.

The nearest urban zone is 1.8 km east of the Project site, other zones within 2 km include Deferred Urban and Employment zones. Other notable land uses in the area include a dog breeder (directly north of the site along Robinson road), a fish farm (approximately 900 m north east of the site), a Rubbish Dump (1.3 km north west of the site) and RAAF defence land approximately 1 km north and the airfield 4 km east of the site.

Infrastructure surrounding the site includes the SEA Gas pipeline (which runs along Undo Road to Robinson Road before heading south), overhead powerlines along Robinson and St Kilda Roads as well as the access to the Bolivar WWTP site. In addition, water utility pipelines surround and cross the site. The raw water intake and treated process water outfall pipeline alignment were developed in consultation with SA water to avoid impacts to existing pipelines and operations.

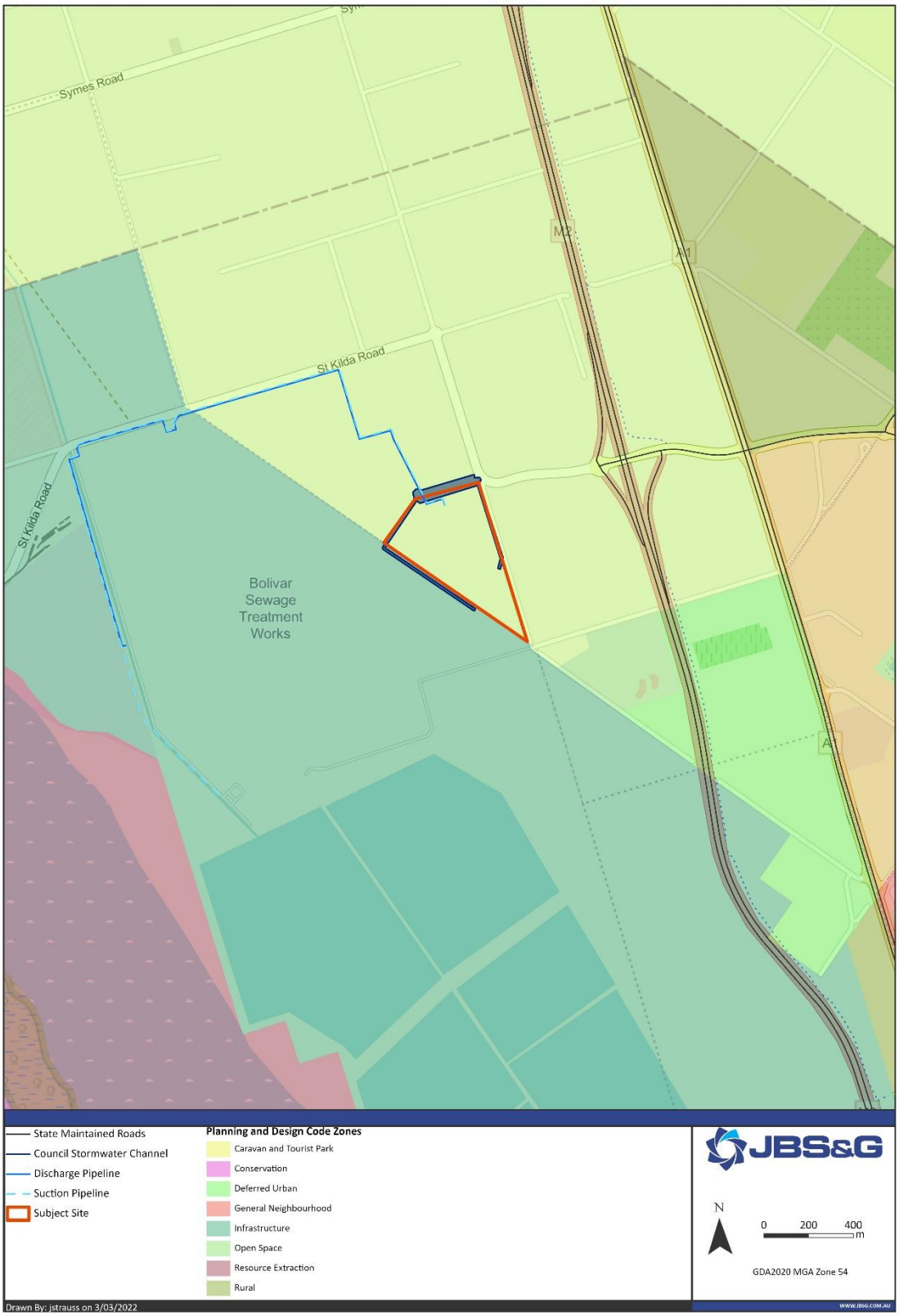


Figure 8-1: Zoning surrounding the Project site

8.3.2 Conservation Areas

The closest conservation area is the Winaityinaityi Pangkara - Adelaide International Bird Sanctuary National Park and the Adelaide Dolphin Sanctuary (2.7 km west of the Project site extending up the coastline 50 km to past the point where the SA Water outfall channel enters the marine environment) (Figure 8-2). There are no state heritage areas or geological monuments within 2 km of the Project site.

Winaityinaityi Pangkara – Adelaide International Bird Sanctuary was established in 2016 under the *National Parks and Wildlife Act 1972*. It was established to protect migratory shore birds and their habitat on the East Asian-Australasian Flyway and stretches over 50 km of coastline and is approximately 14,633 ha in size. The relevant Management Plan (DEW, 2020) identifies the following as key management directions for the park:

- Conserving migratory shorebirds and their habitat (refer to Chapter 10 Biological Environment for a full impact assessment on this component)
- Advancing Kaurna relationships with Country
- Maintaining access and creating opportunities for nature-based tourism.
- The Adelaide Dolphin Sanctuary is protected under the *Adelaide Dolphin Sanctuary Act 2005* and associated regulations. The Management Plan (DEH, 2008) sets out the following key management directions:
- Protection of dolphins
- Protection of key habitat features
- Improvement of water quality (noting the management plan references the Port Waterways Water Quality Improvement Plan which was used to inform the Adelaide Coastal Water Quality Improvement Plan which has informed the marine water quality requirements in Chapter 9 Physical Environment)
- Community participation
- Promotion of the environmental importance of the Adelaide Dolphin Sanctuary
- Promotion of the principles of ecological sustainable development (refer to Chapter 5 Planning Assessment for how these have been included in the assessment).

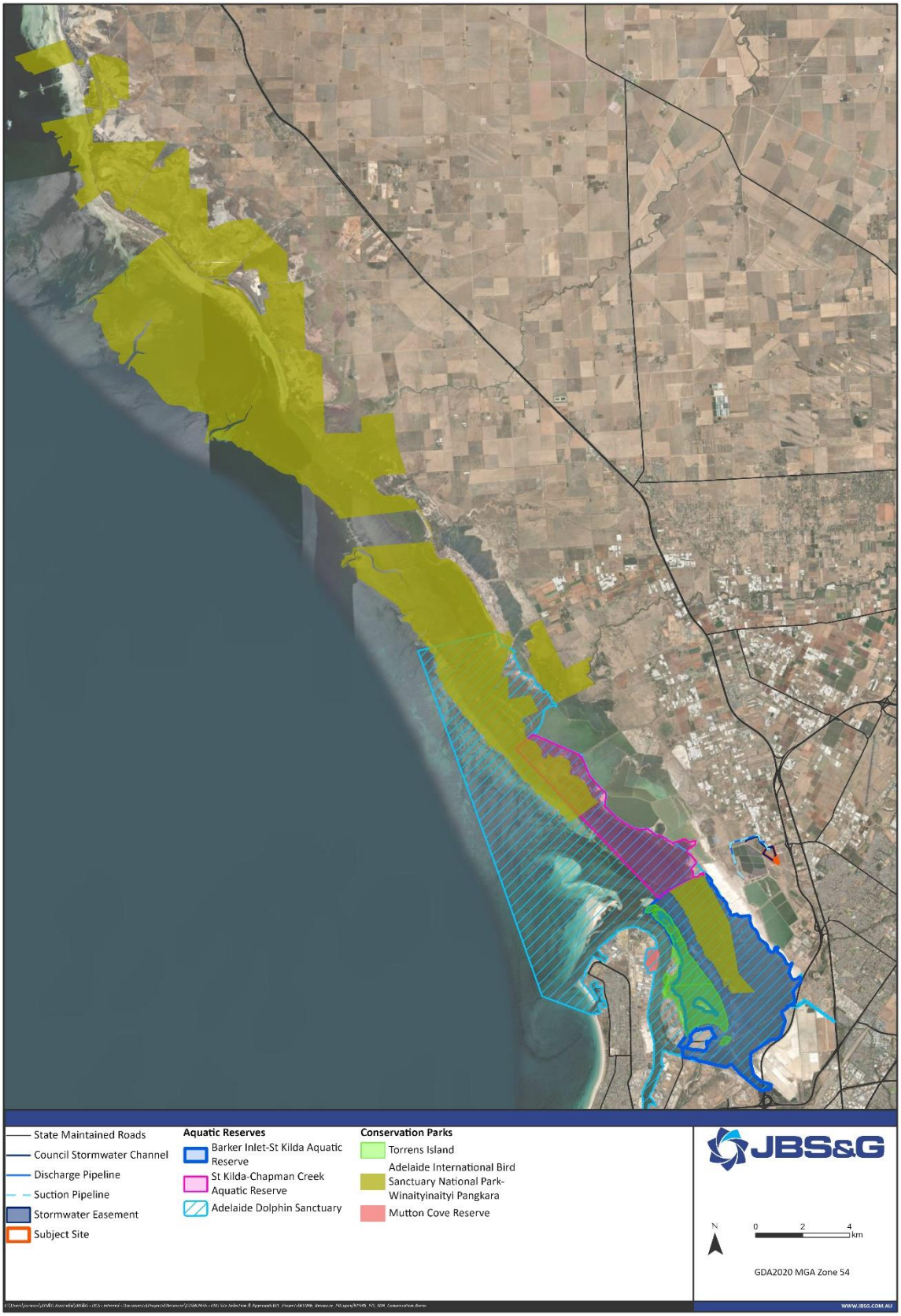


Figure 8-2: Conservation areas

8.3.3 Known future land uses changes

There are no development applications currently in this area for consultation. A review of the register of applications under the PDI Act has identified the following potential change in land use:

- Corner of Driver Road / Undo Road and Robinson Road – decision made on a telecommunications facility comprising 30 m high monopole – planning and building consent granted September 2021.
- Stakeholder engagement did not identify any other proposed changes to land use.

City of Salisbury Strategic Growth Framework – Waterloo Corner and Bolivar Corridor

The City of Salisbury City Plan 2035 includes a critical action to develop a comprehensive 25-year Growth Framework for the land west of Port Wakefield Road (Holmes Dyer 2022). The Strategic Growth Framework (SGF) aims to articulate a pathway toward supporting the orderly and sustainable development of the area, acknowledging pressures felt over time to facilitate progressive redevelopment. The SGF divides the Waterloo Corner and Bolivar Corridor into Planning Areas, responsive to the variety of expected or envisaged future land uses in the area.

Planning Area 1, which abuts the Project site, and captures the present area of intensive rural horticulture to the north-east, envisages 'Future Strategic Employment' with potential for an eco-industrial park. It is noted that this envisaged future land use is not anticipated to occur in the short-medium term. However, Renascor's BAM Facility aligns strongly with the style of development described in the SGF for Planning Area 1 and is thus able to be considered within the context of future land use as broadly supportive of the City of Salisbury's long-term vision for the area.

Renascor's Project site occurs within an area identified by the SGF as Planning Area 4, which encompasses the Bolivar WWTP buffer zone and is envisaged by the SGF to be potentially utilised for eco-industry.

Given the adjacency of the Project site to Planning Area 1, and the nature of the BAM Facility as a manufacturing enterprise contributing directly to the facilitation of renewable industries and jobs, Renascor considers that the Project aligns strongly with the short and medium-term objectives of the SGF.

The landform of the area is stated to be generally well-suited to large industrial and commercial activities, site constraints notwithstanding. The elevation of land and the resultant potential for coastal inundation through sea level rise or storm surge is highlighted as a constraining factor to the future development of land north and west of the Bolivar WWTP lagoons. However, to the east (where the Project is located), further inland and closer to the North South Motorway and Port Wakefield Road, large industrial and commercial activities are strongly recommended.

8.4 Impact Assessment

8.4.1 Potential impacts due to lighting changes

Construction lighting and exterior illumination of the BAM Facility (operations) will be directed to prevent light spill impacts at the Edinburgh RAAF base.

Potential impacts to residents as a result of light spill have been addressed in Chapter 11 Amenity and Environmental Quality. As no tourism businesses identified in Section 8.3.1 operate at night the only potential land use receptor impacted by light spill is the Edinburgh RAAF base.

The Project site is located within the 6 km buffer surrounding the Edinburgh RAAF base runways. This buffer zone identifies areas where there is potential for uncontrolled light spill from development to impact safe aircraft travel. Development within this buffer zone must comply with Guideline E of the National Airports Safeguarding Framework (Managing the risk of distractions to pilots from lighting in the vicinity of airports). Lighting design associated with the construction and operation of the BAM Facility will be designed to comply with this guideline. Further consultation with the Royal Australian Air Force (RAAF) or Civil Aviation Safety Authority (CASA) will occur on the final lighting design, as appropriate.

While the potential impact of a distracted pilot could be **Catastrophic** (multiple fatalities), the likelihood of this occurring is **Rare** (compliance with standards, pilots are trained and wear sunglasses during the day to avoid being blinded or distracted). This impact retains a risk rating of **High** due to the consequence, however, has been reduced to as low as reasonably practicable (ALARP).

Shadows from the Project will not reduce hours of sunlight available for adjacent horticultural activities.

The area immediately north and east of the Project site is used for horticultural activities with predominantly olive trees planted close to the Robinson Road boundary. The shadows cast by tall structures have been modelled for summer and winter solstice (reference Appendix 15). Shadows do not extend to surrounding properties during any modelled time period (Figure 8-3).

Sun-loving plants (including olive trees) require at least 6 hours of direct sun per day which is readily achievable under the above scenarios.

The impact of the Project reducing yield from adjacent market gardens as a result of shadowing is **Negligible**. The likelihood of this occurring is **Rare** resulting in an overall risk of **Low.**

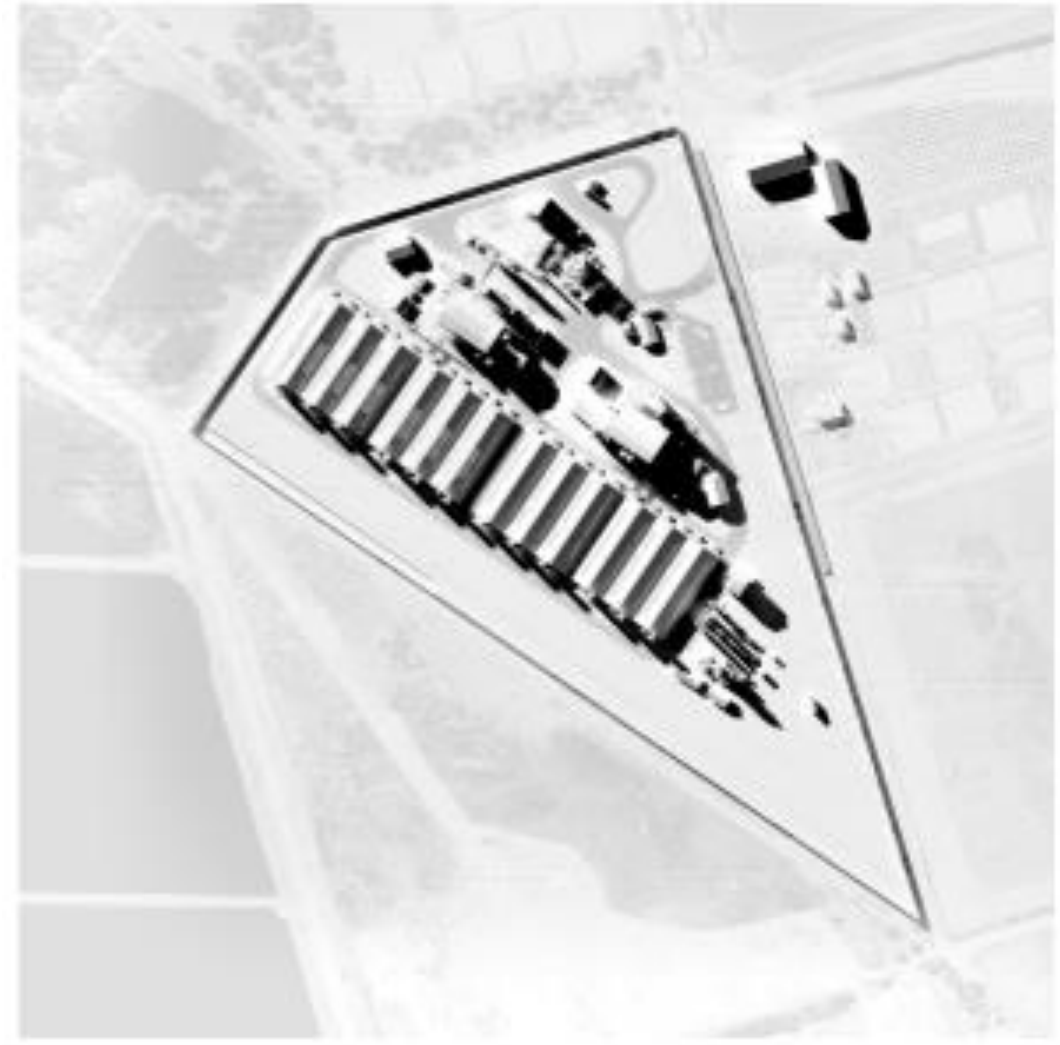


Figure 8-3: Shadow diagram at 3pm during the winter solstice (worst case scenario)

8.4.2 Potential impacts due to amenity

Amenity issues including visual character, noise, odour and dust are not expected to reduce the patronage at local tourism destinations.

Of the surrounding tourism destinations the Gun Club and Go Kart Club are unlikely to be sensitive to surrounding noise, air quality or visual impacts due to the nature of the activities. The noise impact assessment (Chapter 11) shows noise levels will be similar to background at the edge of the Adelaide Zoo feedlot (closest receptor to the location of the Tramway museum and St Kilda playground). Background noise, odour and dust will not be elevated at the tourism destinations as a result of the project.

Visual impact assessment (Chapter 11) shows the visual impacts from these locations will be **Negligible**. The Tramway museum and St Kilda playground are not areas specifically advertised due to the scenic surrounds and thus the change in visual amenity is not likely to have a material impact. The St Kilda Mangroves Board walk will not show a high level of visibility of the BAM facility due to the distance of the facility and the height of trees surrounding the boardwalk. It is also noted other large industrial buildings are clearly visible from these locations including the Torrens Island Power Station

and grain silos. The Project will fit in with the visual character of the area and it is expected that the nearby tourism destinations are not sensitive to this change (with the potential exception of the St Kilda Mangroves Boardwalk which will not have a material change in visual character compared to current conditions).

The potential change in the amenity of tourism destinations in the area as a result of the project is **Negligible**. While the likelihood of this change is **Certain** the overall risk is **Low**.

Minor nuisance impacts from dust on vegetation can be easily mitigated by standard practice.

As discussed in the biological environment assessment (Chapter 10) modelling has concluded the volume of deposited dust will not be large enough to cause 'smothering' or reduced growth on adjacent vegetation (or greenhouses). Rainfall during the year will also contribute to removing dust from fruit, vegetables and greenhouses to prevent excessive build up. The consequence of this impact is **Minor** and the likelihood is **Unlikely** resulting in an overall impact of **Low**.

8.4.3 Potential impacts due to land use change

The BAM Facility does not represent any loss of productive land as an expected form of development for this zone.

The Project site is approximately 20 ha within the Rural Horticultural zone. Industrial development will reduce the land area that could potentially be used for primary production (horticulture). The current land use is vacant land adjacent to the Bolivar WWTP lagoons. Developing this land for horticulture would likely face challenges due to the proximity of the Bolivar WWTP lagoons and elevated coliform levels on the western boundary of the site.

Other land uses allowable in this zone include industry (refer to Chapter 5 Planning Assessment). The Strategic Growth Framework (Holmes Dyer 2022) indicates future intentions to intensify the industry and commercial uses in this area thus the proposed Project is consistent with both current and future land use anticipated in the area. This land is not currently used for primary production, would present challenges to be developed as such and fits in with the desired land use under current and future plans. This impact is not considered material.

8.4.4 Potential benefits

The Project is considered desirable under the known future land use changes.

The City of Salisbury City Plan 2035 highlights the need to open new economic growth and development opportunities for the land west of Port Wakefield Road (this plan borders the eastern side of the Project Site). The City Plan 2035 is supported by the Strategic Growth Framework (Holmes Dryer 2022) which proposes rezoning of the land immediately east of the Project to Employment. The Strategic Growth Framework describes the employment zone as being approximately 20% manufacturing and 80% stores, services, office and other retail. As a manufacturing facility, the Project is considered compatible with proposed future land uses which will involve intensification of the manufacturing industry in this area. There may be a benefit to this development being co-located with other industrial activities as far as sharing of infrastructure and minimising interface impacts with non-compatible land uses.

The Project has been designed using the principles of circular economy to minimise competition for resources.

Resources required by the Project include electricity (sourced from the state grid), water (sourced from the HSP stream of SA Water's WWTP) and natural gas (piped to the site from nearby SEA Gas pipeline). The Project has been designed to reuse water and minimise electricity and natural gas use where possible. Up to 120 MW of electricity and 1.6 TJ/day of gas at peak production are considered sustainable within the existing supply chain. Ongoing consultation with suppliers will ensure sufficient supply is obtained. Water is obtained from the HSP outfall pipeline, there are no other users of this water and due to the quality, any beneficial use will require treatment prior to reuse. Flow rates have been monitored over a 5 year period and output of this water far exceeds the highest water demands of the Project (approximately 4.8 ML/day at peak production). Use of water, electricity and natural gas for the project will not reduce the availability or cost of these resources to other users.

Ancillary infrastructure has been sited to reduce impacts on the usability of adjacent land.

The route of water pipelines has been selected in consultation with stakeholders to prevent splitting land parcels or otherwise reducing the ability of landowners to use their land. The water pipelines between the SA Water outfall channel and the Project site skirt the edges of the Bolivar WWTP lagoons and the Adelaide Zoo feedlot. Pipelines are common on the adjacent land and the route was developed in consultation with SA Water to prevent impact on their operations. This impact is not expected to occur.

8.5 Summary of Mitigation Measures

Mitigation measures have been incorporated into design in consultation with relevant stakeholders where appropriate. Ongoing interface issues will be managed under the Mitigation measures listed in the other impact assessment chapters, of relevance are:

- Chapter 12 Social and Economic Impact
- Chapter 9 Physical Environment
- Chapter 10 Biological Environment
- Chapter 11 Amenity and Environmental Quality

8.6 Conclusion

The Project is compatible with the surrounding and proposed future land uses for the region. While some increase in noise and dust may be occur, these can be adequately managed by standard operational controls.

9 Physical Environment

This chapter provides a summary of the existing conditions and potential impact and risk for the physical environment including soil, landform, geology, surface, groundwater and downstream impacts in the coastal and marine environments. It is based on the outcomes of the specialist assessments attached at Appendices 7, 8, 10 and 18.

9.1 Key findings

- The project will not impact or contaminate the physical environment and will improve the existing contamination of the site by removing existing asbestos materials.
- Surface and groundwater will be managed in accordance with industry standards to prevent impacts.
- Treated process water will not impact on the coastal or marine environment.

9.2 Setting the context

Each section provides information explaining the context within which impact assessment is undertaken. Each section includes:

- Key findings
- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- A description of the existing environment
- The impact assessment undertaken in accordance with the methodology outlined in Chapter 7 for both Construction and Operations
- The key mitigation measures proposed to reduce or prevent environmental impacts
- A conclusion summarising the overall outcome of the impact assessment undertaken.

9.2.1 EIS Assessment Requirements

The EIS Assessment Requirements include an assessment of the effect on the Physical Environment as set out in Table 9-1.

Table 9-1: EIS Assessment Requirements – Physical Environment

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
PE1.1	Coastal Environment	To ensure the natural features and processes of coastal systems are protected so that the environmental values of the coast are maintained.	• Describe existing coastal environmental values including estuarine, littoral and marine environmental values that could be impacted by construction or operation of the development. • Identify the flooding and erosion risks to the site (including flooding and erosion exacerbated by sea level rise and extreme weather events) and measures to reduce the risks. • Identify any potential for Coastal Acid Sulfate Soils (CASS) to be encountered on the site and how this might be mitigated (refer to the Coast Protection Board policy on CASS). • Assess the potential impacts to the coastal system and existing uses from the development and propose mitigation measures to avoid or minimise those impacts during construction and operation. • If MNES have been identified, undertake an assessment of potential impacts relevant the MNES.	STANDARD
PE1.2	Marine Environment	To ensure the quality and productivity of marine waters, sediment and biota are protected so that environmental values are maintained.	• Assess the potential impacts of the proposed project's activities in marine waters including any potential impacts on marine parks, commercial or recreational fisheries effects of the development on nursery habitat (e.g. seagrass beds, reefs, or mangroves) of target species (such as prawns and fish). • The assessment of impacts will: - Consider spills of fuels and chemicals from the development. - Consider run-off / discharge from the development. - Propose mitigation measures to avoid or minimise those impacts during construction and operation - Consider the potential impacts of water discharge on the SA Water outfall channel, other users of the channel and the receiving environment. • If MNES have been identified, undertake an assessment of potential impacts relevant to the MNES	DETAILED
PE2	Soils, Landform and Geology	To ensure development is undertaken in a manner that protects the productivity and	• Provide a detailed description of the soils, landform and geology in the area of the development including the potential for water and wind erosion, soil salinity, acid sulfate soils and soil contamination.	STANDARD

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
		quality land including, soil, subsoil and landform and avoids impact to other environmental values.	• Describe the development activities with potential to impact on soils and ground stability. • Identify the risks of contamination of land from spills of fuel (or other toxic substances). Describe measures for the prevention and containment of spills, describe the contingency plans to be implemented in the event of spills, and comment on their expected effectiveness. • If acid sulfate soils would be disturbed or unexpectedly encountered during construction, describe measures to avoid oxidation of the sulfides, treat and neutralise the acid if it forms and manage any excavated material. • Ensure that appropriate soil contamination investigations have been undertaken and that soil generated from earthworks is managed in accordance with EPA guidelines, including for re-use on site or removal of material off-site for re-use, treatment or disposal.	
PE3	Surface Water and Groundwater	To ensure the quality of groundwater and surface water is protected so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	**Surface Water** • Describe existing surface water conditions upstream and downstream of the site (including seasonal variation and variations with flow). Water Quality, any existing site contamination and potential sources of surface water pollution should be addressed. • Describe the potential for pollution (e.g. sediment plumes, spills to land and water, discharge of stormwater and wastewater, dewatering) of water bodies, watercourses, drainage channels, wetlands and floodplains during construction and operation. • Describe potential alteration to surface water flows as a result of the development. • Impact assessment to consider impacts to downstream water users including food production / horticultural / agricultural land uses. • Describe the proposed mitigation measures to protect environmental values and downstream water users. Provide details of proposed wastewater and stormwater management, as well as any water sensitive design features as part of the development. • Describe the options for supplying water to the development including potable water (if relevant) and temporary demands during the construction period. Describe on-site storage and treatment requirements for wastewater from accommodation and / or offices and workshops. • Describe measures for storage and management of stockpiled topsoil and subsoils during the construction phase. **Groundwater** • Describe the known groundwater related environmental conditions including quality and	STANDARD

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
			significance of groundwater in the area of the development and any surrounding area potentially affected by the proposed development's activities. Groundwater testing is required. • Describe the potential changes to hydrology (including water quality), as a result of the proposal and the implications of these changes. Consider impacts to existing groundwater wells and aquifers. • Describe stormwater and wastewater management an the potential impact on groundwater resources with regard to fuel and chemicals used in construction and / or operation of the development. Describe measures proposed for management of stormwater and wastewater during construction and operation to avoid impacts to groundwater.	

Table 9-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
MNES requirements (PE1.1 and 1.2)	Chapter 10 (Biological Environment)
Assess the potential impacts of the proposed project's activities in marine waters including any potential impacts on marine parks, commercial or recreational fisheries effects of the development on nursery habitat (e.g. seagrass beds, reefs, or mangroves) of target species (such as prawns and fish).	Chapter 10 (Biological Environment)
Risk of Coastal Acid Sulphate Soils	Section 9.3 (Soils, Landform and Geology)
Risk of coastal flooding (including consideration of sea level rise and climate change)	Chapter 14 (Climate Change and Resource Efficiency)
Risk to soil, surface water, groundwater and marine receptors as a result of flooding	Chapter 15 (Hazard and Risks)

9.2.2 Requirements in Legislation

The *Landscape South Australia Act 2019* provides for the protection and management of the State's natural resources, including provisions relating to land management, water resources management and pest plant and animal control. Regional landscape plans and control policies are in force under the Act to guide management of water, soil and biological assets and define water affecting activities which require a permit and the regulation framework for surface and groundwater quantity in prescribed areas. The proposed development is within the Green Adelaide Landscape Management Region.

The *Coast Protection Act 1972* was formed to protect, restore and manage the coast to prevent erosion, damage, deterioration, pollution and misuse. Under this Act the Coastal Protection Board is formed and provides a number of guidelines specific to coastal environments.

The *Environment Protection Act 1993* creates a general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm. It outlines requirements and

standards within Environment Protection Policies, including the *Environment Protection (Water Quality) Policy 2015* (Water Quality EPP) which provides the structure for managing and regulating surface and groundwater quality within SA. The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (*ANZECC, 2000) and revision (ANZG, 2018) are referenced by the Water Quality EPP and provide additional guidance on planning and managing water quality or sediment quality, including the derivation of guidance values.

The *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013) (NEPM) provides nationally consistent guidance on assessment and management of soil contamination.

Guidelines that pertain to the aspects of physical environment discussed in this chapter include:

- A strategy for Implementing Coast Protection Board Policies on Coastal Acid Sulfate Soils in South Australia (South Australian Coast Protection Board, 2003)
- Australian Standard AS 1940 The storage and handling of flammable combustible liquids. (Australian Standard, 2004)
- EPA 080/016 Bunding and spill management (EPA SA, 2016a)
- EPA 1093/21 Environmental management of dewatering during construction activities (EPA SA, 2021a)
- EPA 1095 /21 Construction Environnemental Management Plan guidelines (EPA SA, 2021b)
- EPA 517/16 Stormwater management for wash bays (EPA SA, 2016b)
- Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry (EPA SA, 1999)
- Water Sensitive Urban Design Technical Manual – Greater Adelaide Region, Government of South Australia, 2010

9.2.3 Views of Stakeholders

No community stakeholder feedback has been received specifically related to water or soil quality. The Environment Protection Authority are responsible for regulation of water quality and soil and water contamination under the legislation and guidelines outlined above, which set out their views.

9.3 Soils, Landform and Geology

9.3.1 Assessment Method

A Preliminary Site Investigation (PSI) was undertaken to identify any potential contamination onsite (JBS&G 2022/2022, Appendix 7). The PSI involved a desktop review and assessment of all available data and a site inspection with 20 soil bores to a depth of 0.5 m BGL and three groundwater wells to a depth of 4 m BGL across the subject site (see JBS&G 2022, Appendix 7 for detailed methodology).

A geotechnical investigation was undertaken by ENGEO (Appendix 8). The geotechnical investigation comprised a desktop study and site investigation. For the site investigation, 24 test pits were excavated to depths of 1 m to 3 m below ground level (BGL) and 4 geotechnical boreholes drilled to target depth of 25 m (BGL). Electrical and thermal resistivity testing was undertaken onsite. Soil

geochemistry testing included testing for Acid Sulfate Soils (ASS) and Potential Acid Sulfate Soils (PASS).

Soil bores and groundwater samples were assessed against the NEPM requirements for industrial or commercial triggers (with the exception of PFAS which used ecological triggers) and groundwater quality was assessed against ANZECC and ARMCANZ guidelines (2000 and 2018) for Primary Industries (livestock).

Full details of how the sites were selected and methodology for each of the tests is included in Section 2 of Appendix 8.

9.3.2 Description of the Existing Environment

Regional Landform

The Project site is located within the Northern Adelaide Plains Land System which consists of flat to very gently undulating plains with slopes of less than 1%. This system is formed on mixed clayey and sandy loam to sandy clay sediments deposited under alluvial conditions. The site itself is flat with a fall of approximately 1 m (being 6 m AHD to the east and 5 m AHD to the west).

Regional Geology

The geology of the site indicates that the site overlays quaternary (Pliocene-Pleistocene) alluvial and fluvial sediments (SARIG, 2023). These sediments contain undifferentiated sediments and quaternary rocks. A drillhole located approximately 2.5 km northwest of the site (GH100) shows undifferentiated quaternary sediments for the first 1.2 m below ground level followed by 2.6 m of the Glanville Formation and the Hindmarsh Clay Formation. Groundwater was encountered in this borehole at a depth of 4.3 m BGL.

The Earthquake Hazard Zones of South Australia map (DPTI, 2012) shows the site in an area with a hazard factor of 0.11 or less which is considered a low seismic risk. There are no known active or historical open pit or underground mine workings in the immediate vicinity of the Project nor is there any landslide risk perceived (ENGEO, 2023). The CSIRO Atlas of Acid Sulfate Soils (ASS) (CSIRO, 2023) has mapped the site as an extremely low probability of occurrence of ASS with a low confidence in this assessment. Notably the Bolivar WWTP adjacent to the project site is mapped as having a High Probability of Occurrence of ASS (Figure 9-1).

Site Specific Conditions

Soil samples were taken as part of the PSI (JBS&G, 2022), soil logs are included in Appendix 7 and a summary provided below:

- 0 – 0.2 m depth – silty sand, brown to red-brown with trace organics.
- 0.2 – 0.4 m + depth – Clay, orange-brown with gravels (in some soil logs this layer is missing)
- 0.4 and deeper – Sandy clay, brown, low plasticity, fine to medium grained sand

Groundwater depth

Groundwater was identified in test pits between 0.60 m BGL and 1.8 m BGL and in the boreholes between 1.5 m and 2.5 m BGL. Groundwater samples indicate Total Dissolved Solids (TDS) between 18,000 and 23,300 mg/L (JBS&G, 2022). Given the proximity to the coast and salinity readings, groundwater elevations may be subject to tidal variations as well as seasonal variation. All groundwater wells close to the site either target a deeper aquifer or are backfilled, indicating there are no nearby users of the shallow quaternary aquifer onsite (JBS&G, 2022).

Acid Sulfate Soils

The subject site is mapped as having an 'Extremely Low Probability of Occurrence' of ASS, however is within close proximity to an area (Bolivar WWTP sludge ponds, adjacent to the subject site) mapped as having 'High Probability of Occurrence' of ASS. Further testing for PASS was therefore undertaken. The initial screening showed one sample with potential for PASS. However, further test work against the EPA SA guidelines for site contamination showed the sample did not meet the triggers for PASS. In addition, the soils present onsite showed a significant acid neutralising capacity should ASS be encountered.

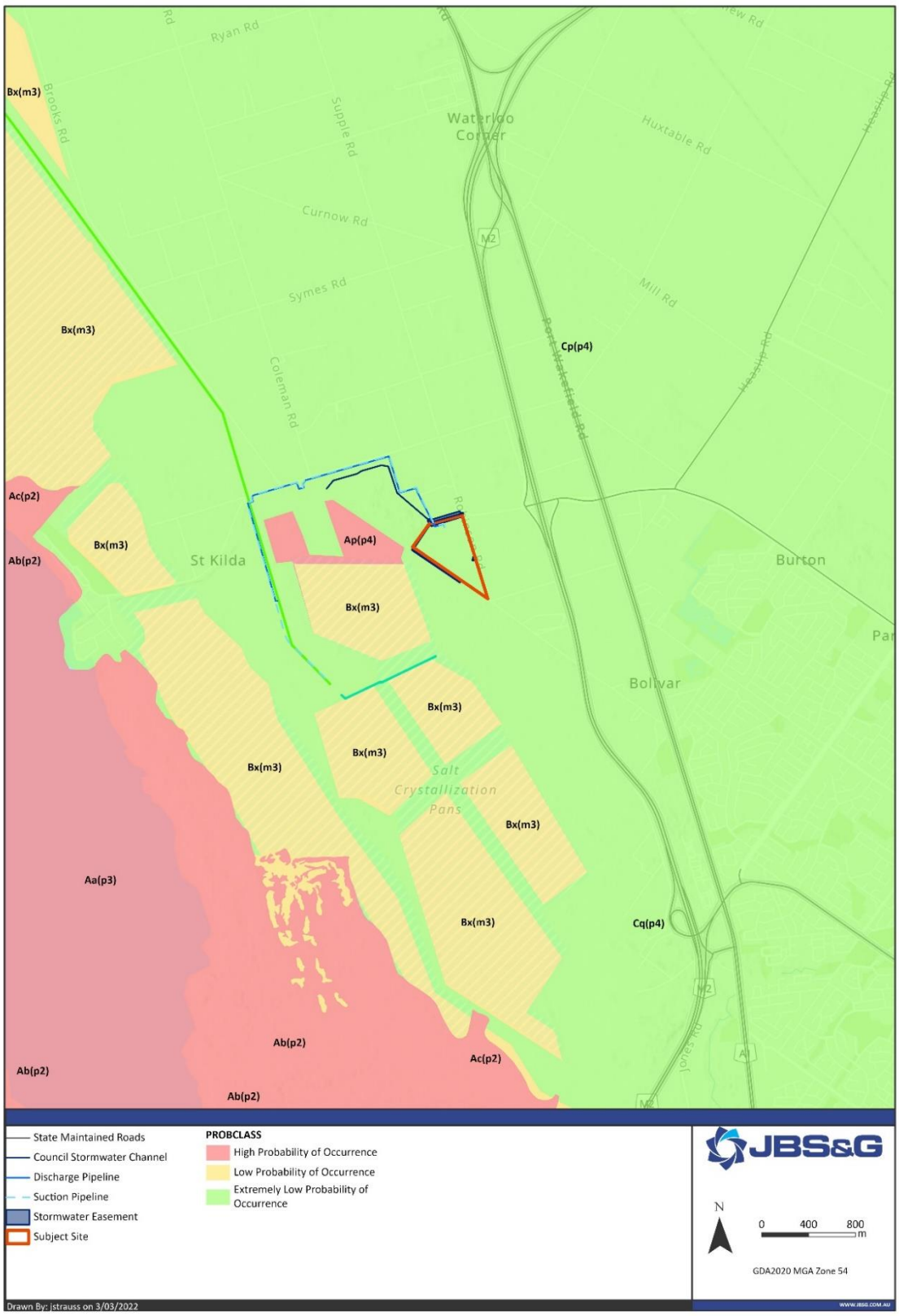


Figure 9-1: Probability of occurrence of Acid Sulfate Soils (CSIRO) – show site and adjacent Bolivar WWTP with CSIRO Atlas of ASS layer



Figure 9-2: PFAS Groundwater Prohibition Area (Edinburgh Air Base)

Soil and Groundwater parameters

All soil and groundwater parameters tested below the adopted indicators with the following exceptions:

- Cement sheet present at site contained presence of chrysotile asbestos fibres.
- Soil samples contained coliforms from 300 Most Probable Number / gram (MPN/g) to 17,000 MPN/g adjacent to the Bolivar lagoons. The source of the coliforms may be from aerolised particles from the Bolivar WWTP lagoons or naturally occurring in the soil from previous land uses including sheep grazing.

Potentially Contaminating Activities

The PSI identified the following Potentially Contaminating Activities as having occurred onsite:

- Historical use of fill from unknown sources.
- Asbestos containing materials (assumed source illegal dumping)
- Use of pesticides, herbicides and fertilisers from agricultural activities
- Illegal dumping
- Potentially contaminating activities occurring offsite with potential to impact on the Project Site (either under current conditions or realistically foreseeable conditions) include:
    - Bolivar WWTP – potential impacts from aerolised wastewater or migration of groundwater
    - Various agricultural land / farmland (potential runoff containing pesticides, herbicides and fertilisers)
    - PFAS contamination from Edinburgh air base (site is located adjacent to a groundwater Prohibition Area – see Figure 9-2).

9.3.3 Impact Assessment

Construction

Management of erosion and stormwater during construction will prevent secondary sedimentation of water courses.

Land clearance and disturbance of soils is a well-known cause of soil erosion from wind or water erosion. The proposed control strategies focus on reducing the area disturbed to minimise erosion, prevention of soil leaving the site (and thus providing a secondary impact of reduced surface water quality and sedimentation of water courses) and establishment of new landcover to prevent further erosion (e.g. hard stand areas, buildings etc. where appropriate).

These impacts and control strategies are well known and are occurring in the area with acceptable outcomes, including the SA Water earthworks directly south of the project site. Erosion and sediment control will be detailed in the CEMP and align with the Code of Practice for management of stormwater in the building and construction industry (EPA SA, 1999). Development of permanent stormwater management strategies will be covered in the OEMP and impacts are assessed below.

Considering the proposed mitigations, it's considered **Possible** stormwater could leave the construction site containing eroded soil or other contaminants with a **Minor**, short term impact to receiving waters. Overall, the risk of this impact is **Low**.

Imported materials (including fill) will be managed in accordance with EPA guidance to ensure a source of contamination is not introduced to site.

The Project requires approximately 20,000 m^3 volume of fill (subject to detailed engineering design) to raise the floor level 300 mm so it is above the 1% AEP flood level. The source of this material will be determined during the Project development process. It is possible the material could be sourced from the excavation of surface water infrastructure (also to be utilised by the local council), particularly to the north of the site (see Figure 9-3). Renascor is in discussions with the local council to investigate opportunities for the use of fill material and appropriate soils and contamination assessments would be undertaken if this option was to be implemented.

Material from inappropriate sources has the potential to introduce a source of contamination to the site. Additionally, inadequate placement of fill can compact over time leading to ground instability.

Mitigations to reduce these risks include following industry standards such as the Standard for the production and use of Waste Derived Fill (EPA SA, 2013a). This standard sets out a risk based approach for use of waste including what investigation or test work is required prior to accepting fill onsite as well as record keeping to demonstrate it is clean from contaminants and fit for purpose. Compaction of any material will be in accordance with Australian Standard AS3798 Guidelines on earthworks for commercial and residential developments with testing undertaken to demonstrate the surface is stable and suitable for constructing foundations.

Importation of contaminated material could have a **Moderate** impact on future land use but given the control strategies the likelihood of this occurring is **Unlikely** resulting in an overall risk of **Medium.**

Accidental spills or loss of containment will be remediated immediately to prevent impacts to soils, surface and groundwater.

Construction and operations will both require fuel and chemicals to be stored onsite. All fuel and chemical storage will be in accordance with EPA guidelines and requirements. Bunding will be installed so that during operations any water which has the potential to contact process fluids is unable to leave the site (see site run off plan, Figure 9-3).

Due to the proximity of groundwater to the surface (shallowest measurement from test pit during geotechnical investigation was 0.6 m BGL) it will not take long for soil contamination to infiltrate to groundwater making remediation more difficult. To mitigate this risk, an inspection schedule will be developed for all fuel and chemical storage areas. Spill management kits will be located in appropriate areas onsite to allow for immediate clean-up of spills and remediation of contaminated soil.

Should soil contamination occur as a result of a spill, it would be contained and removed promptly to mitigate the risk of interaction with groundwater. Should groundwater interaction occur the quaternary aquifer (shallow groundwater aquifer) is highly saline and of limited beneficial use. Any surface run off containing possible contamination would be contained on site for treatment, preventing contamination of surface water offsite.

Car parking areas also represent a potential impact on surface water quality. All car parking areas and other trafficked areas will be directed through appropriately designed industry standard oil-water

separators prior to treatment and/or release. Separated oils and contaminants will be collected for removal to a licensed facility.

It is **Possible** there could be a fuel or chemical spill but the potential impact from such as spill would be **Minor** due to compliance with EPA bunding requirements resulting in an overall **Low** risk from the project.

There are no coastal acid sulfate soils or potential acid sulfate soils onsite.

Mapping of ASS (CSIRO, 2023) shows the site has an extremely low probability of encountering potential or actual ASS onsite (but with low level of confidence). Mapping shows an area outside the subject site (Bolivar WWTP lagoons) has a high potential for ASS. The EPA SA contamination register also identifies ASS on CT 6257/133, south of the site. To reduce the uncertainty associated with this assessment, 24 test pits were excavated over the site with soil samples from five sent for testing to confirm if actual or potential ASS were present. The soil samples were compared with the National Standards (Sullivan *et al*. 2018) and EPA SA criteria (EPA 2007) for ASS / PASS. The report concluded there is no ASS or PASS onsite and the soil had some capacity to neutralise acid.

ASS Management will be included in the CEMP and OEMP giving consideration to the National Strategy for the Management of Coastal Acid Sulfate Soils (National Working Party on Acid Sulfate Soils, 2000). Management strategies may include:

- indicators for further test work being required,
- methodology for test work to be undertaken,
- triggers requiring management,
- preliminary management strategies while test work and ongoing management is developed.

The consequence of exposing PASS or ASS is considered **Moderate**. However, results of two site investigations concluded ASS / PASS was not present on the site, and management strategies for potential discovery has been included as a mitigation measure, the likelihood of this impact occurring is **Rare**. The risk for this impact is **Low**.

Site investigations have shown no contamination that will be mobilised or disturbed during construction or operational activities.

The PSI (Appendix 7) identified potential contamination onsite including cement sheet containing chrysotile asbestos (form illegal dumping) and soil samples with coliform levels up to 17,000 MPN. The high coliform levels in soils may come from natural sources or from the aerolised material from the Bolivar WWTP and lagoons. The site is also located adjacent to the Edinburgh Groundwater Prohibition Area. No other potential sources of contamination have been identified onsite. Potential contamination caused by site activities (eg. disturbance of PASS or accidental spills of chemicals) are discussed in separate impact events above.

Identified asbestos onsite will be removed by a licenced contractor prior to commencement of construction. The risk of uncovering additional material containing asbestos will be identified in the CEMP, along with strategies to manage the risk. Strategies to manage risk of encountering asbestos may include further preconstruction site surveys and training of specific construction workers to identify potential asbestos materials during excavation work.

Elevated coliform content of soils will require additional precautions for worker safety when disturbing soils in areas where they have been identified. There is no public risk from the presence of these coliforms and any disturbed soil will be reused onsite so there is no potential for this to spread.

The site is not located within the Edinburgh Groundwater Prohibition Area. Operational process water demands are proposed to be met from the Bolivar HSP. Laying of footings or the establishment of surface water infrastructure during construction may require minor interaction with groundwater. There is a low likelihood that a groundwater gradient would be created and hence PFAS contaminated groundwater is unlikely to migrate and spread outside of the current Groundwater Prohibition Area.

The consequence of project activities spreading soil contamination is **Major** due to the potential impacts on human health, however, the likelihood of this occurring is **Rare**. The risk of this impact remains at **Medium** due to the consequence. The PSI undertaken to identify all potential contaminants onsite and development of management strategies are considered effective to reduce this risk to as low as reasonably practicable (ALARP).

Operation

Erosion of soil or sediments during operations has a low impact on stormwater quality offsite.

During operations the site will comprise predominantly hardstand areas. Compared to land that has just undergone clearing, these areas will be resistant to erosion. Stockpiling on the site will be minimised. Products will be stored in silos and the majority of processing will be contained within enclosed buildings under negative pressure to prevent contamination. Runoff from disturbed areas will be contained onsite with bunding, treated and used in the processing (See site run off plan, Figure 9-3). Runoff from undisturbed areas will be directed around the site to prevent contamination (including siltation) and thus poses no impact above background. The stormwater management system onsite will be designed to hold a 1% AEP rainfall event.

The risk of loss of containment is **Rare**. The consequence of a loss of containment is limited to events that are 300mm above a 1% AEP hence being significantly diluted by rainfall, and would be **Minor.** Thus, the risk of this impact is **Low**.

Decommissioning

Industry standard mitigation and remediation measures will be used to restore the soil structure and quality impacted by the project.

Building infrastructure, creation of hardstand areas and high traffic are all known to compact soils resulting in a loss of soil structure and quality. These impacts are well understood and common across all large scale developments, as are the mitigation measures to restore the soil structure and quality following decommissioning and deconstruction of the project infrastructure. Mitigation measures will include ripping of soil, mixing of topsoil and mulch or other organic matter and seeding with cover crops followed by selected species planting.

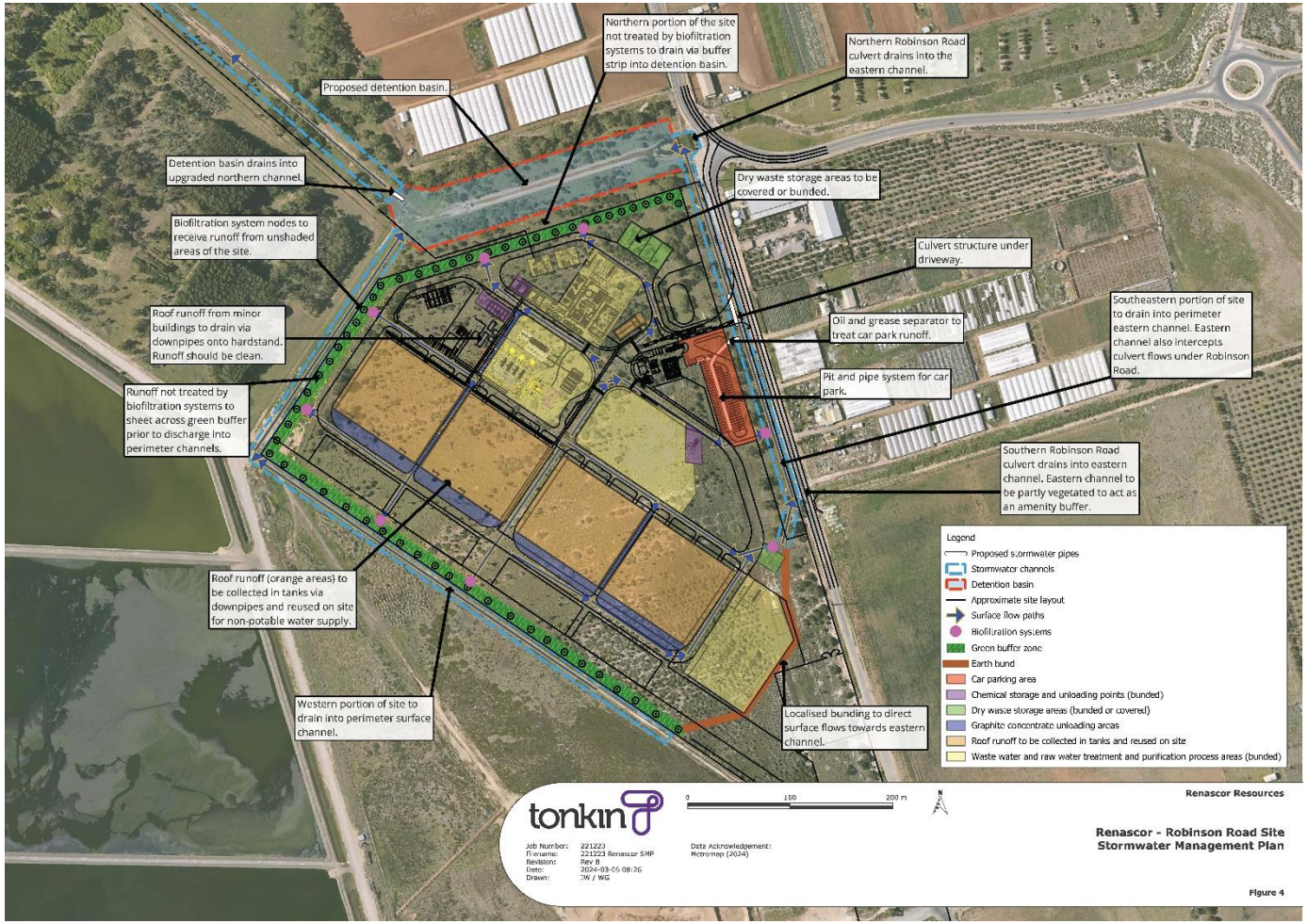


Figure 9-3: Stormwater management plan (Appendix 10)

As the future land use has not been determined, a decommissioning plan will be developed before the end of infrastructure life to transition the site to a suitable land use if required. This plan would involve consideration of the geological, landform and soil features to determine a suitable land use. For the purpose of the EIS, the impact assessment considers the ability to restore the current land use of open area / native vegetation growth.

The consequence of soil changes from project activities being unable to be remediated to achieve current land use conditions at end of life is **Minor** and **Unlikely** to occur, and therefore the risk is **Low**.

9.3.4 Summary of Key Mitigation Measures

Table 9-3: Mitigation measures – Soils, Landform and Geology

Mitigation Measure	Construction	Operation
Development of erosion and sediment control strategies within the CEMP which aligns with Code of Practice for management of stormwater in the building and construction industry (EPA SA, 1999)	✓	
Construction to occur in stages to minimize the area of undisturbed ground at any one time.	✓	
Development of erosion and sediment control strategies within the OEMP which aligns with Water Sensitive Urban Design Principles		✓
Separation of water catchments and containment of water which has the potential to contact process fluids onsite (designed to contain water following a 1% AEP).		✓
Stabilization of stockpiles onsite using water, sterile cover crop or similar	✓	✓
Storage and handling of fuel and other chemicals in accordance with AS 1940 and EPA guidelines	✓	✓
Spill management and emergency response procedures developed and implemented.	✓	✓
Storage of all fuel and chemicals above the 1% AEP flood levels	✓	✓
Regular inspections of fuel and chemical storage areas and equipment.	✓	✓
Development of Acid Sulfate Soils Management strategies within the CEMP and OEMP to cover unexpected discovery of ASS onsite and comply with industry standards	✓	✓
All asbestos to be removed by a licensed professional prior to construction works	✓	
Management strategies within the CEMP for discovery of unexpected contamination (including asbestos) during construction	✓	
Imported materials (including fill) will be managed in accordance with EPA guidelines including inspections, testing if required and record keeping to demonstrate no source of contamination has been introduced.	✓	✓
Fill material used to raise floor levels 300 mm above the 1% AEP flood levels will be compacted in accordance with AS3798 standard to ensure sufficiently stable for construction	✓	
Remediation of the site in accordance with standard industry methods to achieve a suitable land use where required (to be developed close to project completion).		Post operation

9.3.5 Conclusion

Current onsite contamination is limited to materials containing asbestos and elevated coliform levels. The asbestos will be cleaned up prior to construction occurring and construction and operations will be managed to prevent introducing a new source of contamination.

9.4 Surface Water and Groundwater

9.4.1 Assessment Method

To support the surface and groundwater assessment, climate data was sourced from the closest Bureau of Meteorology Station, Edinburgh RAAF site (7.1 km from site), with data available from 1972 – 2023 (BOM, 2023a).

As detailed in Section 9.3.1, PSI and geotechnical investigations were undertaken for the site to assess groundwater conditions, see detailed methodology in (Appendices 7 & 8).

The project involves interaction with multiple streams of water:

- Surface water external to the site is assessed in Hazards – Flooding (section 15.4).
- Surface water generated within the site, separated into clean and process impacted water, is assessed below.
- Groundwater interaction is assessed below.
- Process water sourced from the SA Water Bolivar Outfall Channel does not constitute surface water (as described in Section 9.4.3), and is assessed in Coastal and Marine (section 9.5.3).

9.4.2 Description of the Existing Environment

Climate

Bolivar has a Mediterranean climate with hot summers and mild winters. Temperature ranges between an average maximum of 30.2°C in January and an average minimum of 6.1 °C in July (see Figure 9-4). The highest recorded maximum is 47.5°C.

Average rainfall is 430 mm per year with generally highest rainfall between May and September (see Figure 9-5).

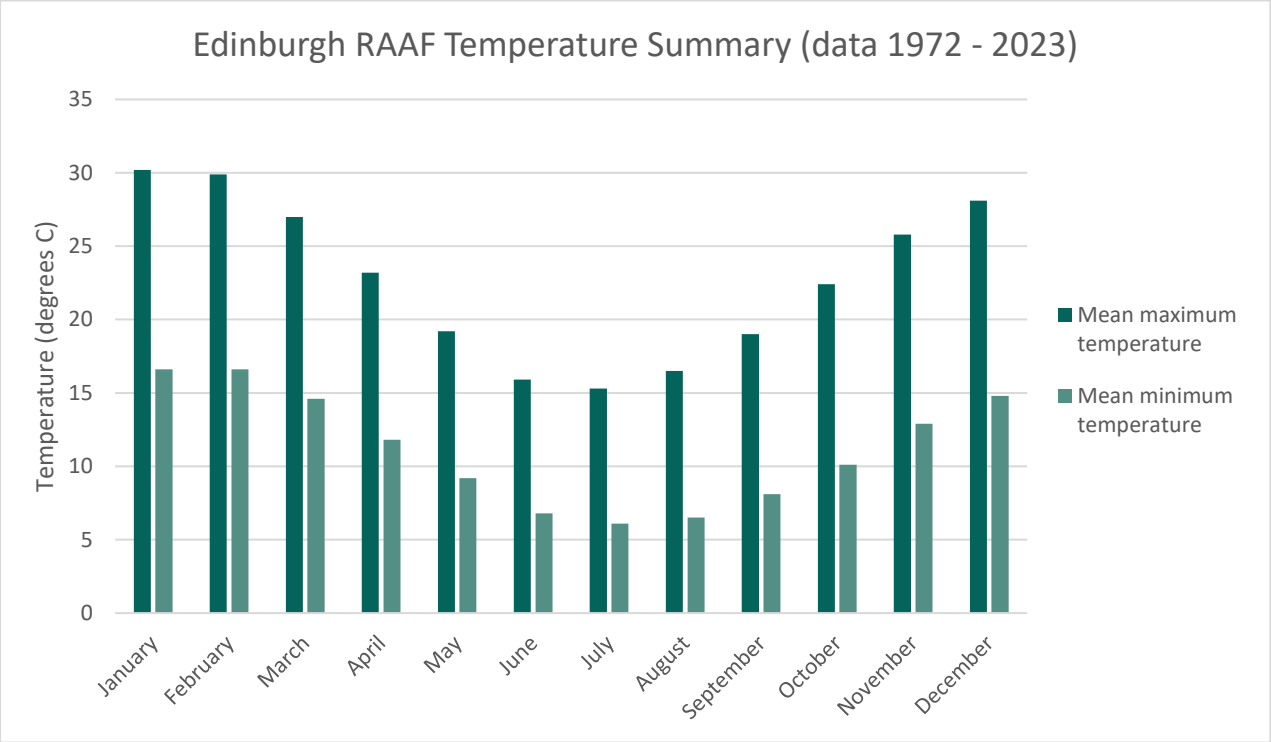


Figure 9-4: Summary of average temperatures (source BOM.gov.au)

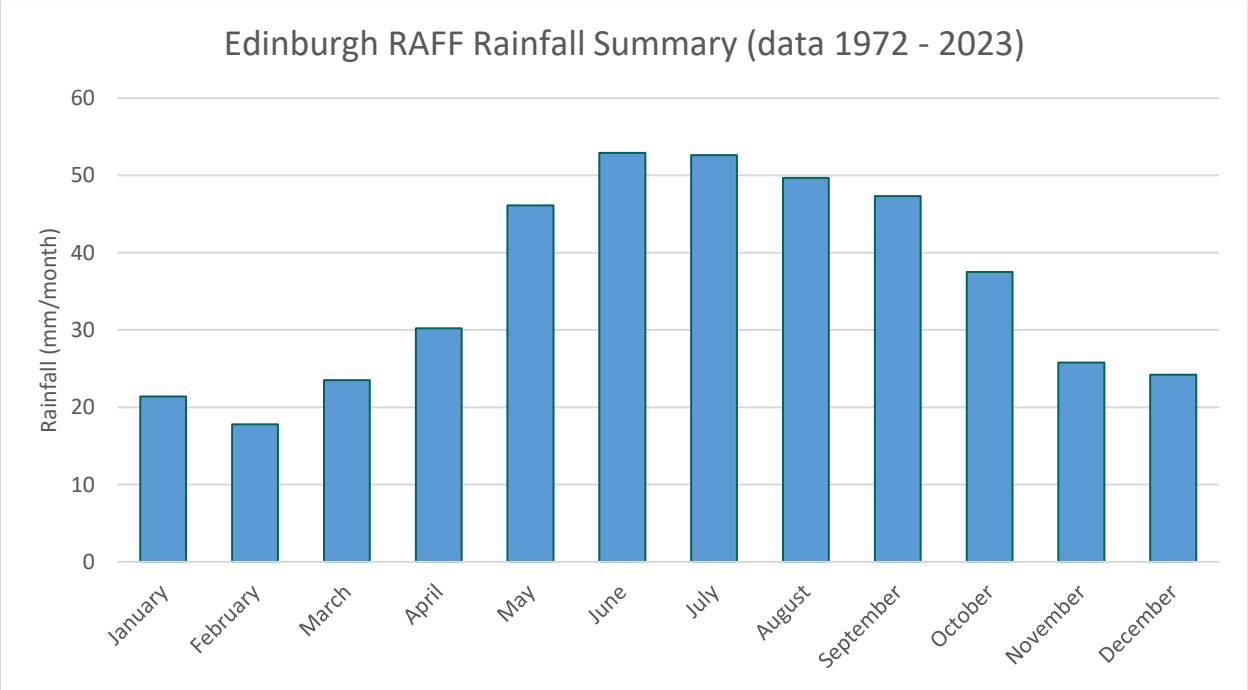


Figure 9-5: Average monthly rainfall Edinburgh RAFF

The Edinburgh RAFF BOM site shows 9 am wind direction predominantly north to north easterly (average speeds between 11.7 and 18.4 km/h) (Figure 9-6) and the 3 pm wind direction predominantly east to south easterly (average speeds between 17.6 to 24.1 km/h) (Figure 9-7).

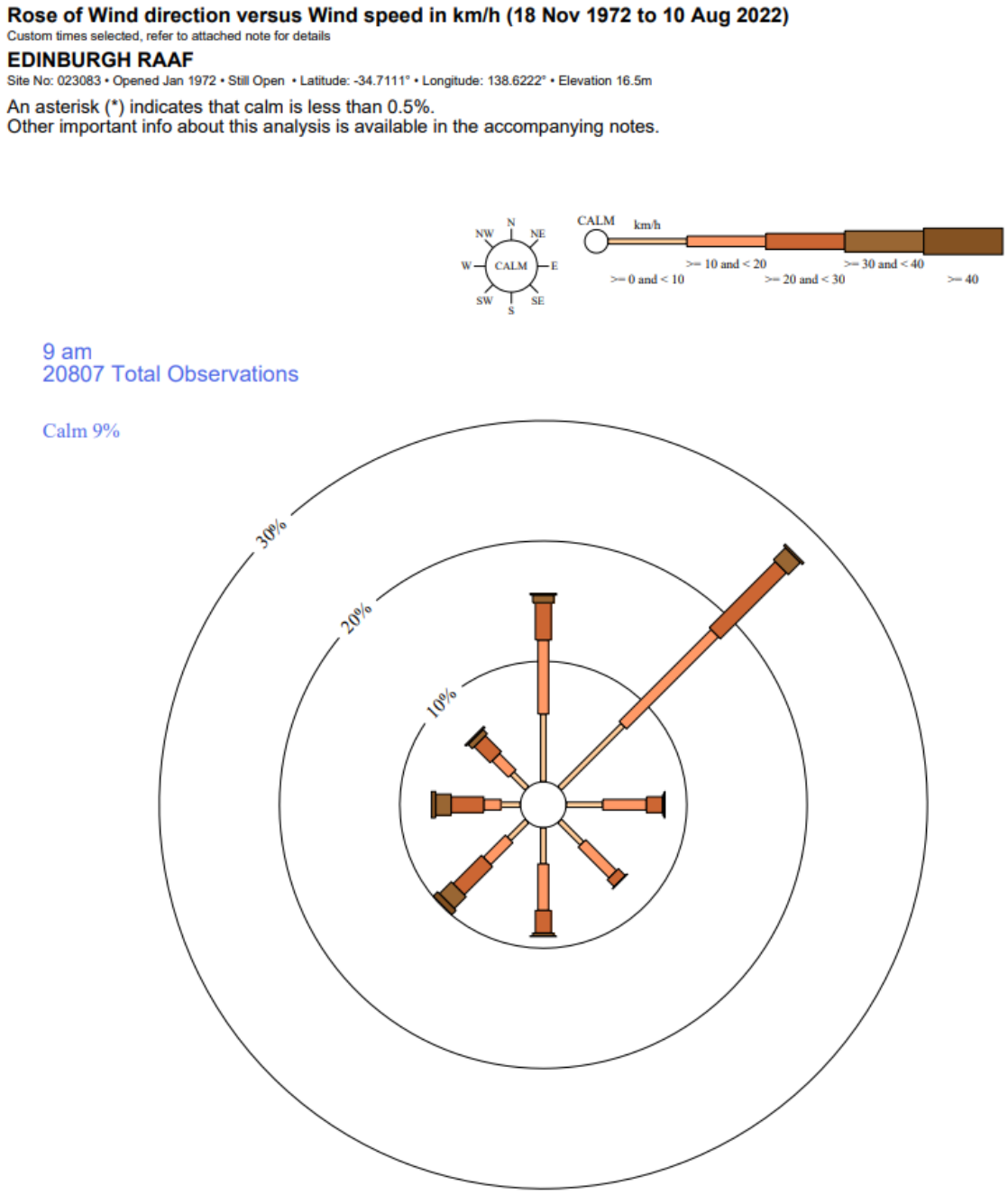


Figure 9-6: Edinburgh RAAF BOM Site - 9 am Wind Rose

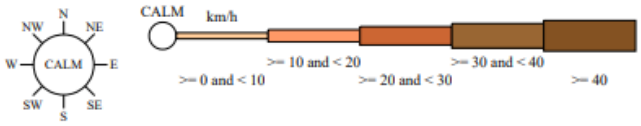
Rose of Wind direction versus Wind speed in km/h (18 Nov 1972 to 10 Aug 2022)

Custom times selected, refer to attached note for details

EDINBURGH RAAF

Site No: 023083 • Opened Jan 1972 • Still Open • Latitude: -34.7111° • Longitude: 138.6222° • Elevation 16.5m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
18513 Total Observations

Calm 1%

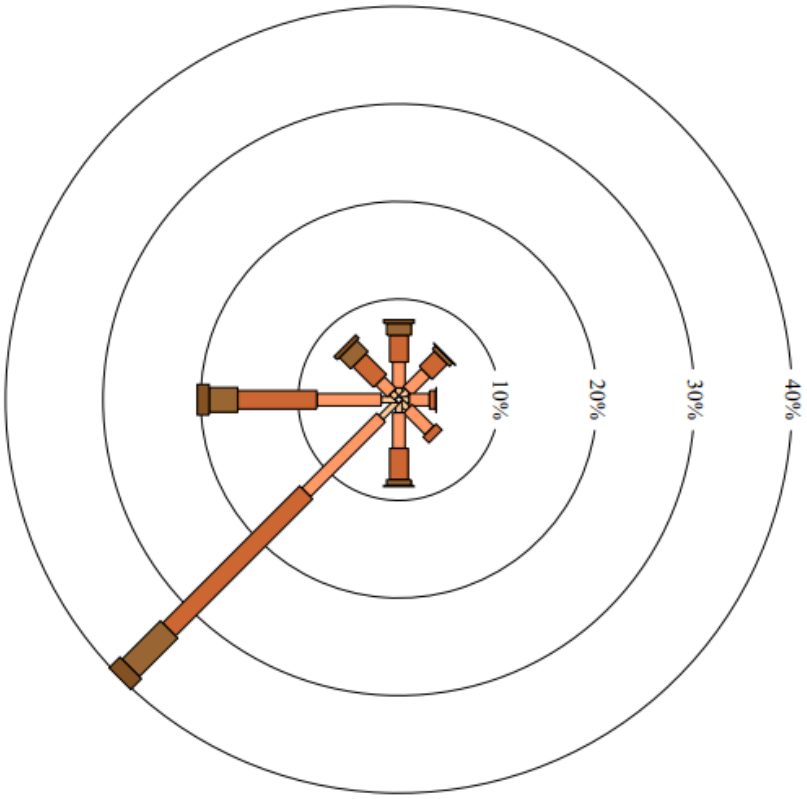


Figure 9-7: Edinburgh RAAF BOM Site - 3 pm Wind Rose

The Annual Exceedance Probability (AEP) for the site was calculated using the 2016 Intensity-Frequency-Duration (IFD) tool available on the BOM website (BOM, 2023). The AEPs are presented in Figure 9-8 and for the purpose of design, a 1% AEP rainfall event has been chosen.

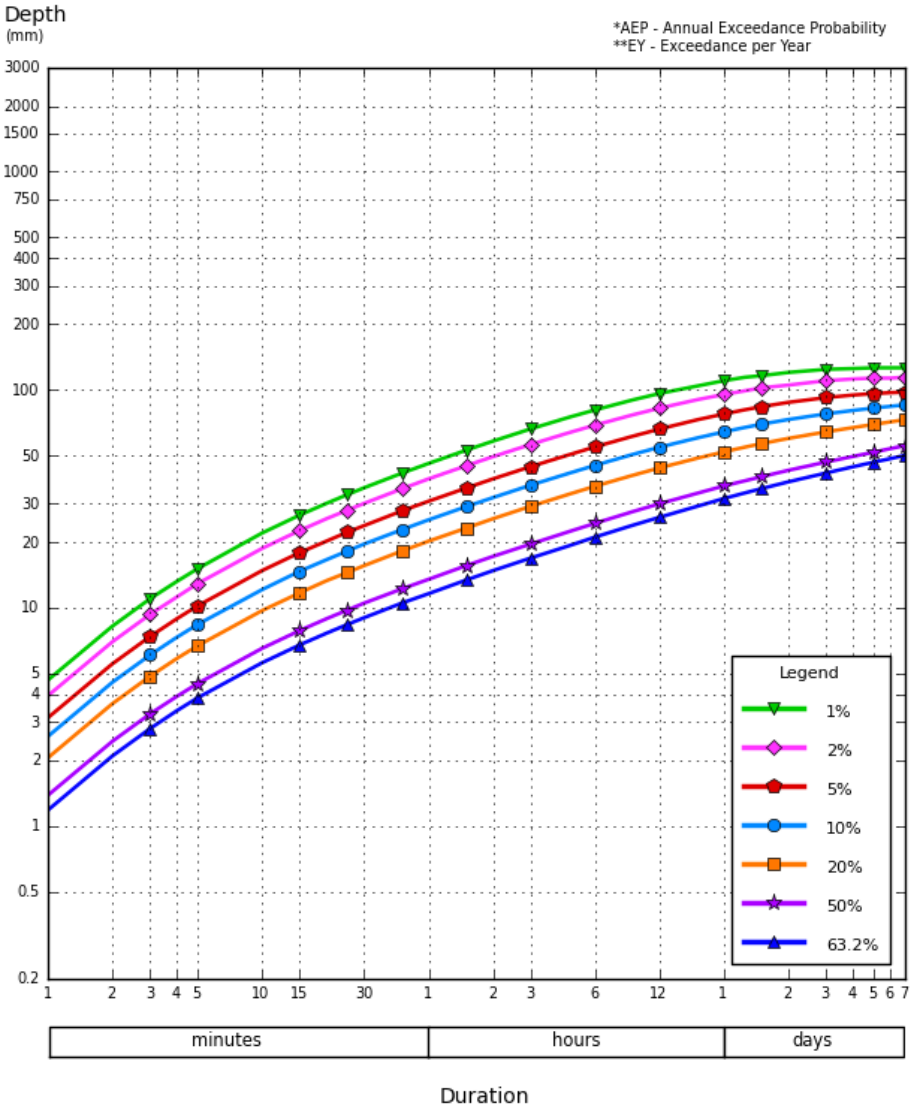


Figure 9-8: Annual Exceedance Probability graph for Bolivar (BOM 2023)

Groundwater

The site is located within the Northern Adelaide Plains Prescribed Wells Area (NAP PWA). The Adelaide Plains Water Allocation Plan (WAP) sets out how water is managed in this area (DEW, 2022a). The following summary of regional hydrogeology is sourced from the Adelaide Plains WAP (DEW, 2022a) unless otherwise stated.

The groundwater is divided into several aquifers with the main groupings being the shallow Quaternary aquifers and the deeper, confined Tertiary aquifers, as shown in Figure 9-9. The Quaternary aquifers are composed of sedimentary layers of sand and gravel interbedded with mottled clay and are designated Q1 – Q6 in order of depth. They are used for stock and domestic purposes and

considered low flowing (usually 2 L/s or below). This aquifer is highly variable in quality influenced by saline intrusion from the coast. This aquifer contains patches of groundwater contamination from surface activities including the PFAS contamination from the Edinburgh Air Base (see Figure 9-2 for groundwater prohibition area relating to this contamination).

Underlying the Quaternary aquifers are a series of Tertiary aquifers in sedimentary layers of sand, gravel and limestone designated T1 – T4 with increasing depth. The T1 and T2 aquifers are the major groundwater resource in this area with yields between 10 and 30 L/s and generally good water quality. They support irrigated horticulture, industry and watering of recreational areas. The T3 and T4 aquifers are more saline and have minimal use.

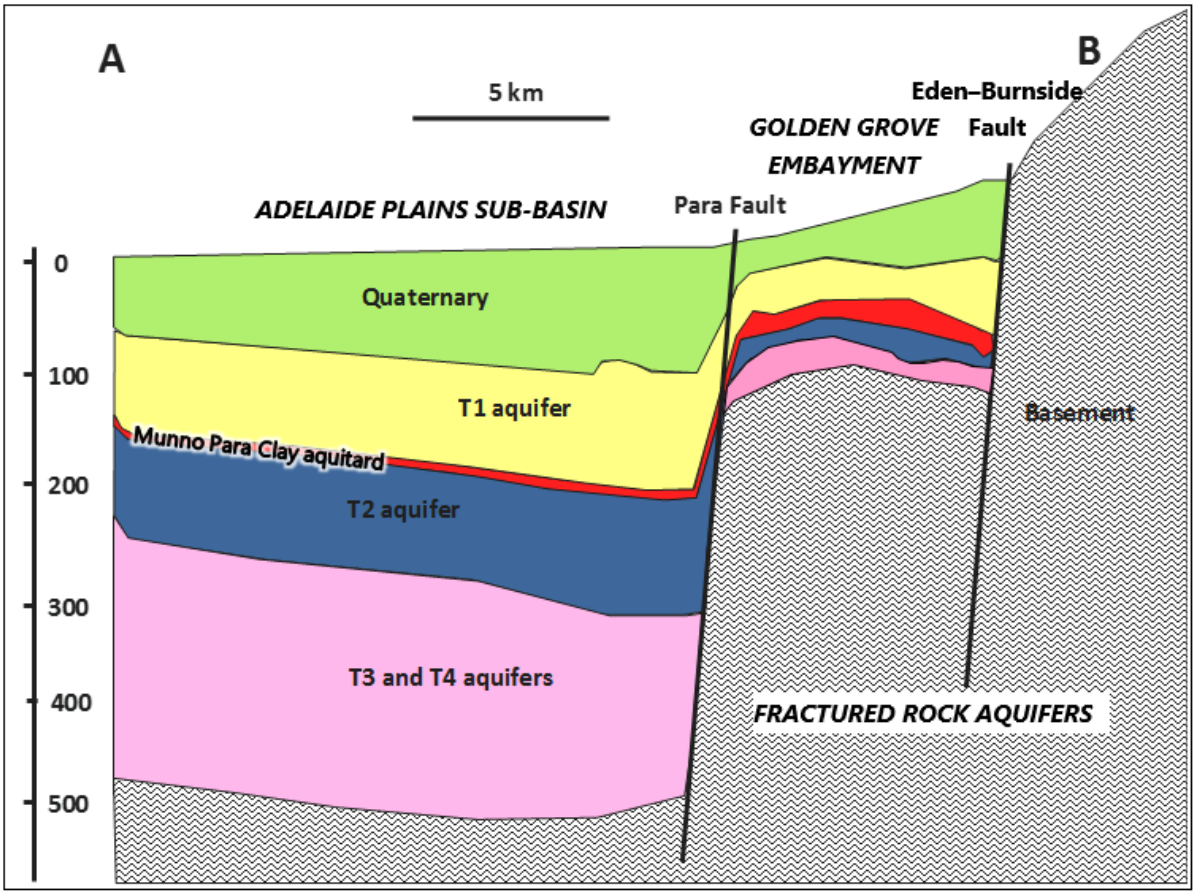


Figure 9-9: Aquifer cross-section of the Adelaide Plains (source: DEW, 2022a)

The PSI (Appendix 7) identified groundwater in test pits between 0.6 and 1.8 m BGL and in bores between 1.5 and 2.5 m BGL. It was noted the groundwater depth variation is likely influenced by tidal movements and the highly saline nature of groundwater is likely due to the proximity of the coast. The report also noted all groundwater wells close to the site either targeted a deeper aquifer or were backfilled, indicating there are no nearby groundwater users of wells. A review of the Groundwater Dependent Ecosystem (GDE) Atlas (BOM, 2023b) shows a number of potential GDEs based on national assessment. The closest potential GDEs to site are the Bolivar WWTP lagoons and the Buckland's Dry Creek salt fields. Both of these sites are man made ponds and are not dependent upon groundwater inflows. The GDE Atlas also shows samphire shrubland north west of the site as having a high potential to be reliant on groundwater flows in the area, see Figure 9-10.



Figure 9-10: Location of potential GDEs from BOM GDE Atlas

Surface Water

The Project site is located on relatively flat ground (approximately 1 m fall across entire site) within the Smith and Adams Creeks Catchment. There are no natural surface water features in the surrounding 2 km of the site.

The key points stormwater enters the site from are the culverts under Robinson road at the north eastern point and midway along the eastern boundary of the site. The stormwater flows from the north to the south of the site with the deepest ponding of stormwater in the southern portion (Appendix 10).

A stormwater channel runs adjacent to the northern edge of the site (see Figure 9-11), skirting the eastern and northern edges of Adelaide Zoo's feedlot before joining a pipe on the WWTP site. This stormwater channel is typically dry and only holds water after major rainfall events.



Figure 9-11: Stormwater channel northern boundary of site

9.4.3 Impact Assessment

The following impacts associated with potential surface and groundwater contamination as a result of spills onsite have been assessed in Section 9.3.3 given soil will be the first receptor impacted by these events.

- Erosion of soils and run off from stockpiles and disturbed surfaces leads to erosion gullying and secondary sedimentation of water courses.
- Accidental spills / loss of containment results in contamination of land with secondary pathways including surface water and groundwater.
- Potential impacts to the project as a result of flooding or adjacent land use as a result of flood mitigation measures on the land has been assessed in Chapter 15 Hazard and Risks.

Surface Water

The Project will not impact on the quality of surface water downstream of the site.

Water falling within the BAM facility is divided into multiple catchments (refer to Figure 9-3, Appendix 10):

- Water that falls outside the site and overland flows will be directed around the site via bunding or swales to the existing, northern stormwater channel.
- Onsite catchments where water may come into contact with process fluid or hazardous chemicals will be fully bunded in accordance with EPA guidelines and stormwater directed to the onsite water treatment plants prior to reuse onsite. Where possible, hazardous chemical storage will be covered to reduce the volumes of stormwater requiring treatment.
- Car parks and other catchments where water will likely come into contact with oils and greases will be directed through an oily water separator or similar treatment before being discharged into the perimeter drainage channel.
- Run off from building roofs will be collected to be reused onsite as non-potable water supply.
- Clean catchments onsite (not covered by the above streams) will be directed into biofiltration systems or for minor flows through a green buffer strip before being directed towards the northern stormwater channel. These catchments are similar to the surrounding urban catchment (consisting of roads and hardstand areas with no potential to contact process water).

All water management structures will be sized to manage and hold (for catchments with potential to contact process water) a 1% AEP event. This water will be treated using the onsite treatment system for reuse into the system.

Water falling within clean catchments and water from car parks that has been treated with an oily water separator will be directed to the perimeter and northern stormwater channels. The northern stormwater channel forms part of the City of Salisbury stormwater system and any clean run off from the site will be treated the same as run off from roads and other urban areas. The stormwater management system was designed in consultation with the City of Salisbury and captures outflow from culverts under Robinson Road and directs them towards the northern basin. It is important to note that under high rainfall events, the contribution of stormwater from the urban run off through the culverts under Robinson Road will contribute significantly higher volumes and flows than those

generated by project site. This has meant co-design of the system with the City of Salisbury is critical, and that the sizing of the system is also driven by stormwater flows generated outside of this project.

Any stormwater leaving the site is from a clean catchment and of a similar quality to run off from urban catchments. The consequence of these flows will be **Minor** and **Unlikely** to occur leaving an overall risk rating of **Low**.

Onsite stormwater management will not materially reduce the amount of water available to other users.

Process water will be sourced from the SA Water HSP which does not currently have any users, this will be supplemented by treated stormwater that falls within catchments with potential to contact the processing areas and water collected from roof structures. Surface water from outside the site will be redirected around the site to avoid any potential contamination and reduce the amounts of water requiring management.

The project area is approximately 20 ha, as surface water that does not fall onsite will be directed around the site, the loss of catchment area for any vegetation downstream is only 20 ha. This would not have a material impact on downstream water quantity and as the water flow is to the urban stormwater management system there are no known users of this water.

The shallow quaternary groundwater aquifer is an unconfined aquifer thus the recharge zone is substantial. Loss of the 20 ha of recharge catchment from the project area will not materially reduce the amount of groundwater available and there are no known users of groundwater in the area, discussed below.

SA Water outfall channel

The SA Water outfall channel is a man made channel which runs along the western side of the Bolivar WWTP lagoons (refer Figure 9-12) and carries treated wastewater from the Bolivar WWTP, Buckland Dry Creek Salt Fields and various other industrial sites to the marine environment. As detailed below the SA Water outfall channel is not considered a surface water receptor and assessment of returning treated process water to this channel is further discussed in Section 9.5.3 as the key receptor for this impact is the marine environment.

The SA Water outfall channel does not meet the definition of surface water.

The *Environment Protection Act 1993* declares water as “water occurring naturally above or under the ground; or water introduced to an aquifer or other area under the ground or an artificially created body of water or stream that is for public use or enjoyment”. The *Environment Protection (Water Quality) Policy 2015* specifically excludes water “within sewerage infrastructure or any other wastewater management system”. The *Landscape South Australia Act 2019* describes surface water as water having either fallen as rail, hail or other precipitation or rising to the surface naturally from underground and can be flowing over land, within a dam or stormwater management infrastructure or within a prescribed area. The SA Water outfall channel does not meet either of these definitions of surface water and falls within the exclusion for wastewater management system under the Water Quality EPP. It is not considered a protected water source under either the EP Act or the Landscape SA Act.

The SA Water outfall channel water is suitable for industrial use only, and there are no known users of this water currently.

Water quality monitors have been installed in SA Water outfall channel (Figure 9-12) to collect baseline water quality data (data from 2022 – 2024) with additional data provided by SA Water covering a 5 year period from 2017-2023. The treated wastewater currently present in the channel is of quality that can be used for industrial purposes (such as by Renascor). The salinity makes it unsuitable for agriculture purposes (with the exception of some stock watering) against the ANZECC guidelines, noting that metal concentrations would make it unsuitable for any stock watering purposes. The only suitable use of this water is industry (such as Renascor), there are no known users of this water currently.

Groundwater

Groundwater will not require management during construction or operation and will not result in land contamination.

Dewatering is not expected to be required to place footings. There is potential for minor excavations to intersect groundwater during construction, however, this is expected to be managed in accordance with SA EPA Water Quality Guideline *Environmental management of dewatering during construction activities*. Fill will be placed on the surface to raise the ground level 300 mm above the 1% AEP flood level and construction footings will be placed on top of this.

Stormwater channels to be constructed along the site boundaries will be to a maximum depth of 2.2 m BGL (3.9 – 4.7 m AHD, subject to detailed engineering). The quaternary groundwater aquifer has been intersected onsite between 0.6 and 2.5 m BGL with some fluctuation likely due to tidal influences.

There are no bores or GDEs in close proximity of the site that would access the shallow quaternary aquifer thus any reduction in groundwater table as a result of evaporation would not impact other users. Groundwater users in the area (e.g. SA Water Northern Adelaide Irrigation Scheme) utilise the deeper T2 aquifer (section 9.4.2). Any interaction between the Project and groundwater would be in the shallow quaternary aquifer. The quaternary aquifer is highly saline and contains PFAS contamination, discussed below, and there are no nearby users of the quaternary aquifer. The quaternary aquifer is separated from the T2 aquifer by an aquitard (Figure 9-9).

The quaternary aquifer contains PFAS contamination from the Edinburgh RAAF base, the Groundwater Prohibition Area (GPA) adjoins the site boundary. While no active dewatering is occurring and the groundwater flow across the quaternary aquifers is low (refer section 9.4.2) there is potential for surface water channels to interact with the quaternary groundwater aquifer. As these channels are expected to contain water for parts of the year (Appendix 10 states that retention is anticipated), during times when they contain water there is a low chance that evaporation will create a groundwater gradient that could propagate to the edge of the GPA. To further mitigate this impact Renascor will separate groundwater and surface water. Exact mitigation measures are subject to detailed design but are likely to include (but not limited to) further design optimisation to minimise groundwater interaction, construction of channels during seasonal groundwater lows or the potential to line the channels (or through other construction methods).

The consequence of mobilisation of existing contamination to an aquifer with very few to no receptors is considered **Minor** but **Unlikely**, resulting in an overall risk of **Low**.

The PSI concluded the risk of PASS occurring onsite was low and with no dewatering to expose / oxygenate shallow subsoils, there is no source nor pathway for this potential impact event.

9.4.4 Summary of Key Mitigation Measures

Table 9-4: Mitigation Measures - Surface and Groundwater

Mitigation Measure	Construction	Operation
Separation of water catchments and containment of water which has the potential to contact process fluids onsite (designed to contain water following a 1% AEP)		✓
Ground level will be raised using clean fill above the 1 % AEP flood event.		✓
Capture of runoff within the site to ensure all run off from the operational areas is collected for treatment and reuse and to prevent potential contamination from leaving the site. Refer to stormwater management plan (Figure 9-3).		✓
Clean stormwater that is not used will be released to the northern basin in compliance with EPA requirements	✓	✓
Subject to detailed design, separation of groundwater and surface water (e.g. further design optimisation to minimise groundwater interaction, timing of construction to align with seasonal groundwater lows, lining of stormwater channels or other construction methods)	✓	✓

9.4.5 Conclusion

Any excavations below the groundwater table for construction will be managed in accordance with appropriate guidelines. Surface water will be managed onsite to prevent contamination from running off the site. Impacts related to return of treated process water to the SA Water outfall channel are assessed in Section 9.5.

9.5 Coastal and Marine

9.5.1 Assessment Method

A desktop assessment was undertaken for the coastal and marine assessment. The key focus for the coastal and marine assessment was on marine water quality, given that water from the existing SA Water outfall channel enters the coastal waters at the location of Freshwater Creek. Potential impacts from the Project on marine flora and fauna are assessed in Chapter 10 (Biological Environment).

Data was sourced from government agencies and several water quality studies previously undertaken in the surrounding coastal environment.

Water quality source data

Water quality monitoring was undertaken by EPA SA in the Port River / Barker Inlet for the period 1995 – 2008. Nine sites were monitored as part of the program. A site near the Section Bank, Barker Inlet (Site 8) represents the closest site to Freshwater Creek. Water quality data for Site 8 was sourced through EPA (2002) (data for period 1995 – 2000) as the raw data set for this site (for 1995 – 2008) was not publicly available at the time of undertaking this assessment. Water quality data from Site 7, south of Site 8 (but still within Barker Inlet) was also used to support the assessment (data available from 1995 – 2008) (EPA SA, 2023b).

Other key data sources used in this assessment include:

- Adelaide Coastal Waters Study (CSIRO, 2007)
- Adelaide Coastal Water Quality Improvement Plan (EPA SA, 2013b)
- Adelaide Dolphin Sanctuary Management Plan (DEH, 2008)
- Winaityinaityi Pangkara – Adelaide International Bird Sanctuary Management Plan (DEW, 2020)
- Port Waterways Water Quality Improvement Plan (EPA SA, 2008)

Treated process water will be returned to the SA Water outfall channel, a man-made, concrete lined wastewater channel. As detailed in Section 9.4.2 the SA Water outfall channel is not considered a surface water receiver. The channel spans a distance of 11 km before entering the marine environment at Freshwater Creek (Figure 9-12). This assessment has considered the marine water quality default guideline values stated in the Water Quality Guidelines framework (Australian & New Zealand Guidelines for Fresh & Marine Water Quality, 2018) where baseline data is not available. The Water Quality Guidelines set out a hierarchy for measuring water quality parameters. Water Quality parameters / targets should first consider background values where available, followed by default guideline values that have been selected based on a number of ecotoxicology studies and finally a weight-of-evidence process looking at multiple indicators.

Modelling of treated process water quality

Water quality data from the SA Water outfall channel was sourced from SA Water assays (Commercial in Confidence). Demineralisation plant brine quality was determined using software projections in combination from water quality input data mentioned above. The treated process water qualities were determined from a mix of test work and modelling performed on expected feed solutions from the purification process with the proposed water treatment plant process. The water quality at outfall

was modelled using simple mass balance calculations blending the volumes and concentrations of the various treated process water and channel streams together.

The treated process water quality has been assessed in 2 scenarios:

- Average scenario – this scenario considers the SA Water outfall channel has average flows and analyte concentrations from both the Bolivar WWTP (identified as weir one) and HSP. This scenario is considered to represent the water quality at the point of mixing at the end of the outfall pipe for the majority period.
- Worst case scenario – this scenario considers the low seasonal flow for the HSP and 10 percent of the lowest seasonal flow from the Bolivar WWTP with the analytes present in average concentrations. While this flow rate has been presented as the worst case scenario, a review of the flow data available over a 5 year period shows the lowest channel flow rate during this time period was approximately twice this amount. This scenario is considered conservative and unlikely to occur.

Modelling of extent of mixing

The above-described modelling of treated process water quality considered instantaneous mixing at end of pipe. Renascor have commissioned further modelling to determine the zone of mixing for the treated process water. Computational fluid dynamics modelling was used for this analysis and concluded the concentration of the Renascor treated process water would be less than 5%, at any point of the channel cross section, 100 m downstream of the outfall point under the worst case flow scenario. This indicates any increases in analytes measured within the channel will have reached 95% of the final concentrations within 100 m of the outfall point.

9.5.2 Description of the Existing Environment

Overview

As detailed previously, the Project site is located approximately 3 km east of the coast at St Kilda. Surface water runoff and treated process water are separated with management of surface water runoff outlined in section 9.4.3. Treated process water from the project will be returned to the SA Water outfall channel which travels for approximately 11 km before entering the Gulf St Vincent at Freshwater Creek estuary. The broader estuary environment, including at the location of Freshwater Creek location, comprises mangroves within the intertidal zone and seagrass beds in adjacent coastal waters. The estuary and coastal environment across the wider area provides important feeding and nursery grounds for migratory birds, fish, crustaceans and molluscs.

The coastline from the southern end of Torrens Island to Lower Light is protected under both the *Adelaide Dolphin Sanctuary Act 2005* and the Winaityinaityi Pangkara – Adelaide International Bird Sanctuary.

The key threats to this region are high levels of suspended solids, turbidity and nutrients resulting in growth of epiphytes and reduced light for seagrass beds (EPA SA, 2013b).

Existing Marine Water Quality

Historic industrial, commercial and urban development have had significant impacts on water quality in the Port River estuary itself. Heavy metal concentrations have however shown a decrease since the 1970s, with the phasing out of lead based petrol (CSIRO, 2007).

A summary of water quality parameters for EPA monitoring Site 8 are provided in Table 9-5. It should be noted that a longer-term (1995- 2008) data set for Site 7 (the closest to monitoring Site 8) show overall similar values (EPA SA, 2023b).

Table 9-5: Summary of background marine water quality data at EPA monitoring Site 8 (1995 – 2000)

Metal (Units)	Mean	Standard deviation	90th Percentile
Turbidity (NTU)	1.8 NTU	1.4 NTU	3.5 NTU
Salinity (µS)	56,023 µS	4,298 µS	62,300 µS
Temperature (°C)	18 °C	4.7 °C	24 °C
Cadmium (mg/L)	0.0020 mg/L	0.0002 mg/L	0.0020 mg/L
Copper (mg/L)	0.013 mg/L	0.008 mg/L	0.016 mg/L
Lead (mg/L)	0.010 mg/L	-	0.010 mg/L
Mercury(mg/L)	0.00036 mg/L	0.00012 mg/L	0.00050 mg/L
Iron (mg/L)	0.075 mg/L	0.076 mg/L	0.172 mg/L
Soluble Aluminium (mg/L)	0.039 mg/L	0.024 mg/L	0.071 mg/L
Total Aluminium (mg/L)	0.055 mg/L	0.040 mg/L	0.102 mg/L
Soluble Zinc (mg/L)	0.027 mg/L	0.021 mg/L	0.053 mg/L
Total Zinc (mg/L)	0.040 mg/L	0.038 mg/L	0.083 mg/L
Ammonia (N) (mg/L)	0.27 mg/L	0.45 mg/L	0.50 mg/L
Oxidised nitrogen (mg/L)	0.21 mg/L	0.21 mg/L	0.51 mg/L
Total Phosphorous (mg/L)	0.06 mg/L	0.06 mg/L	0.11 mg/L

Marine Water Quality Targets

The Adelaide Coastal Water Quality Improvement Plan (ACWQIP) (EPA SA, 2013b) sets out the key parameters in Table 9-6 as targets for the waters surrounding Adelaide in the Gulf St Vincent.

Table 9-6: Water Quality Objectives set out in Adelaide Coastal Water Quality Improvement Plan

Parameter	ACWQIP water quality objective	Notes
Physical parameters		
Suspended solids	< 3 mg/L (90 percentile)	
Turbidity	<1 NTU > 200 m offshore (90 percentile)	
pH	7.5 to 8.5	
Metals (95% level of protection)		
Copper	0.0013 mg/L (90 percentile)	Marine water quality exceeded this limit at time of ACWQIP
Lead	0.0044 mg/L (90 percentile)	
Zinc	0.015 mg/L (90 percentile)	Marine water quality exceeded this limit at time of ACWQIP
Cadmium	0.0055 mg/L (90 percentile)	
Organics (95% protection)		
Oils and petroleum hydrocarbons	< 1 mg/L (95 percentile)	

Existing Water Quality – SA Water outfall channel

Treated process water from the Project will be returned to the SA Water outfall channel (see above) which travels for approximately 11 km before entering the Gulf St Vincent at Freshwater Creek estuary (refer Figure 9-12).

Wastewater from Bolivar WWTP flows over weir one, with the HSP outfall directly downstream of weir one (refer Figure 9-13). Flow data has been collected over a period of 5 years (2017 – 2023). Flow from the Bolivar WWTP (through Weir One) is significantly higher than flow from the HSP but is significantly more variable. Flows generally follow a seasonal pattern with increased flow during the winter months and low flow over summer.

The SA Water outfall channel is a wastewater channel and as such has no specific water quality requirements to be met under legislation. As the SA Water outfall channel ultimately enters the marine environment, a conservative approach to prevent impacts on sensitive receptors downstream of the Project has been to ensure treated process water from the Project is mixed with the channel to a comparable quality to the existing levels. To account for seasonal variability in the quality of this water, standard deviations above the average parameter concentration have been used to assist with environmental assessment. Volume, flow rate and water quality within the channel vary throughout the year due to summer reuse and other SA Water management strategies outside the control of Renascor.

For any analytes with potential to increase under worst case scenarios, consideration will also be given the appropriate guidance values (set out below). The Bolivar WWTP and proposed Project outfall location is located at the start of the SA Water outfall channel and other sources enter the channel downstream diluting the treated process water further before it reaches the marine environment.



Figure 9-12: Proposed intake and outfall locations on SA Water outfall channel and baseline water quality monitors



Figure 9-13: SA Water outfall channel showing weir one (bridge over central channel) and the HSP outfall point (concrete box and associated pipe)

9.5.3 Impact Assessment

Due to the distance to the coast (3 km) air quality, noise and visual amenity impacts will not impact on the coastal or marine environment (Chapter 11 Amenity and Environmental Quality). The only Project activity with potential to impact upon the coastal or marine environment is return of treated process water to the SA Water outfall channel which enters the marine environment at Freshwater Creek (Figure 9-12).

Potential impacts on the coastal and marine system would be a result of treated process water quality within the SA Water outfall channel impacting upon coastal water quality. The volume of treated process water is equivalent to the amount of top up water (water intake requirements) and thus there is no proposed change in channel flow volumes or velocity.

Construction

There is no process water during construction and therefore no impact to the coastal or marine environment.

Operation

Process water is treated prior to being returned to the SA Water outfall channel. The impact assessment below has grouped the different analytes present in the treated process water stream based on the risk they pose to the receiving environment.

Treated process water is comparable quality to existing SA Water outfall channel quality.

Modelling of the treated process water has been undertaken (as described in Section 9.5.1). A summary of the changes in relevant modelled parameters (as a standard deviation) is presented in Table 9-7 for average flow scenarios representing the most likely operational parameters. Worst case scenarios are discussed for each impact and as stated above are considered appropriately conservative. The majority of parameters are within one standard deviation of the baseline water quality under worst case scenarios and thus are considered comparable to the existing water quality in the SA Water outfall channel. Those with potential increases above one standard deviation under average flow rates are assessed further below and these assessments demonstrate no expected impact to the environment as a result of the Project.

Modelling the water quality from the Project shows a **Negligible** consequence of impact to marine water quality (under likely and worst case scenarios) and would be a **Rare** occurrence (noting that the worst case scenario assumptions have not occurred during the last five years based on historical monitoring data). Thus, the overall risk posed by these analytes is **Low**.

Table 9-7: Treated process water likely impact on SA Water outfall channel quality

Analyte	Likely increased analyte concentrations (Standard Deviations above average)	Likely decreased analyte concentrations (Standard Deviations below average)
Temperature	<1 SD	
TSS		<1 SD
TDS	<2 SD	
EC	~ 1 SD	
Aluminium		<1 SD
Calcium	<1 SD	
Cadmium	<1 SD	
Cobalt	<1 SD	
Chromium	<1 SD	
Copper	<1 SD	
Iron		<1 SD
Lithium	<1 SD	
Molybdenum	>2 SD	
Sodium	~2 SD	
Nickel	<1 SD	
Lead		<1 SD
Strontium		<1 SD
Vanadium	~2 SD	
Zinc	<1 SD	
Ammonia (as N)	<1 SD	
Sulphate	<1 SD	
Bicarbonates	>2 SD	
Nitrate and Nitrite as N	<1 SD	

Salinity and conductivity changes will not impact upon the marine environment

Modelled process water quality indicates Total Dissolved Solids (TDS) and Electrical Conductivity (EC) will increase by between 1 standard deviation and 2 standard deviations under both average flow and worst case flow scenarios. These values are less than 10% of EPA limits currently applied to other users of the SA Water outfall channel who are approved to discharge into the channel downstream of the BAM facility outfall. The increase in salinity and conductivity will be **Negligible** and within the range of existing salinities experienced in the SA Water outfall channel. The likelihood is **almost certain** resulting in an overall risk rating of **Low**.

Sodium and vanadium changes will not impact upon the marine environment

Under average flow conditions sodium and vanadium levels are modelled as two standard deviations above average which is still within what could be expected during normal conditions. There are no marine water quality guideline values for sodium as sodium chloride is the key salt in the marine environment, and hence increases in sodium under worst case scenarios are not expected to impact upon the marine environment. Default water quality guidelines (ANZG, 2016) for Vanadium are 0.100 mg/L for marine waters to protect 95% of species. Calculated worst case scenario concentrations for Vanadium are approximately one quarter of this value.

The consequence of increases in sodium and vanadium in the SA Water outfall channel on the marine water quality is **Minor** under worst case scenarios with the likelihood of occurring being **Rare** resulting in an overall risk rating of **Low**.

Changes in molybdenum concentrations will remain below relevant nationally recognised standards for protection of species.

Molybdenum was not included in the baseline EPA monitoring for Adelaide Coastal Waters, target parameters for the ACWQIP nor is there a marine default guideline value for molybdenum under the WQG. The freshwater default trigger value under the WQG for molybdenum is 0.034 mg/L for protection of 95% of species. Process water modelling shows that for the average flow scenario, molybdenum concentrations would be well below this freshwater trigger value. Under the worst case modelling scenario, molybdenum will be approximately equivalent to the default trigger level (within 10%). As there are no freshwater receptors in the channel and water within the channel it is not defined as surface water, comparison to the freshwater trigger value is considered conservative and the modelling results indicate that impacts would not be expected in the marine environment. The process water modelling has only considered inputs from the Bolivar WWTP and HSP plants which are upstream of the BAM facility outfall and additional discharges from other industries over the 11 km of channel before it enters the marine environment (including other industries and stormwater run off) will dilute this value further.

Thus the consequence of increased molybdenum impacting upon the marine environment is **Minor**, the likelihood of this occurring is **Rare** resulting in an overall risk rating of **Low**.

Bicarbonate is inert at the pH experienced in the SA Water outfall channel. Increased concentrations will not impact upon sensitive receptors.

Bicarbonate ions are modelled to be above existing levels (greater than two standard deviations above the average) for both average and worst case scenarios. Bicarbonate is inert at the pH levels within the SA Water outfall channel. As the expected pH of the SA Water outfall channel subsequent to mixing is approximately pH 8 and all treated process water streams will undergo a pH neutralisation process

before returning to the SA Water outfall channel, the bicarbonate concentrations are not expected to impact upon sensitive receptors. Additionally, at this pH the bicarbonate ions will provide buffering capacity in the water maintaining the existing pH and will not present a risk to sensitive receptors.

The maximum 4.8 ML/d of treated process water from the Project to be returned to the SA Water outfall channel would represent approximately 2% of the channel flow at the outfall point based on maximum flows. Additional inputs downstream of the outfall will reduce this contribution further. The consequence of increased bicarbonate concentrations impacting upon the marine environment is **Minor**, the likelihood of this occurring is **Rare** resulting in an overall risk rating of **Low**.

Monitoring

It is acknowledged that this risk assessment is reliant upon water quality modelling. In order to provide additional confidence that these water quality values can be achieved, water quality monitoring downstream of the modelled mixing zone will be conducted throughout the life of the Project. A draft Discharge Criteria Management Plan has been attached (Appendix 18) for consideration.

Emergency response procedures for responding to water quality exceedances are being developed. These plans will include procedures for shutdown of the site processing under short notice (for emergency situations) and actions to make an emergency situation safe. Emergency response plans will be developed in consultation with relevant third parties such as the local Metropolitan Fire Service and SA Water. All chemicals and process areas onsite will be bunded such that any loss of containment will be controlled to avoid contamination of soil and/or local waterways.

9.5.4 Summary of Key Mitigation Measures

Table 9-8 Mitigation Measures – Coastal and Marine

Mitigation Measure	Construction	Operation
Water treatment prior to returning to channel for all process water.		✓
Monitoring against Discharge Criteria Management Plan (Appendix 18)		✓
Adaptive management based on real time monitoring (as per Appendix 18 Discharge Management Plan)		✓

9.5.5 Conclusion

Treated process water will be returned to the SA Water outfall channel either at a quality comparable to the existing water or a quality that will not result in any impacts to marine water quality.

10 Biological Environment

10.1 Key findings

- Approximately 22.22 ha of native vegetation will be cleared during construction (based on upper estimates). The native habitat represents overall, poor quality habitat and provides low habitat value. The clearance will be offset by achieving a Significant Environmental Benefit in accordance with the *Native Vegetation Act 1991*.
- Project layout has been designed so as to minimise the impacts to Regulated and Significant trees. Detailed design of plant and infrastructure will seek to avoid impact to Regulated and Significant trees, however, if this cannot be achieved, a maximum of eight (8) Regulated and ten (10) Significant trees are proposed to be removed during construction.
- Vegetation clearance will not impact nationally listed threatened ecological communities, nationally listed flora or state listed flora.
- Vegetation clearance will not impact nationally listed fauna, nationally listed migratory species or state listed fauna.
- Noise from construction and operation activities are not expected to impact fauna on or beyond the Project site.
- Light spill from the Project will be minimised through design and will not impact native fauna.
- Risks associated with fires during construction and operation can be appropriately managed.
- Vehicle strike causing fauna mortality is unlikely to occur.
- Management of erosion and stormwater during construction will prevent indirect impacts to vegetation on the Project site and beyond.
- Dust generated from construction activities will not impact vegetation on or beyond the Project site.
- Dust (including graphite fines) generated from operational activities will not impact vegetation on or beyond the Project site.
- Accidental spills or loss of containment will be remediated immediately to prevent impacts to native vegetation and fauna.
- Project activities are not expected to result in the introduction or spread of weeds, other nuisance plant species or pathogens.
- Project activities are not expected to result in the introduction or spread of pest, or nuisance species, diseases and pathogens.
- Renascor has conducted a self-assessment for the Project in accordance with the Matters of National Environmental Significance, Significant impact guidelines 1.1 (Department of Environment (DoE), 2013). Based on the ecological assessment and desktop investigations undertaken, the self-assessment concluded that the Project is not likely to have a significant impact on any MNES, and is therefore not classified as a controlled action requiring referral under Part 9 of the EPBC Act.
- There will be no impacts to the marine environment as a result of the Project. Treated process water will be returned to the SA Water outfall channel at a comparable level with the existing

water quality (Chapter 9 Physical Environment) and will be monitored in accordance with a Discharge Management Plan (Appendix 18).

10.2 Setting the context

This section provides information to explain the context within which impact assessment is undertaken. It describes:

- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- The assessment methodology used to identify baseline environmental values and used to undertaken the impact assessment

10.2.1 EIS Assessment Requirements

The EIS Assessment Requirements include an assessment of the effect on the Biological Environment as set out in Table 10-1.

Table 10-1: EIS Assessment requirements - Biological Environment

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
BE1	Biosecurity	To ensure that construction and operation of the development avoids the introduction or spread of biosecurity threats including pest or nuisance animal and plant species (including marine pests), diseases and pathogens.	• Identify the potential for the introduction or dispersal of new, and/or increased distribution and abundance of existing, exotic, pest or nuisance plant and animal species, diseases and pathogens, and the associated implications for native species, habitat, agricultural land and other environmental values. • Propose measures to remove, control and limit the introduction or spread of exotic, pest or nuisance plants and animals, diseases and pathogens on the development site and any areas under the proponent's control (e.g. decontamination of vehicles, mobile plant, equipment and materials), having regard to the effectiveness of such mitigation measures in the past. This includes declared plants and animals under relevant State and Commonwealth legislation.	Standard
BE2	Marine Flora and Fauna	To ensure that the nature and scale of the development avoids or minimises adverse effects on biodiversity, threatened and protected marine flora and fauna species, their	• Describe the development activities with the potential to impact on threatened and protected marine species, and listed threatened, protected and migratory fauna species, and provide an assessment of how those impacts will be avoided or mitigated. Address discharge to marine waters. • The assessment of impacts to threatened and protected species and habitat will consider: ○ The potential impacts of water discharge to the SA Water Outfall Channel, other users of the channel and the receiving environment.	Detailed

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
		ecological communities and habitat	○ Impact on conservation parks, marine reserves, the Adelaide International Bird Sanctuary and the Adelaide Dolphin Sanctuary. ○ Cumulative impacts, noting that the receiving environment is already a stressed ecosystem. • If potential impacts on MNES require approval under the EPBC Act, an assessment of impacts on the affected MNES must be prepared by an appropriately qualified specialist. • Prepare a Discharge Criteria Management Plan, prepared by a suitably qualified expert, which details the existing environment and identifies any marine features or habitats. The plan will focus on the management measures and strategies adopted to ensure water discharge to the SA Water outfall channel meets compliance criteria.	
BE3	Terrestrial Flora and Fauna	To ensure that the nature and scale of the development avoids or minimises adverse effects on biodiversity, threatened and protected terrestrial and aquatic flora and fauna species, their ecological communities and habitat.	• Describe the development activities with the potential to impact on native vegetation and listed threatened flora species and ecological communities and provide an assessment of how those impacts will be avoided, mitigated or offset. • The assessment of impacts to terrestrial flora and fauna will consider impact beyond the site, with respect to dust and noise. • If potential impacts on MNES require approval under the EPBC Act, an assessment of impacts on the affected MNES must be prepared by an appropriately qualified specialist. • Prepare a Native Vegetation Clearance Data Report prepared by an Accredited Consultant approved by the Native Vegetation Council. The assessment should undertake a survey of the vegetation and fauna (including EPBC Act Listed threatened species and communities), detail compliance with the impact mitigation hierarchy and describe how the significant environmental benefit would be achieved. • Outline measures to mitigate effects on native vegetation by addressing the mitigation hierarchy, including any compensatory activities in already degraded areas and use of existing easements. Refer to guidelines produced by the Native Vegetation Council and outline the likely effectiveness of any mitigation measures adopted during both construction and maintenance.	Standard

Table 10-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Propose measures to remove, control and limit the introduction or spread of exotic, pest or nuisance plants and animals, diseases and pathogens on the development site and any areas under the proponent's control (e.g. decontamination of vehicles, mobile plant, equipment and materials), having regard to the effectiveness of such mitigation measures in the past. This includes declared plants and animals under relevant State and Commonwealth legislation.	Chapter 12 (Social and Economic Impact) – Midge Fly mitigation in collaboration with SA Water

10.2.2 Requirements in Legislation

Environment Protection Act 1993

The EP Act provides the regulatory framework for the management of pollution and general environmental protection in SA. The object of the EP Act is to protect the environment, promote the principles of ecologically sustainable development (ESD) and ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment, having regard to ESD principles.

The EP Act provides for a general environmental duty, to take all reasonable and practical steps to prevent or minimise any resulting environmental harm and sets out activities of environmental significance which require licencing and environment protection policies developed for specific issues.

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act is the primary Commonwealth legislation regulating environmental matters. Under the EPBC Act, any action that is likely to have a significant impact on a 'matter of national environmental significance' (MNES) requires approval from the Commonwealth Minister for the Environment (i.e. a 'controlled action'). MNES defined in the EPBC Act which are potentially relevant to the Project include:

- listed threatened species and threatened ecological communities
- listed migratory species.

If a proponent believes that there is a possibility that a proposed project may result in a significant impact to a MNES, they must refer the project to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) to determine whether a proposed action will need formal assessment and approval under the EPBC Act. The referral document is the principal basis for informing the Commonwealth Minister's decision as to whether approval is necessary and, if so, the type and level of assessment that will be undertaken. The referral is then released to the public, as well as relevant State, Territory and Commonwealth ministers, for comment on whether the project is likely to have a significant impact on a MNES.

Provisions under the EPBC Act entitle proponents to undertake a self-assessment of the impacts of a proposed development on MNES and whether a referral to the Commonwealth Government will be required. A self-assessment for the Project in accordance with the MNES Significant impact guidelines 1.1 (DoE, 2013) has been undertaken (See Section 10.3).

Based on the ecological assessment and desktop investigations undertaken, the self-assessment concluded that the Project is not likely to have a significant impact on any MNES, and is therefore not classified as a controlled action requiring approval under Part 9 of the EPBC Act.

National Parks and Wildlife Act 1972

The *National Parks and Wildlife Act 1972* (NPW Act) establishes the system of conservation reserves in South Australia and provides protection for native plants and animals. Under the NPW Act, it is an offence to take protected plants or animals without approval. Part 5 of the NPW Act provides for the conservation of native animals and Schedule 9 lists protected species and their protection status. The NPW Act applies to the Project site for the purposes of determining protected species of plant or animals, which influences requirements under the Native Vegetation Act 1991.

Native Vegetation Act 1991 (South Australia)

The *Native Vegetation Act 1991* (NV Act) applies to the management and clearance of native vegetation on private and public land in South Australia. Under the NV Act, a permit is generally required from the Native Vegetation Council (NVC) to clear native vegetation except in prescribed circumstances. Vegetation clearance is permitted where undertaken in accordance with a development consent and an approved management plan and must achieve a significant environmental benefit (SEB).

The Project will require a permit under the NV Act to clear native vegetation on the Project site. Field surveys have been undertaken to provide an assessment of the nature and quantity of vegetation required to be cleared in association with the Project (EcoSphere, 2022a). The Project is seeking approval for the clearance of 22.2 ha of native vegetation over the Project site. A Native Vegetation Clearance Data Report has been prepared by an Accredited Consultant approved by the Native Vegetation Council (Andrew Sinel; Ecosphere Ecological Solutions) and is included with this EIS (Ecosphere, 2023b) (Appendix 9B).

Landscape South Australia Act 2019

Under the *Landscape South Australia Act 2019*, landholders have a legal responsibility to manage declared pest plants and animals and prevent land and water degradation. A key priority of landscape boards is to support local communities and landowners to be solely responsible for sustainably managing their region's landscapes with an emphasis on land and water management, pest animal and plant control, and biodiversity. This includes providing greater funding and partnership opportunities with local community organisations to deliver on ground works and projects.

The Act further legislates control requirements for 'declared' plants (specific to each region or statewide), which controls the movement of declared plants, requires landowners / managers to destroy or control infestations of certain declared plants and requires further notification of authorities when an infestation of certain declared plants is detected. A permit or notification to the relevant Landscape Board representative may be required if movement or relocation of cleared vegetation containing declared plants will be undertaken (as per sections 186 and 197 of the Act).

Planning Development and Infrastructure Act 2016

The PDI Act is the primary legislation for development approval for the Project. The PDI Act EIS Assessment Requirements include an assessment of the effect on the Biological Environment as set out in Table 10-1. In addition, under the PDI Act, any activity that damages a 'regulated tree' or significant tree' is development, and as such requires development approval.

Fisheries Management Act 2007 (SA)

The *Fisheries Management Act 2007* is administered by the Biosecurity SA division of Primary Industries and Regions SA (PIRSA) to manage risks to South Australia posed by animal and plant pests and diseases, including noxious and pest marine species and the Pacific Oyster Mortality Syndrome (POMS). The Act also provides for the management of fisheries and aquatic reserves and protection of aquatic habitats, mammals and resources.

Adelaide Dolphin Sanctuary 2005

The *Adelaide Dolphin Sanctuary Act 2005* provides for the establishment and management of a sanctuary to protect the dolphin population of the Port River estuary and Barker Inlet and its natural habitat.

Biosecurity Act 2015 (Cth)

Biosecurity risks in Australia, including introduced marine pests, are managed by DAFF in accordance with the *Biosecurity Act 2015*. The Act provides requirements and regulatory powers for managing biosecurity risks associated with goods, people and conveyances entering Australia.

10.2.3 Views of Stakeholders

No community stakeholder feedback has been received specifically related to ecology, flora and fauna. The State Department for Environment and Water (DEW) and Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) are responsible for regulation of ecology, flora and fauna under the relevant legislation outlined above. In pre lodgement meetings with DTI PLUS, EPA, DEW and DCCEEW, the main view raised was the potential for returning treated process water to the SA Water outfall channel to impact on marine ecology. Based on these views and meetings, the EIS has focussed on a robust and rigorous assessment to address these views.

10.3 Terrestrial Flora and Fauna

10.3.1 Assessment Method

An ecological assessment was undertaken by Ecosphere (Ecosphere 2023a, Appendix 9A). This assessment comprised a desktop and on-ground survey. Detailed methodology is described in Ecosphere (2023a) and outlined below. A Native Vegetation Assessment Report was also prepared for the proposed clearance of native vegetation (Ecosphere, 2023b, Appendix 9B).

In addition and as outlined in Section 10.2.2, a self-assessment for the Project in accordance with the MNES Significant impact guidelines 1.1 (DoE, 2013) was undertaken.

For the purposes of the terrestrial ecological assessment, the Project site includes the BAM Facility site, the water pipeline corridor and the stormwater channel and detention basin easement (Figure 10-1).

The likelihood of each threatened flora and fauna species occurring within the Project site (plus 5 km buffer) was assessed. A likelihood of occurrence rating (Highly Likely/Known; Likely; Possible and Unlikely) was assigned to each threatened ecological community and species identified in the PMST and BDBSA search as outlined in Table 10-3.



Figure 10-1: Project site for the terrestrial flora and fauna assessment

Table 10-3: Criteria for the likelihood of occurrence in the Project site (with a 5 km buffer)

Likelihood	Criteria
High Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is largely intact and falls within the known Project area. The species was recorded as part of the field surveys.
Likely	Recorded within the last 20 years, the area falls within the known distribution of the species and the area provides species habitat which is largely in intact.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species. Recorded within 20 – 40 years, survey effort is considered adequate, habitat is present and intact, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded within the 20 – 40 years, however suitable habitat does not occur, ad species of similar habitat requirements have not been recorded in the area. No records within the previous 40 years, despite suitable habitat being known to occur in the area. No records despite adequate survey effort.

Field survey

Field surveys were conducted for the Project site on the 29 June 2022 (location of BAM facility itself) and 11 May 2023 (for the water pipeline corridor).

In summary, the field surveys included:

- Mapping of vegetation types within the Project site in accordance with Native Vegetation Councils' Bushland Assessment Method.
- Vegetation within the individual associations surveyed for national, state and regionally significant flora species that occurred within the Project site.
- Identification of potential significant habitats for fauna.
- Identification of Regulated and Significant Trees (under the PDI Act).
- A focused avian species assessment.
- Opportunistic observations of other fauna species.

10.3.2 Description of the Existing Environment

Flora

Vegetation associations

NVIS mapping showed vegetation across the Project site and surrounds to be *Tecticornia* sp., *Sarcocornia quinqueflora* low open shrubland over *Parapholis incurva*, *Disphyma crassifolium* ssp. *clavellatum*, +/- Wilsonia humilis (samphire/saltmarsh).

The vegetation was comprised of planted indigenous amenity shrub and tree species over an exotic understorey with low density emergent native indigenous shrubland vegetation. Plantings of amenity species were comprised of locally indigenous species however were planted in rows and likely to be as a functional stand for water take up or filtration rather than as a habitat area. Sheep were grazing this area as a pasture at the time of the assessment.

Ten vegetation associations were recorded across the Project site during the field survey (Table 10-4). The majority of these vegetation associations have been planted historically, or are re-emergent native vegetation associations. Vegetation was in overall poor condition and providing low habitat value; with the presence of emergent naturally generated species but which are well known grow naturally in highly disturbed areas.

Overall, flora species richness is observed to be low as a result of grazing and historical land modification.

Table 10-4: Vegetation associations summary

Association	Description	UBS	Area (ha)
1	*Myoporum insulare* (Boobialla) amenity plantings over exotic grassland and emergent chenopod shrubs.	3.14	0.64
2	Mixed Amenity plantings over emergent chenopod shrubs	6.23	2.85
3	Sparsely remnant *Eucalyptus largiflorens E. odorata* Woodland over planted amenity species and emergent chenopod shrubs	22.23	2.50
4	Tecticornia pergranulata emergent under planted *Melaleuca halmaturorum* and *Atriplex rhagodioides*	29.60	0.75
5	Planted *Melaleuca halmaturorum* over planted *Atriplex rhagodioides* and emergent chenopod shrubs	15.15	3.68
6	Mixed amenity shrubs over exotic grassland and emergent chenopod shrubs	7.79	9.52
7	Fallow land used for industrial or storage areas.	N/S*	2.32
8	*Nitraria billardierei* (Nitre Bush) Low Open Shrubland.	15.50	1.52
9	*Myoporum insulare* (boobialla) emergent shrubs over *Threlkeldia diffusa* (Coast Bonefruit) and *Maireana brevifolia* (Short leaved Bluebush)	4.16	0.65
10	*Austrostipa* spp. (Spear Grass), *Chloris truncata* (Windmill Grass) Open Grassland.	7.62	0.10
TOTAL			24.53

* N/S denotes not scored a native vegetation or bushland.

Regulated and Significant trees

Eighteen regulated trees were recorded within the Project site. Ten of these trees were classed as significant; i.e. having a circumference of greater than 3 m. Many of these were in less than optimum health, with broken limbs and dieback observed.

Table 10-5: Significant and regulated tree occurrence and details

Tree ID	Species	Height	Average Circumference	Total Circumference	Regulated (R) / Significant (S)
1	*Eucalyptus spathulata*	10.0	98.44	295.31	R
2	*Eucalyptus odorata*	11.4	224.62	224.62	R
3	*Eucalyptus odorata*	7.6	221.48	221.48	R
4	*Eucalyptus nicholii*	8.2	85.35	400.55	S
5	*Melaleuca lanceolata*	8.7	109.96	329.87	S
6	*Eucalyptus spathulata*	9.8	132.99	398.98	S
7	*Eucalyptus spathulata*	12.1	182.21	364.42	S
8	*Eucalyptus spathulata*	9.7	148.70	446.11	S
9	*Eucalyptus spathulata*	5.7	111.53	334.58	S
10	*Melaleuca lanceolata*	4.7	125.66	251.33	R
11	*Eucalyptus spathulata*	11.2	273.32	273.32	R
12	*Eucalyptus spathulata*	7.7	125.66	251.33	R
13	*Melaleuca lanceolata*	8.0	99.48	515.22	S
14	*Eucalyptus odorata*	7.5	108.38	216.77	R
15	*Eucalyptus spathulata*	13.2	216.77	216.77	R
16	*Eucalyptus spathulata*	11.7	163.36	326.73	S
17	*Eucalyptus spathulata*	11.1	85.35	381.70	S
18	*Eucalyptus spathulata*	13.0	351.85	351.85	S

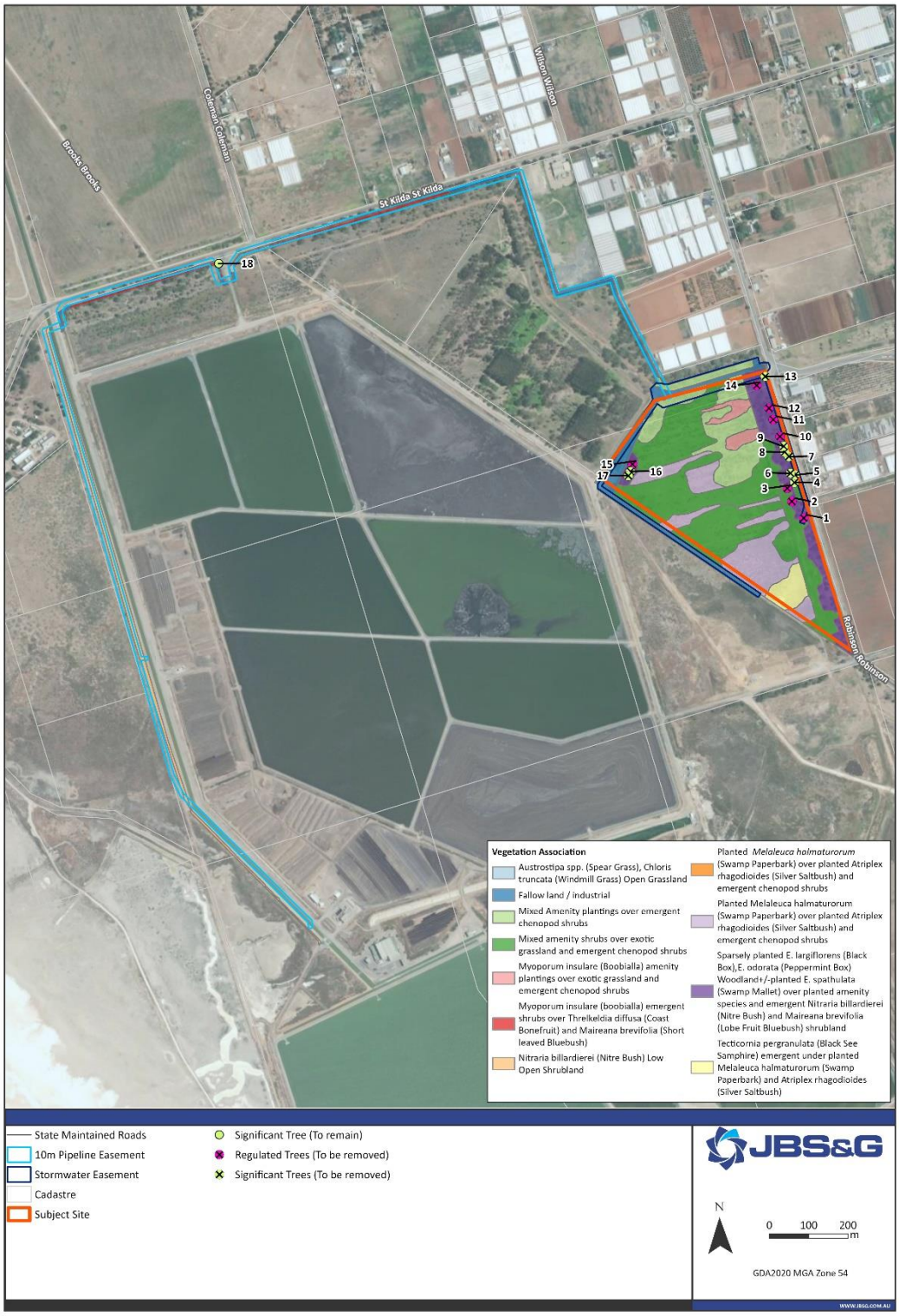


Figure 10-2: Vegetation associations recorded during field survey

Threatened ecological communities

Two (2) EPBC threatened ecological communities (TEC) were predicted by the PMST within 5 km of the Project site:

- Peppermint Box (Eucalyptus odorata) Grassy Woodland of South Australia (Critically Endangered); and
- Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community (Vulnerable).

For Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia, no indigenous intact Peppermint Box Woodlands were recorded during the field survey. There were areas of planted *Eucalyptus odorata* along the eastern boundary of the BAM Facility site for screening. However, these planted trees do not represent this TEC because of the lack of understorey species richness and intact perennial grass stands.

Tidal influence is a key criterion for Subtropical and Temperate Coastal Saltmarsh (DSEWPC, 2013). The field survey recorded no areas with connectivity to supra tidal conditions. The presence of infrastructure and evaporation ponds associated with the Bolivar WWTP ensure no flooding from tidal surges can occur within the Project site. Therefore, this TEC is not present in the Project site.

Threatened flora

Five EPBC listed flora species were identified in the PMST as potentially occurring or using habitat in the Project site. These are:

- Greencomb Spider-orchid, Rigid Spider-orchid (*Caladenia tensa*)
- Pale Leek-orchid (*Prasophyllum pallidum*)
- Large-fruit Fireweed, Large-fruit Groundsel (*Senecio macrocarpus*)
- Yellow Swainson-pea (*Swainsona pyrophila*)
- Bead Glasswort (*Tecticornia flabelliformis*)

Bead Glasswort had several historical records within 5 km of the Project site. A known population occurs approximately 2 km from the Project site at St Kilda. No individuals of this species were recorded in the Project site and the species was not considered likely to occur based on habitat present. None of the other EPBC listed flora species were recorded during the field survey.

One State conservation significant species, *Juncus radula* (Hoary Rush) had historical records within 5 km of the Project site. However, the species was considered unlikely to occur due to lack of permanent water within the Project site.

Biosecurity - Plant pests, pathogens and diseases

More than 20 weed species were recorded on the Project site during the field survey including declared weeds regulated under the *Landscape South Australia Act 2019*; African Boxthorn (*Lycium ferocissimum*), Lincoln Weed (*Diplotaxis tenuifolia*) and Silver-leaf Nightshade (*Solanum elaeagnifolium*). African Boxthorn and Silver-leaf Nightshade are also listed as Weeds of National Significance.

There are no records for the soil and water borne organism, *Phytophthora* for the Project site or wider area. The risk of *Phytophthora* occurring at the Project site is very low, partly due to relatively low rainfall and saline soils, and with no susceptible species present.

Fauna

Threatened species

A total of 43 EPBC threatened bird species were predicted to occur or use habitat within 5 km of the Project site. Of these, three species were assessed as possibly occurring at the Project site:

- Blue-winged Parrot (*Neophema chrysostoma*)
- Australian Fairy Tern (*Sternula nereis neris*)– as a fly over species
- Grey-headed Flying Fox (*Pteropus Poliocephalus*) – as a fly over species

None of these above listed species were recorded during field surveys.

A total of 32 State threatened fauna species have historical records within 5 km of the Project site. Three species were considered as possibly or likely to occur within the Project site, these were:

- Elegant Parrot (*Neophema elegans*)
- Brown Quail (*Coturnix ypsilophora australis*)
- Little Egret (*Egretta garzetta nigripes*).

None of these species were recorded during field surveys.

A list of all EPBC and NPW listed fauna species with historical records within 5 km of the Project site is provided in Ecosphere (2023a).

Migratory species

A total of 63 EPBC listed migratory bird species were predicted to occur or use habitat within the Project site using PMST. Approximately half of the migratory bird species were assessed as possibly occurring at the BAM. None of these species were observed during field surveys.

Biosecurity – Animal pests, pathogens and diseases

The Project site has been heavily grazed (as a farming allotment) with sheep grazing occurring during the field survey.

Several pest fauna species are known to occur or have records (in the last 20 years) in the 5 km area surrounding the Project site. Feral mammal species recorded in the wider area around the Project site include declared species under the Landscape SA Act; Feral cat (*Felis catus*), European fox (*Vulpes vulpes*), Black rat (*Rattus rattus*) House mouse (*Mus musculus*). Furthermore, under the EPBC Act, Feral cats and Red foxes are recognised as having threats to native animals and plants.

Several feral birds species have recent records (in last three years) in the wider area surrounding the Project site, including declared species under the Landscape SA Act; Common Starling (*Sturnus vulgaris vulgaris*), Spotted Dove (*Spilopelia chinensis*) and Barbary Dove (*Streptopelia risorii*).

10.3.3 Impact Assessment

Clearance of vegetation and habitat

Approximately 22.22 ha of native vegetation will be cleared during construction (based on upper estimates). The native habitat represents overall, poor quality habitat and provides low habitat value. The clearance will be offset by achieving a Significant Environmental Benefit' in accordance with the Native Vegetation Act 1991.

To accommodate the construction of Stage 1 and 2 of the Project, clearance of existing vegetation within the footprint will be required. Upper estimates indicate that approximately 22.22 ha of native vegetation would be cleared (from a total cleared vegetation area of 26.72 ha).

The majority of vegetation associations across the Project site have been planted historically (approximately 2010), or are re-emergent native vegetation associations. The site has been previously cropped and is currently grazed. Overall site vegetation has been assessed as sparse with minimal upper storey vegetation and a large, open, unvegetated area with some areas heavily grazed, and with weed infestations.

The vegetation communities on the Project site and the upper estimate of clearance in each community is summarised in Table 10-6. The impacted vegetation is representative of ten Bushland Condition Monitoring (BCM) communities. Further detail is provided in Ecosphere 2023b (Appendix 9B). Table 10-6 shows the estimated condition of the vegetation that would be cleared (based on field assessments using the NVC Bushland Assessment Method (BAM) (NVC 2020a)). The vegetation condition scores across the Project site range from 2.32 to 22.06, representing 'very low' vegetation condition (see Table 10-7) for more than 96% of the vegetation proposed to be cleared.

A pipeline corridor of 10 m, which will contain the two water pipelines, is required for the Project. The majority of the corridor is proposed to be located in already cleared areas (i.e. adjacent or within existing firebreaks) and in areas of degraded regenerated vegetation. As such, the requirement for clearance for the pipeline corridor is minimal. The water pipelines will above ground for most of the pipeline route except where small sections interface with existing tracks or vehicle access points.

An easement for the stormwater channel and detention basin is also required for the Project. The stormwater channel runs along the eastern boundary and with its current design, would require some vegetation clearance in this area. However, the stormwater channel design is maturing with ongoing collaboration with stakeholders, including SA Water and Council. Collaboration with Council includes discussions in regard to how stormwater design along Robinson Road can fit in with the Councils' long term planning for broader stormwater management. Final siting and design of the stormwater channel will aim to minimise clearing of native vegetation and maintain the screen along the eastern boundary, where practicable. If removal of any existing vegetation along the eastern boundary is required, juvenile plantings of appropriate species will be planted to provide screening amenity in this area.

Table 10-6: Bushland Assessment Methodology Vegetation Condition Score that will require clearance

Association	Description	Vegetation condition Score	Unit Biodiversity Score	Area (ha)
1	*Myoporum insulare* (Boobialla) amenity plantings over exotic grassland and emergent chenopod shrubs.	2.31	3.14	0.64
2	Mixed Amenity plantings over emergent chenopod shrubs	4.64	6.23	2.85
3	Sparsely remnant *Eucalyptus largiflorens E. odorata* Woodland over planted amenity species and emergent chenopod shrubs	16.56	22.23	2.50
4	*Tecticornia pergranulata* emergent under planted *Melaleuca halmaturorum* and *Atriplex rhagodioides*	22.06	22.60	0.75
5	Planted *Melaleuca halmaturorum* over planted *Atriplex rhagodioides* and emergent chenopod shrubs	11.29	15.15	3.68
6	Mixed amenity shrubs over exotic grassland and emergent chenopod shrubs	5.81	7.79	9.52
8	*Nitraria billardierei* (Nitre Bush) Low Open Shrubland.	11.74	15.50	1.52
9	*Myoporum insulare* (boobialla) emergent shrubs over *Threlkeldia diffusa* (Coast Bonefruit) and *Maireana brevifolia* (Short leaved Bluebush)	3.15	4.16	0.65
10	*Austrostipa* spp. (Spear Grass), *Chloris truncata* (Windmill Grass) Open Grassland.	5.78	7.62	0.10

Table 10-7: Categorisation of Bushland Assessment Methodology Vegetation Condition Score

Vegetation Condition Category	Vegetation Condition Score
Very low	< 20
Low	20 - 35
Medium	36 - 55
High	> 55

Clearance of native vegetation requires approval under Native Vegetation Act 1991 and Native Vegetation Regulations 2017. A Native Vegetation Clearance Data Report is contained in Appendix 9B. The Project will require a Level 4 application to be approved by the Native Vegetation Council and will need to provide a Significant Environmental Benefit offset as per the Significant Environmental Benefit Policy and Guide (NVC 2020b, c). Renascor will fulfil the SEB requirement by a payment into the Native Vegetation Fund.

The predicted impacts are in the **Minor** category, especially when considering the offset provided by the SEB. The level of the certainty in the predictions has been evaluated as **High.**

Up to 17 Regulated and Significant trees are proposed to be removed during construction.

Under the PDI Act, any activity that damages a 'regulated tree' or significant tree' is development, and as such requires development approval. Figure 10-2 shows the location of regulated and significant trees.

A total of 18 (8 'regulated' and 10 'significant') trees have been identified within the Project site (Table 10-8). Seventeen of these trees (8 'regulated' and 9 'significant' trees) will require removal . Three of these trees (ID15, ID16, ID17) are within the plant site layout footprint itself. Trees labelled as ID1 to ID14 are situated along the eastern boundary of the Project site, with the design of the stormwater channel overlapping or in very close proximity to these trees. Trees labelled as ID1, ID4 to ID13 require removal as they coincide with the proposed stormwater channel. Trees labelled as ID2, ID3 and ID14 are situated close (within a few metres) to the proposed stormwater channel and likely require removal also, however all efforts to avoid removing these trees will be undertaken. The stormwater channel design (i.e. siting and width of channel, location of drain, size of detention basin) will be further optimised during detailed design, to the extent practicable, to minimise impact on existing vegetation. Tree ID18 is located in the north western corner of the water pipeline corridor and through further engineering design, will be retained.

Removal of regulated or significant trees requires approval under the PDI Act, and involves either tree replanting (two replanted trees per regulated tree, three replanted trees per significant tree) or payment into an urban tree fund. For the removal of the 8 regulated trees and 9 significant trees, payment will be made into an urban tree fund. It is also noted juvenile plantings of appropriate species will be planted to provide screening amenity in this area.

Table 10-8: Significant and regulated trees requiring removal for the Project.

Tree ID	Species	Height	Average Circumference	Total Circumference	Regulated (R) /Significant (S)	Proposed Removal (Yes/No)
1	*Eucalyptus spathulata*	10.0	98.44	295.31	R	Yes
2	*Eucalyptus odorata*	11.4	224.62	224.62	R	Yes
3	*Eucalyptus odorata*	7.6	221.48	221.48	R	Yes
4	*Eucalyptus nicholii*	8.2	85.35	400.55	S	Yes
5	*Melaleuca lanceolata*	8.7	109.96	329.87	S	Yes
6	*Eucalyptus spathulata*	9.8	132.99	398.98	S	Yes
7	*Eucalyptus spathulata*	12.1	182.21	364.42	S	Yes
8	*Eucalyptus spathulata*	9.7	148.70	446.11	S	Yes
9	*Eucalyptus spathulata*	5.7	111.53	334.58	S	Yes
10	*Melaleuca lanceolata*	4.7	125.66	251.33	R	Yes
11	*Eucalyptus spathulata*	11.2	273.32	273.32	R	Yes
12	*Eucalyptus spathulata*	7.7	125.66	251.33	R	Yes
13	*Melaleuca lanceolata*	8.0	99.48	515.22	S	Yes
14	*Eucalyptus odorata*	7.5	108.38	216.77	R	Yes
15	*Eucalyptus spathulata*	13.2	216.77	216.77	R	Yes
16	*Eucalyptus spathulata*	11.7	163.36	326.73	S	Yes
17	*Eucalyptus spathulata*	11.1	85.35	381.70	S	Yes
18	*Eucalyptus spathulata*	13.0	351.86	351.85	S	No



Figure 10-3: Regulated trees (ID2 and ID10) on the Project site

While seventeen trees require removal due to their overlap with the plant facility itself or the stormwater channel, many of these were in less than optimum health, with broken limbs and dieback observed. Water pipelines will be laid on the ground (rather than fully installed underground and requiring continuous trenching) and as such, this design further minimises the number of trees that require removal. Note, some minor sections of the water pipelines may be required to be installed underneath track and vehicle access points. As described above, payment into the urban tree fund will be made for those regulated and significant trees that require removal, and juvenile trees will be planted along the eastern boundary of the Project site.

The predicted impacts are in the **Minor** category, especially when considering the condition of these trees. The level of the certainty in the predictions has been evaluated as **High.**

Vegetation clearance will not impact nationally listed threatened ecological communities, nationally listed flora or state listed flora

As detailed in Section 10.3.2, no threatened ecological communities occur on the Project site (Ecosphere 2023, Appendix 9). In addition, no nationally listed or state listed flora species were assessed as likely to occur on the Project site. As such, the predicted impacts are in the **Negligible** category. The level of the certainty in the predictions has been evaluated as **High.**

Vegetation clearance will not impact nationally listed fauna, nationally listed migratory species or state listed fauna

Thirty-two bird species were recorded on the Project site during the field survey; however none of these species were considered as conservation significance species (Ecosphere 2023, Appendix 9).

Three EPBC listed fauna species were assessed as possibly occurring at the Project site; two of these being fly over species (see section 10.3.2). Further information for these species is provided below.

Blue-winged Parrot are known to inhabit coastal, sub-coastal and inland areas, favouring grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can be found in altered environments (e.g. airfields, golf-courses and paddocks). Habitat within the Project site is not deemed critical for the species given the Project site is a previously degraded and marginally rehabilitated area that is subject to grazing by sheep and with ongoing disturbance from heavy vehicles and machinery associated with the SA Water Bolivar WWTP. No records occur within 5km of the project site. However, suitable habitat for the species is present within the wider area and this transient species is considered to possibly move through the Project site to access areas of suitable habitat.

Grey-headed Flying-fox are known to roost in the Adelaide Botanic Park and forage over a wide area. Individuals are capable of travelling 40 km between their roost and feeding sites in a night (Eby and Law, 2008), which places the project site well within their range. Grey-headed Flying Foxes consume fleshy fruits and blossoms, including Moreton Bay Fig (*Ficus macrophylla*) and the blossoms of eucalypts (*Eucalyptus* spp. and *Corymbia* sp.). Although the species may fly through the Project site, the field survey did not identify any habitat critical to the species within the Project site.

Australian Fairy Tern utilises a variety of habitats including coastal and offshore islands, as well as sheltered inlets, estuaries and lagoons. The species favour both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt ponds. Several species records occur within 5 km of Project site (last record 2012), however it was not recorded during the field survey. While Australian Fairy Tern is considered a possible fly-over species, habitat at the Project site is not well suited to the species as the site is set back from the coastal area and the Bolivar WWTP ponds isolate the site from the coast.

Approximately thirty migratory bird species were assessed as possibly occurring at the BAM Facility. However, the Project site would not provide important habitat for any of these migratory species.

Of the three state threatened fauna species assessed as possibly occurring (see Section 10.3.2), none of these species were considered likely to be impacted by Project. The Elegant Parrot and Little Egret are typically transient in nature and do not occupy habitats on a permanent basis and the Brown Quail requires dense undergrowth which is not present within the Project site.

As such, vegetation clearance is not expected to impact nationally listed fauna, migratory species or state listed fauna species.

The predicted impacts are in the **Negligible** category. The level of the certainty in the predictions has been evaluated as **High.**

Disturbance to and or direct impacts to fauna

Noise from construction and operation activities are not expected to impact fauna on or beyond the Project site

The impact of noise on fauna can include a range physiological or behavioural responses. The potential impact of noise on fauna is dependent upon the fauna species. The most common behavioural response for birds for example, is flight, as they perceive the noise as a threat. However, changes to existing noise levels can potentially affect breeding behaviour, foraging behaviour and social interactions.

As detailed above, thirty-two bird species were recorded on the Project site during the field survey; however none of these species were considered as conservation significance species (Ecosphere 2023, Appendix 9). Two nationally listed birds, approximately 30 nationally listed migratory bird species, and three state listed bird species were also assessed as possibly occurring on the Project site (Ecosphere, 2023 (Appendix 9). However, the Project site does not provide preferred habitat for any of these conservation significant species (Ecosphere, 2023 Appendix 9). As such, noise impacts (or any other impacts) to nationally and state conservation significant bird species on the Project site, is unlikely.

As the Project site is located in an urban environment, it is likely that any bird species (and potentially other fauna species) present or visiting the Project site or wider area, are tolerant to noise already present in the environment. As detailed in Section 11.3 (Noise), construction activities will reach approximately 68 dB(A) at one of the closest receptors (between 7am to 7pm Monday to Saturday) and with construction of limited nature occurring outside these hours to comply with the limits set in the Noise EPP. As further detailed in Section 11.3 (Noise), operational noise will comply with the Noise EPP limits in most cases during Stage 1 and 2 operations for closest receptors, with the exception of night time trucking, which is well within the current background level of heavy vehicles travelling along Robinson Road. It is considered that these limits will adequately mitigate noise risks to fauna and as such, there is not expected to be any impact to fauna beyond the Project site.

The predicted impacts are in the **Negligible** category. While it is considered **Likely** there will be increases in noise on the Project site, given the mitigation measures and current levels of urban noise, any fauna on or near the Project site are already exposed to these noise levels. As such, the consequence of noise impacting fauna is expected to be **Negligible,** and with **Low** risk.

Light spill from the Project will be minimised through design and will not impact native fauna

Minimal lighting will be required for construction, as construction is limited to daytime hours. Exterior lighting within the Project site will be designed and positioned to minimise light spill to the environment or sensitive receptors, in accordance with relevant guidelines and policies. Given the Project site does not provide preferred habitat for any EPBC listed threatened species, EPBC listed migratory species, or state conservation significant species, lighting impacts to native fauna, either on the Project site or on adjacent land, are considered to be Negligible.

The predicted impacts are **Negligible**. It is considered **Rare** that lighting will impact native fauna, with the consequence being **Minor**, and the risk of the event occurring being **Low**.

Risks associated with fires during construction and operation can be appropriately managed

Uncontrolled fires have the potential to cause impact to native vegetation and fauna.

As assessed in Chapter 15 (Hazard and Risks), the Project has been designed to prevent fires onsite and extinguish any fires that do start immediately. With design, construction and operation measures in place as outlined in Chapter 15 (Hazard and Risks), any fire is likely to be small. The likelihood of a fire resulting from Project activities impacting native vegetation and fauna onsite or off site is considered **Rare**, and with **Minor** consequence and overall **Low** Risk.

Vehicle strike causing fauna mortality is unlikely to occur

There is the potential for fauna injury to occur through collision with vehicles or vegetation clearance machinery, predominantly during the construction phase. Once construction begins, larger or more mobile local fauna would move away from the local areas during disturbance, however smaller species (e.g. small reptiles) may remain.

No mammal species were recorded on the Project site during the field survey and no nationally or state listed mammal species was assessed as likely to occur, or use habitat on the Project site. Reptiles may be present on the Project site, but no species of conservation significance are considered likely to occur on the Project site. Approximately 30 bird species were recorded on the Project site, however none of these species were conservation significant species. No nationally listed threatened or migratory species, or state listed species were assessed as likely to occur on the Project site. Even so, any bird species visiting the site are likely to fly away during construction activities. As such, impacts to fauna from vehicle strike are considered **Negligible.** The level of the certainty in the predictions has been evaluated as **High.**

Direct impacts on flora

Vehicle movements are not expected to result in the introduction and / or spread of weeds, pests or pathogens to surrounding horticultural / agricultural areas

There is the potential for vehicle movements to and from the site during construction and operation to introduce and or spread weeds, pests and pathogens to surrounding horticultural / agricultural areas.

During construction, works will be contained to within the Project site, with defined boundaries for clearance areas including routes for vehicle and personnel movements and stockpiling of materials, soil and or vegetation.

During construction and operation potential impacts would be further managed through standard practices in the CEMP and OEMP respectively including standard vehicle hygiene protocols (also for mobile plant and equipment) and ensuring importation of clean fill.

As such, impacts are considered **Minor**. The level of the certainty in the predictions has been evaluated as **High**.

Vehicle movements are not expected to result in the introduction and / or spread of weeds, pests or pathogens to surrounding horticultural / agricultural areas.

Indirect effects on flora and fauna

Management of erosion and stormwater during construction will prevent indirect impacts to vegetation on the Project site and beyond

There is the potential for erosion of soils and runoff from stockpiles and disturbed surfaces during construction to result in gullying and secondary sedimentation near vegetation (including native vegetarian) on and beyond the Project site. As detailed in Section 9.3 (Soils, Landform and Geology) erosion and stormwater will be managed during construction through well known, and effective control strategies (i.e. staged construction, soil and sediment management and establishment of new landcover). These control measures will be detailed in the CEMP, and will comply with the Code of Practice for management of stormwater in the building and construction industry (SA EPA, 1999).

The predicted impacts are **Minor**. With control measures in place, it is considered **Possible** stormwater could leave the construction site containing eroded soil or other contaminants with a **Minor**, short term consequence to vegetation on the Project site and beyond. The level of the certainty in the predictions has been evaluated as **Medium.**

Dust generated from construction activities will not impact vegetation on or beyond the Project site

Dust from construction activities have the potential to settle on remaining vegetation on the Project site and or on vegetation beyond the Project site, potentially resulting in a reduction in vegetation health. Vegetation receptors outside of the Project site include the Adelaide Zoo feedlot north west of the Project site and the market gardens adjacent to the Project site.

As detailed in Section 11.2 (Air Quality), dust will be adequately managed to prevent impacts on closest sensitive receptors (approximately 100m - 500 m from the Project site). Construction activities are short term and temporary and will be staged to minimise the exposed area that can generate dust during high wind events. As further detailed in Section 11.2 (Air Quality), there are no known impacts resulting from SA Water's onsite construction and earthmoving activities, which would pose similar potential risks to the Project. Dust will be managed during construction by implementing dust control measures as part of the CEMP and as detailed in Section 11.2 (Air Quality).

The predicted impacts are in the **Minor** category. It is considered **possible** that construction activities could generate dust that could settle on vegetation on the Project site or in nearby land. However, any increase in dust from Project construction activities is expected to be short term and localised so as to have a **Minor**, short term consequence on vegetation on the Project site and beyond. The level of the certainty in the predictions has been evaluated as **Medium.**

Dust (including graphite fines) generated from operational activities will not impact vegetation on or beyond the Project site

Dust (including graphite fines) generated from operational activities could settle on remaining vegetation on the Project site and or on vegetation beyond the Project site, potentially resulting in reduction in vegetation health.

The dust produced from the manufacturing activities is graphite (carbon) and will not contain any specific pollutants to the terrestrial environment. As detailed above and in Section 11.2 (Air Quality), dust will be adequately managed during operation to prevent impacts on closest sensitive receptors (approximately 100 m to 500m from the Project site). Therefore, it is expected that there would be no impacts to vegetation health on the Project site or beyond from operational activities.

The predicted impacts are in the **Minor** category. It is considered **unlikely** that operational activities will increase background levels of dust which in turn could settle on vegetation on the Project site or on adjacent land, and impact vegetation health. Any increase in dust during operational activities are expected to minimal as to have a **Minor** consequence on the Project site and beyond. The level of the certainty in the predictions has been evaluated as **High.**

Accidental spills or loss of containment will be remediated immediately to prevent impacts to native vegetation and fauna

Accidental spills or loss of containment of fuels and chemicals have the potential to impact native vegetation and any (native) fauna consuming that vegetation through secondary pathways of surface water or groundwater.

Fuel and chemicals are required to be stored onsite during both construction and operation. As detailed in Section 15.6 (Dangerous Substances), all fuel and chemical storage in accordance with EPA guidelines and requirements. During operations, water management infrastructure will be constructed on the Project site to prevent any water which has had the potential to come into contact with processing fluids from water leaving the site. Spill management and response procedures will be developed and implemented through the CEMP and OEMP.

The predicted impacts are **Minor**. With appropriate design measures and spill management response procedures in place, it is considered **Possible** that an accidental spill or loss of containment event could occur and result in subsequent impacts to native vegetation and fauna on the Project site or beyond. The consequence is considered to be **Minor**, with the level of certainty in the predictions being evaluated as high and the risk being evaluated as **Low**.

Project activities are not expected to result in the introduction and / or spread of weeds, pests or pathogens elsewhere

As noted in Section 10.3.2, more than 20 weed species were recorded on the Project site with three State declared species and two Weeds of National Significance. Vegetation on the Project site is in overall poor condition (Ecosphere, 2023; Appendix 9). Vegetation adjacent to the Project site is of variable quality, with much of adjacent lands cropped. However, the introduction, or spread of weeds, pests and/or pathogens could degrade better quality vegetation (where/if present) adjacent to the Project site and promote and or harbor predator pest species (e.g. foxes and cats).

Standard practices will be in place during construction activities to manage the risk of introduction or spread of weeds, pests and pathogens. These will be detailed in the CEMP. Pre-construction inspections would be undertaken to identify any areas of weed infestation requiring specific management measures. Vegetation clearance would occur in approved areas, no-go zones would be established and vegetative material containing declared weeds would not be moved from the site (unless appropriate permits (from the Landscape Board) are in place). Stockpiles will also be monitored for weed outbreaks. Awareness about key weed threats (e.g. African Boxthorn, Lincoln Weed, Silver-leaf Nightshade) would be included in induction programs.

During operation, standard practices will be in place to manage the risk of introduction or spread of weeds, pests and pathogens. Adaptative weed management, monitoring and control would be undertaken where required. Targeted management of key threat species (e.g. weeds of national significance or declared weeds) would be undertaken in consultation with Green Adelaide Landscape Board staff, if required.

As noted in Section 10.3.2, there is a very low risk for the soil borne pathogen *Phytophthora* to be present at the Project site and as such, it is considered that specific management protocols for this pathogen are not required for the Project.

The predicted impacts are **Negligible,** with the level of certainty in the predictions evaluated as **High.**

Project activities are not expected to result in the introduction or spread of pest, or nuisance species, diseases and pathogens

Project activities have the potential to result in an increase in pest species, particularly if waste is not managed effectively. Pest species (including state declared and nationally recognised feral animals) are known in the wider area (i.e. cats, foxes, rats, mouse, some bird species – see Section 10.3.2).

The CEMP and OEMP will include mitigation measures to avoid the introduction or spread of pest and nuisance species, and subsequent spread of disease and pathogens. Waste will be managed to avoid increasing or facilitating predators and pests in the Project site.

Adaptive pest management, monitoring and control would be undertaken where required, particularly during construction. Management would be undertaken in consultation with Green Adelaide Landscape Management Board staff, if required.

The predicted impacts are **Negligible,** with the level of certainty in the predictions evaluated as **High.**

10.3.4 Summary of Key Mitigation Measures

Table 10-9: Summary of Key Mitigation Measures

Mitigation Measure	Construction	Operation
Restrict vegetation disturbance, clearance or trimming to approved areas (as per NVC approval)	✓	✓
Avoid removal of larger trees (e.g. trunk diameter over 30 cm) where possible	✓	
Final siting and design of the stormwater channel will aim to minimise clearing of native vegetation and maintain the screen along the eastern boundary, where practicable	✓	
Utilise areas where native vegetation is degraded or has been previously cleared in preference to clearing less degraded vegetation wherever practicable	✓	
Offset vegetation clearance with a Significant Environmental Benefit in accordance with NVC approval	✓	
Rehabilitate or allow natural regeneration in areas of disturbance where not required after construction	✓	
Implement protocols for management of waste during construction to avoid attracting feral pest animals	✓	✓
Undertake pre-construction inspection to identify any areas of weed infestation requiring specific management measures	✓	
Implement weed hygiene procedures such as vehicle wash-downs and inspections where appropriate	✓	
Control weeds within the works area in accordance with the Landscape South Australia Act	✓	✓
Conduct post construction weed survey and control program (if necessary) with particular focus on any weed infestations identified in pre-construction surveys		✓
Appropriately dispose of any declared weeds cleared as part of the Project (with any necessary notification / permits under the Landscape South Australia Act in place for moving / relocating vegetation containing declared plants)	✓	✓
Any vegetation areas retained within the Project footprint will be managed for weeds		✓
Undertake pest animal control if ground disturbance encourages pest animal (e.g. rabbit) activity	✓	✓
Hot works to occur away from native vegetation and fuel sources	✓	✓
To ensure potential fire risks to adjacent land is mitigated, appropriate land management and fire management strategies to be considered for inclusion in the CEMP and OEMP.		✓
Emergency Response Plan to be developed for fire risk		✓
Staff induction regarding fire hazards and emergency response plan		✓
Containment of hazardous substances in accordance with EPA guidelines		✓
Installation of fire fighting equipment including pumps, hoses, extinguishers and sprinkler systems in high risk areas onsite		✓
Consultation with MFS regarding bushfire evacuation protocol and site access to emergency vehicles where appropriate		✓
Undertake weed maintenance to ensure fuel load is minimised		✓
Ensure that all equipment is fitted with appropriate firefighting equipment	✓	✓
Maintain awareness of local seasonal restrictions, particularly regarding hot works during fire ban season	✓	✓
Restrict high risk fire activities during fire ban periods (in accordance with applicable statutory requirements)	✓	✓

10.3.5 Conclusion

Project construction or operational activities will not lead to significant or long-term impacts to flora and fauna. Potential impacts can be readily managed with appropriate Project design layout and application of mitigation measures.

10.4 Marine Flora and Fauna

10.4.1 Assessment Method

A desktop assessment was undertaken for marine flora and fauna. As detailed in Section 10.3, the Project site is situated approximately 3 km east of the coastline on open flat land. Large ponds associated with the Bolivar WWTP extend for over one kilometre in an east-west direction and 4.8 kilometres in the north-south direction from the Project site, effectively separating the Project site from the coast. As such, the 20ha Project site itself is not assessed further as part of the Marine Flora and Fauna assessment chapter.

Given the existing SA Water outfall channel location enters the coastal environment approximately 10 km north of the Project site at Freshwater Creek, the outfall location at Freshwater Creek (Freshwater Creek, herein) represents the marine site of assessment (Figure 10-4).

Online mapping tools were used in the desktop assessment to map and describe conservation significant areas and intertidal and benthic habitats within proximity to Freshwater Creek. These were accessed through NatureMaps (DEW, 2023b) and include:

- Coastal Saltmarsh and mangroves mapping
- State Benthic Mapping
- Areas Proving Protection
- Bathymetry
- Wetlands.

In addition, threatened species listed under the EPBC Act (Cth) and NPW Act (SA) that may occur or are likely to have suitable habitat at Freshwater Creek were identified using the same data bases as outlined in 10.3.1 but using a 5 km radius around Freshwater Creek (for PMST and BDBSA).



Figure 10-4: Existing SA Water outfall channel location entering into Freshwater creek (with reference to the BAM Facility site)

10.4.2 Description of the Existing Environment

Regional context

The existing SA Water outfall channel which enters the coastal environment at Freshwater Creek (Figure 10-4) falls within the Gulf St Vincent Marine Bioregion and the Clinton Biounit (which extends from Ardrossan in the north to Marino Rocks in the south, in waters of 2 to 15 m depth).

Conservation parks, reserves and Wetlands of National Importance

Several conservation parks, reserves and important wetlands occur within 5 km of Freshwater Creek (Figure 10-5).

Freshwater creek enters into the Port Gawler and Buckland Park Lake Wetlands of National Importance (Figure 10-5).

The Adelaide International Bird Sanctuary National Park (Winaityinaityi Pangkara) is approximately 0.5 km east of Freshwater Creek (at closest distance). The Sanctuary provides important feeding ground for many migratory birds (refer later to migratory birds) (NPWSSA, 2023a).

The St Kilda-Chapman Creek Aquatic Reserve is immediately adjacent to Freshwater Creek, spanning a distance along the adjacent coast of approximately 2 km north and 7 km south. The Barker Inlet – St Kilda Aquatic Reserve abuts St-Kilda-Chapman Creek Aquatic Reserve in the south. These aquatic reserves provide habitat for a range of native fauna.

Torrens Island Conservation Park is approximately 10 km south east of Freshwater Creek and located between Port River, Barker Inlet and Section Bank Mudflats (NPWSSA, 2023b). Mutton Cove Conservation Reserve is located approximately 9 km to the south of Freshwater Creek. These conservations areas comprise mangroves and samphire and provide important habitat for many conservation significant bird species (MPWSSA 2023b) (Cook and Coleman, 2003).

The wider coastal area, including Port River is located within the area established for the Adelaide Dolphin Sanctuary under the *Adelaide Dolphin Sanctuary Act 2005.*

Intertidal and benthic habitat

The proximal area adjacent Freshwater Creek is mapped as degraded intertidal samphire interspersed with intact supratidal and intertidal mangrove and small patches of intertidal cyanobacterial mat (Figure 10-6).

The mudflats provide habitat for many molluscs, worms and other invertebrate species, which provide food for wading shorebirds, including migratory species. The mangroves and saltmarsh are known as habitat for juvenile fish and the wider area provides an important nursery area for commercial fish and crustacean species.

Extending past the intertidal zone, benthic mapping shows patchy, unconsolidated bare substrate interspersed with sparse to medium, patchy seagrass to depths of approximately 2 m (Figure 10-6). Patches of continuous medium to dense seagrass density, interspersed with patchy sparse seagrass and unconsolidated bare substrate are further mapped between approximately 2 m and 9 m depths in the wider area. Seabirds are often seen in the area.

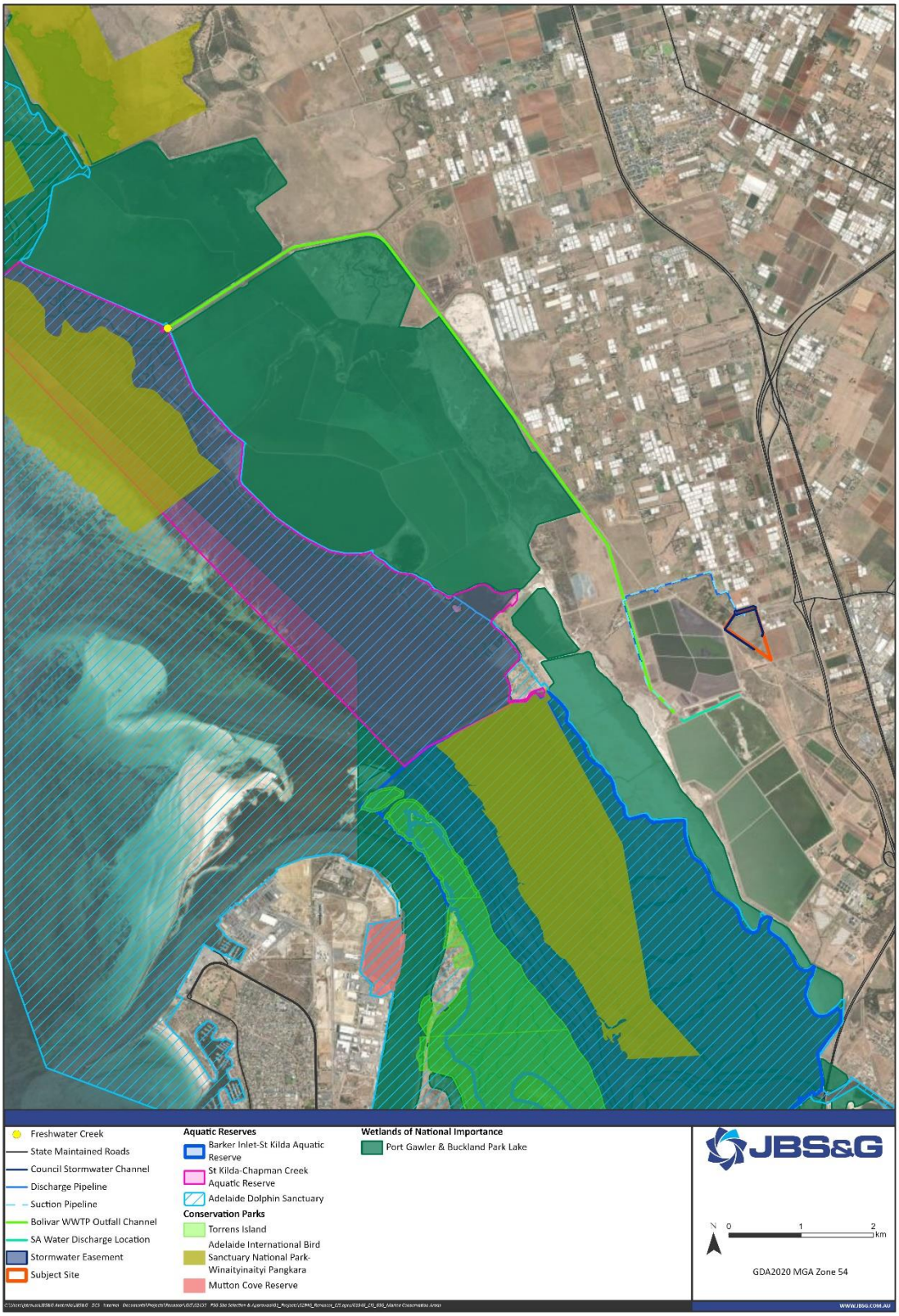


Figure 10-5: Conservation parks, reserves and Wetlands of National Importance in vicinity of Freshwater Creek

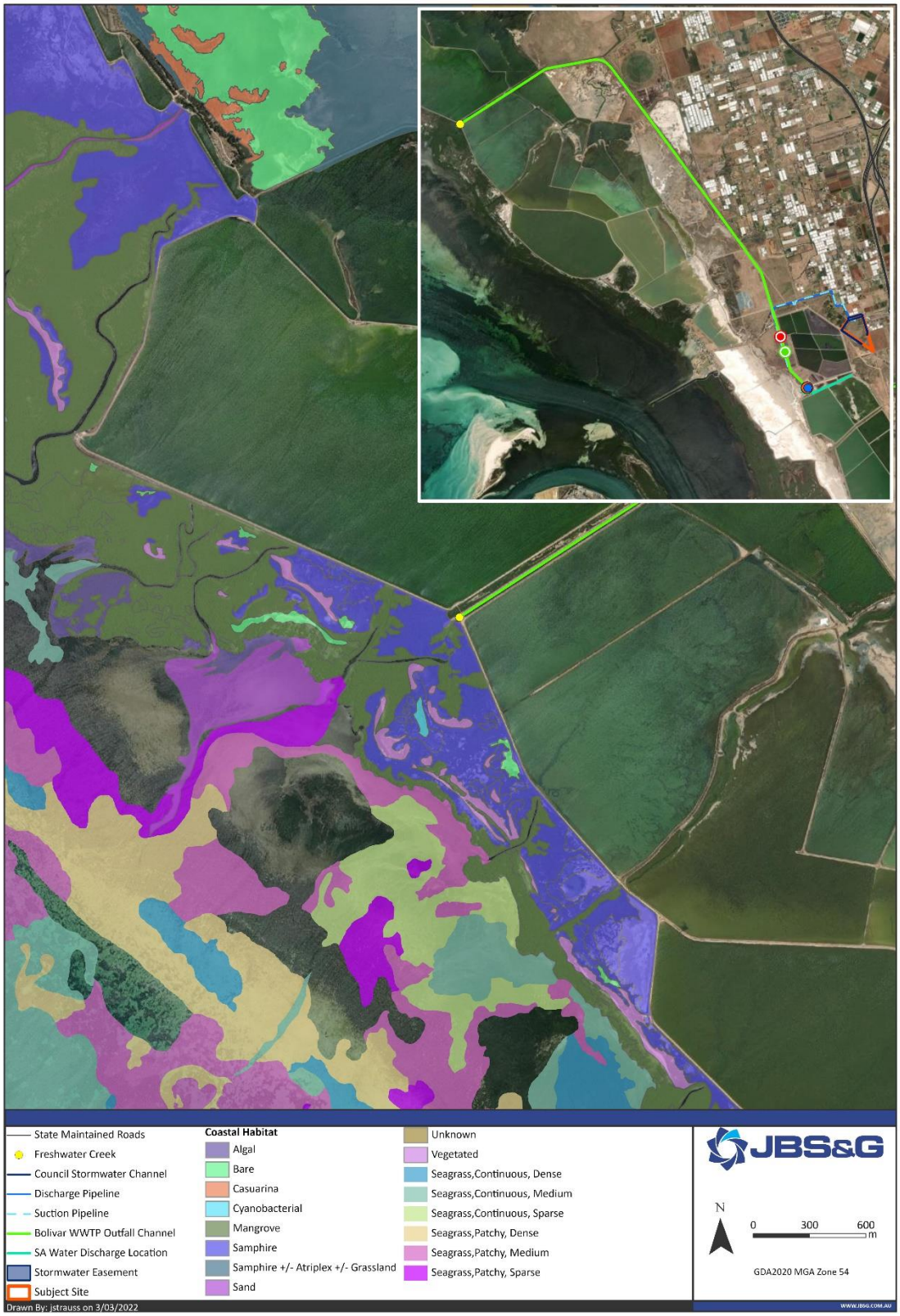


Figure 10-6: Intertidal and benthic habitat within the vicinity of Freshwater Creek

Flora

Threatened Ecological Communities

Two (2) EPBC threatened ecological communities (TEC) were predicted by the PMST within 5 km of the Project site (same as detailed in Section 10.3.2). Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia is not likely to occur at Freshwater Creek. The Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community was assessed as likely to occur at Freshwater Creek. However, This TEC does not constitute a MNES. The significant impact guidelines (DoE 2013) state that listed ecological communities in the Vulnerable category are not MNES for the purposes of Part 3 of the EPBC Act (requirements for environmental approvals).

Nationally listed flora

The same five EPBC listed flora species as detailed in 10.3.2, were identified in the PMST as potentially occurring or using habitat in the Project site. Of these, Bead Glasswort was assessed as possibly occurring at Freshwater Creek.

State listed flora

Species of State conservation significance with records (but latest records being 1993 and 2006) within 5 km of Freshwater Creek include *Atriplex australasica*, Bead Glasswort and Swamp daisy (*Brachyscome paludicola*).

Fauna

Nationally listed species

A total of 43 EPBC threatened fauna species were predicted to occur or use habitat at Freshwater Creek. Of these, eight bird species were assessed as possibly occurring at the Freshwater Creek:

- Slender-billed Thornbill (Gulf St Vincent) (*Acanthiza iredalei rosinae*)
- Southern Whiteface (*Aphelocephala leucopsis*)
- Red Knot (*Calidris canutus*)
- Greater Sand Plover (*Charadrius leschenaultia*)
- Lesser Sand Plover (*Charadrius mongolu*)
- Blue-winged Parrot (*Neophema chrysostoma*)
- Eastern Curlew (*Numenius madagascariensis*)
- Australian Fairy Tern (*Sternula nereis nereis*).

Two bird species were assessed as likely to occur or use habitat at Freshwater Creek

- Curlew Sandpiper (*Calidris ferruginea*)
- Great Knot (*Calidris tenuirostris*)

However, none of the species assessed as possibly occurring, or likely to occur, were considered dependent on habitat at Freshwater Creek.

For other EPBC threatened fauna including mammals, reptiles and sharks which were predicted to occur with PMST within 5 km of Freshwater Creek, one of these species were assessed as likely to occur at Freshwater Creek, given no preferred habitat at Freshwater Creek.

Migratory species

A total of 63 EPBC listed migratory bird species were predicted to occur or use habitat at Freshwater Creek. Approximately half of the migratory bird species were assessed as possibly occurring at Freshwater Creek, and with two species (same species as detailed above; Great Knot and Curlew Sandpiper) considered as likely to occur at Freshwater Creek.

Marine species

A total of 98 EPBC listed marine species (including fish (all Sygnathids (26)), mammals (3), reptiles (3) and birds (66); many of which are EPBC listed threatened and or EPBC Migratory species) were predicted by the PMST within 5 km of Freshwater Creek.

State significant species

All Sygnathid species are listed under 'Marine' under the EPBC Act (see above) and protected under South Australian Fisheries Management Act. Wide-bodied pipefish (*Stigmatophora nigra*) and deep bodied pipefish (*Kaupus costatus*) have been shown to be relatively abundant in the nearby Port River and Barker Inlet with several other Sygnathid species recorded in the wider area (Gillanders et al. 2008).

Fish

More than sixty fish species have been recorded in the nearby Port River and Barker Inlet (Gillanders et al. 2008). Dominant species included King George whiting (*Sillaginodes punctatus*), striped perch and yellow-eye Mullet (*Aldrichetta forsteri*).

Fisheries

Within upper Gulf St Vincent there are three main fisheries; the Marine Scalefish Fishery, Blue Crab Fishery and Gulf St Vincent Prawn Fishery. These fisheries are supported by tidal flats, mangroves and creeks of Port River, Barker inlet and surrounds, which provide breeding, nursey and feeding habitat for a number of fish and macroinvertebrate fisheries taxa. These include the blue crab, western king prawn, garfish, whiting, mud cockles, razor clams and bait worms.

Biosecurity - Pest species, pathogens and diseases

Of the 250 introduced marine species, most have little impact, however there are some species which have the potential to significantly impact the marine environment and industries (DAFF, 2023).

A number of marine pest species are known to have established in the wider vicinity of Freshwater Creek (mostly recorded in Port River but also in Gulf St Vincent). These include noxious species declared (as having a severe threat to natural environment) under the *Fisheries Management Act 2007* such as *Caulerpa taxifolia*, European Green Shore Crab (*Carcinus maenas*), European fan worm (*Sabella spallanzanii*) and Asian Paddle Crab (*Charybdis japonica*), (PIRSA, undated a, and DAFF, 2023).

The Pacific Oyster is another pest species of concern for the Port River and surrounds, as it can establish on hard substrate, competing for food with farmed oysters and native molluscs.

The Pacific Oyster is also subject to Pacific Oyster Mortality Syndrome (POMS) caused by the virus OsHV-1 microvariant. POMS causes rapid death and high mortality to Pacific Oysters. While the virus is not known to infect other bivalve species, some bivalve species may play a role in the transmission of the virus (O'Reiley et al. 2018). POMS is currently contained within the Port River (PIRSA, undated b).

10.4.3 Impact Assessment

Impacts to marine habitats

There is no source for the Project (during construction or operations) to impact upon marine environments including nursery habitat

Nursery habitat supporting the main fisheries in Gulf St Vincent are tidal flats, mangroves and creeks of Port River, Barker inlet and surrounds (including Freshwater Creek). Key threats to these habitats are described in EPA (2009) and are listed below in Table 10-10, together with identified potential impacts from the Project.

Table 10-10: Key threats to nursery habitat and potential impacts form the Project

Key Threat	Potential impact from the Project
Salinity, turbidity, trace metals	Treated process water quality will be comparable to existing water quality within the SA Water outfall channel and will not cause a plume of fresh, saline or turbid water which could impact the flora and fauna in these habitats. Trace metals will be at comparable levels to the current water quality within the SA Water outfall channel, or where raised will be below ANZECC guidelines. The Project will not impact this environmental aspect. Refer to Section 9.5 (Coastal and Marine) of Chapter 9 (Physical Environment) for further details of this assessment.
Eutrophication (from excess nutrients or increased temperature)	Treated process water will not increase macronutrients (nitrogen as ammonia, nitrite and nitrate and Phosphate). The Project will not alter this environmental aspect. Temperature of treated process water is comparable to the existing channel at the outfall location, in addition there is approximately 11 km of open channel before the treated process water reaches the marine environment for the temperature to equilibrate to ambient. The Project will not alter this environmental aspect. Refer to Section 9.5 (Coastal and Marine) of Chapter 9 (Physical Environment) for further details of this assessment.
Hydrocarbons	Any spills of hydrocarbons or hazardous substances will be contained onsite and remediated immediately. No hydrocarbons will be discharged from the Project site. Refer to Section 9.3 (Soils, Landform and Geology) of Chapter 9 (Physical Environment) for further details of this assessment.
Micro-organisms	No source of micro-organisms from the Project.
Pesticides	No source of pesticides from the Project.

There is no source for the Project (during construction or operations) to impact upon marine environments including nursery habitat. The detailed assessment of treated process water impacting upon the water quality of the SA Water outfall channel and downstream marine environment is included in Chapter 9 Physical Environment.

Disturbance to and or direct impacts to marine associated fauna and flora

There is no source from Project activities (construction or operations) to impact upon nationally listed flora and fauna, nationally listed migratory species, protected marine species and or state listed fauna

The EPBC listed flora, Bead Glasswort, was assessed as possibly occurring at Freshwater Creek. Several listed birds were assessed as possibly or likely to occur at Freshwater Creek, and with more than thirty migratory birds assessed as possibly occurring at Freshwater Creek. Many listed marine species, including state listed species, were further predicted to occur within 5 km of Freshwater Creek. Potential impacts on these flora and fauna from the Project are described Table 10-11.

Table 10-11: Threatened or protected fauna species group, likelihood of occurrence and potential impact from the Project

Group	Likelihood of presence of threatened species	Potential impact from the Project	Project impacts Group?
Flora	Bead Glasswort (*Tecticornia flabelliformis*) possibly occurs within 5 km of Freshwater Creek.	Key threats to this species include weed invasion, direct disturbance and altered hydrology. Weed species will be controlled at the Project site (refer to Section 10.3.3) and the Project does not present a new source of weeds at Freshwater Creek. No direct disturbance or clearance will occur at Freshwater Creek (diluted, treated process water present in SA Water outfall channel). Quality and quantity of treated process water will be comparable with existing SA Water outfall channel water (Chapter 9 Physical Environment) and there will be no alteration to the hydrology regime from the Project. There is no source of potential impacts from the Project on threatened flora species.	No
Birds	Eight threatened bird species were assessed as possibly occurring and another two as likely to occur or use habitat at Freshwater Creek. More than 30 migratory bird species were assessed as possibly occurring at Freshwater Creek and with the same two threatened species assessed as likely to occur or use habitat at Freshwater Creek).	Potential impacts from on EPBC listed birds, EPBC Listed Migratory birds and State listed birds from Project activities at the Project site have been assessed in Section 10.3.3. The assessment concluded no impacts to threatened birds at the Project site (or surrounds) as a result of Project activities (e.g. native vegetation clearance, light spill, noise, vehicle strike, fire, or weed / pest introduction or spread). Freshwater Creek would not provide important habitat for any of these threatened bird species. No direct disturbance or clearance will occur at Freshwater Creek (diluted, treated process water present in SA Water outfall channel). Quality and quantity of treated process water being returned to SA Water outfall channel will be comparable with existing channel water (Chapter 9 Physical Environment) and there will be no alteration to the hydrology regime from the Project.	No
Mammals, Reptiles and Sharks	No mammals, reptiles or sharks assessed as likely to occur within 5 km of Freshwater Creek.	No identified receptors.	No
Fish	A total of 26 listed Marine fish species (all Sygnathids) were predicted to occur within 5 km of Freshwater Creek. More than sixty fish species have been recorded in the nearby Port River and Barker Inlet (Gillanders et al. 2008).	Potential impacts on nursery habitat have been assessed above and concluded no material changes to water quality or temperature will occur from the project and no source of hydrocarbons, micro-organisms or pesticides in the treated process water which could impact nurseries. Likewise, these aspects will not impact fish species occurring in the area. Noise assessment indicates no impacts are expected at the coast or within the marine environment (refer Section 9.5 Coastal and Marine). There are no significant vibration sources that could generate underwater noise or vibration 3 km from the Project site. There is no potential for noise impacts to fish species from the Project.	No

There is no source for the Project (during construction or operations) to impact upon marine flora or fauna. The detailed assessment of treated process water impacting upon the water quality of the SA Water outfall channel and downstream marine environment is included in Chapter 9 (Physical Environment) assessment of Project impacts on terrestrial flora and fauna (including bird species) is included in Section 10.3.3, above. Therefore, the Project would not significantly change the composition, volume or quality of water to what currently enters the marine environment at Freshwater Creek from the SA Water outfall channel. Freshwater Creek habitat, nor any potentially associated fauna flora, would not be impacted by the Project.

Spread and or introduction of marine pests and pathogens

Project activities will not result in the introduction or spread of marine pest species or pathogens

As detailed in Section 10.4.2, several marine pest species are known to have established in the wider vicinity of Gulf St Vincent. POMS is currently contained within the Port River (PIRSA, undated b).

There is no source for the Project (during construction or operations) to result in the spread of existing marine pest species or pathogens, or the introduction of new marine pest species or pathogens, into the marine environment. The Project will return treated process water to the existing SA Water outfall channel, where it will eventually enter the marine environment at Freshwater Creek. The treated process water is not a source, nor would provide suitable conditions or habitat, for any marine pest or pathogen.

The detailed assessment of treated process water impacting upon the water quality of the SA Water outfall channel and downstream marine environment is included in Chapter 9 (Physical Environment).

Potential cumulative Impacts to the marine environment

There will be no cumulative impacts on the marine environment inclusive of conservation areas

Gulf St Vincent has experienced significant environmental degradation over the last 50 years as a result of wastewater and stormwater (EPA, 2009b). Following release of the report identifying the key risks to water quality in the Gulf St Vincent (EPA, 2009b). EPA released the Adelaide Coastal Water Quality Improvement Plan (ACWQIP) (EPA SA, 2013b) which sets out key water quality targets for improving the overall health of the ecosystem. The ACWQIP incorporates the water quality targets for the Adelaide Dolphin Sanctuary Management Plan (DEH, 2008), Winaityinaityi Pangkara – Adelaide International Bird Sanctuary Management Plan (DEW, 2020) and the Port Waterways Water Quality Improvement Plan (EPA SA, 2008).

Chapter 9 (Physical Environment) concludes the mixed channel water will not exceed the target parameters identified in the ACWQIP and for water quality not specified, it will be comparable to baseline SA Water outfall channel quality. The Project will not alter the quality of water within Gulf St Vincent due to use and return of existing Bolivar WWTP treated wastewater. Other potential impacts from the Project (e.g. dust deposition and noise) will not be greater than background levels at the coast (Chapter 11 Amenity and Environmental Quality).

10.4.4 Summary of Key Mitigation Measures

Potential impacts on marine species are secondary impacts. Mitigation measures are listed in the primary impact assessment chapters, of relevance are:

- Section 10.3.4 of Chapter 10 (Biological Environment)
- Chapter 9 (Physical Environment)
- Chapter 11 (Amenity and Environmental Quality)

10.4.5 Conclusion

There will be no impacts to the marine environment as a result of the Project. Treated process water will be returned to the SA Water outfall channel either at a quality comparable to existing water (Chapter 9 Physical Environment) or a quality that will not result in any impacts to marine water quality and will be monitored in accordance with a Discharge Criteria Management Plan (Appendix 18).

11 Amenity and Environmental Quality

This chapter provides a summary of the existing conditions and potential impact and risk for air quality (including odour), noise, transport and traffic, and visual amenity. It is based on the outcomes of the specialist assessments attached at Appendix 11 - 15. Assessment of the Project's contribution to greenhouse gas emissions is included in Chapter 14 (Climate Change and Resource Efficiency).

11.1 Setting the context

Each section provides information explaining the context within which impact assessment is undertaken. Each section includes:

- Key findings
- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- A description of the existing environment
- The impact assessment undertaken in accordance with the methodology outlined in Chapter 7 (Impact Assessment Methodology) for both Construction and Operations
- The key mitigation measures proposed to reduce or prevent environmental impacts
- A conclusion summarising the overall outcome of the impact assessment undertaken.

11.2 Air Quality

Air emissions which will be generated by the Project include particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO) and hydrogen sulfide (H_2S).

11.2.1 Key Findings

- Construction activities will not result in an increase in particulate matter above existing background levels in the area and will not impact the health or amenity of the community, vegetation growth or the marine environment.
- Modelling has been undertaken for operational air quality emissions (Appendix 11) and shows that emitted air pollutants will be below all human health limits prescribed in the *Environment Protection (Air Quality) Policy 2016* (Air EPP).
- Management of dust to prevent human health limits prescribed in the Air EPP will also adequately manage dust to prevent impacts to amenity, vegetation growth and the marine environment.
- Emission of H_2S during operations has been modelled and shown to be compliant with limits set in the Air EPP for odour.

11.2.2 EIS Assessment Requirements

The EIS Assessment Requirements for air quality are set out in Table 11-1.

Table 11-1: EIS Assessment Requirements – Amenity and Environmental Quality, Air Quality

Library Ref	Environmental Attribute	Assessment Requirements	Assessment level
Air Quality			
Objective: To ensure the development does not have unacceptable adverse air quality impacts on the surrounding receiving environment, in particular sensitive receivers in proximity to polluting development.			
AEQ1	Air Quality	Provide an air quality impact assessment prepared by an appropriately qualified specialist for all potential sources of dust / particles and gaseous pollutants associated with the construction and ongoing operation of the proposed development, to identify any known or potential human health and amenity effects of air emissions (including point source and diffuse sources) on the residential population and local businesses and describe how these would be mitigated, minimised, managed and monitored.	DETAILED
		The impact assessment must include modelling undertaken in accordance with the Environment Protection (Air Quality) Policy 2016 and the EPA's Ambient Air Quality Assessment 2016 guidance document. Techniques used to obtain the predictions should be referenced and key assumptions and data sets explained.	
		Impact assessment must outline the impacts of dust / particles and gaseous pollutants on existing food production / horticultural / agricultural activities, commercial operations and any other identified nearby sensitive receivers in the vicinity of the proposed development, including cumulative impacts.	

Table 11-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Impact of dust on vegetation	10 – Biological Environment
Impact of dust on food production / horticultural / agricultural activities	8 – Land Use and Site Conditions
Impact of odour on tourism commercial operations (eg. Go Kart facility and St Kilda playground).	8 – Land Use and Site Conditions

11.2.3 Requirements in Legislation

The *National Environmental Protection (Ambient Air Quality) Measure* (Ambient Air Quality NEPM) was introduced in 1998 and contains ambient air quality standards for six dominant pollutants across Australia: carbon monoxide, lead, nitrogen dioxide, particles, ozone and sulphur dioxide. The NEPM also provides a framework for monitoring and reporting on air quality.

The South Australian *Environment Protection (Air Quality) Policy 2016* (Air EPP) prepared under Section 28 of the *Environment Protection Act 1993* (EP Act) sets out the air quality standards adopted by EPA SA. The ground level concentration standards adopted in the air quality study are from Schedule 2 and 3 of the Air Quality EPP. The aim of the policy is to reduce the impact of smoke and other air pollutants on communities across the state.

Guidance on meeting requirements under the Air Quality EPP is provided in *Evaluation distances of effective air quality and noise management* (EPA SA, 2023a) and *Ambient air quality assessment* (EPA SA, 2016c) prepared by EPA SA. EPA SA 2023a provides recommended evaluation distance from polluting activities, within which potential adverse impacts on sensitive receivers need to be assessed. The guideline sets out that mineral works, including processing of ore, sands or earths, should be assessed on an individual basis and crushing, grinding or milling of rock or ore should have an air quality assessment if sensitive receivers exist within 500 m of the activity. EPA SA 2016 sets out the methodology for air quality modelling, assessment of impacts on receivers and considerations for setting up a monitoring network.

11.2.4 Views of Stakeholders

St Kilda Progress Association raised a concern regarding impacts of the Project on air quality in St Kilda, this is covered in Section 11.2.7. The Environment Protection Authority are responsible for regulation of air quality under the legislation and guidelines outlined above, which set out their views on air quality.

11.2.5 Assessment Method

The method of impact assessment has followed that set out in Chapter 7 (Impact Assessment Methodology). Air Quality Modelling (SLR, 2023, Appendix 11) was undertaken for the project and is attached in Appendix 11 (Air Quality Assessment). Dispersion modelling for air pollutants was performed using the CALPUFF dispersion model (widely used within Australia) with background climate data obtained from the Bureau of Meteorology (BoM) Automated Weather Stations (AWS) including Edinburgh, Parafield and Outer Harbour (5.5 to 10 km from the Project site). The model domain developed for the Project was 9 km by 9 km with a resolution of 100 m. Worst case assumption of continuous emissions (24/7 operations) was assumed.

For construction activities the Institute of Air Quality Management (IAQM)'s method "*Guideline on the Assessment of Dust from Demolition and Construction*" (IAQM, 2014) was used. The IAQM method involves a series of screening tools based on distance between activities and receptors, sensitivity of receptors and types of activity undertaken onsite. A full description of the air quality model methodology has been provided in Section 4 of Appendix 11 (Air Quality Assessment).

11.2.6 Description of the Existing Environment

The site is located within the rural horticulture zone and adjacent to Infrastructure, open space, deferred urban and strategic employment zones. The closest sensitive receptors (identified as R14, R15 and R16) are located approximately 120 m east of the project boundary shown in Figure 11-1.



Figure 11-1: Location of Air Quality sensitive receivers

Background climate data was obtained from the Edinburgh BoM AWS (approximately 5.5 km northeast of the Project). The prevailing wind directions in the area are south-westerly in the summer months, afternoons and evenings (all year) and north-easterly in the winter months, nights and mornings (all year). The closest sensitive receptors are immediately northeast of the Project (i.e. directly downwind during the prevailing south-westerly winds). Existing sources of dust in the area include earthworks occurring south of the project site, sludge management occurring to the west of the site, salt crystallisation occurring to the southwest of the site and exposed areas of rural allotments and unsealed roads surrounding the site.

Ambient air quality monitoring data has been taken from the Elizabeth Downs EPA monitoring station (approximately 12 km to the northeast of the Project location). Although North Haven monitoring station is closer to the Project site, it is also more exposed to coastal conditions and thus not considered as representative.

The background air quality data is considered generally good with only minor exceedances of the Air Quality EPP limits and standards. A summary of the background data used in the model is included in Table 11-3.

At its nearest point, the Project site is located approximately 100 metres from the SA Water Bolivar WWTP lagoons. These lagoons are a known source of odour in the area.

Table 11-3: Air quality data used for background concentrations from Elizabeth Downs EPA monitoring station

Pollutant	Background Concentration	Air EPP limits	Averaging Time	Statistic	Percentile Year
PM_{10}	22.5 µg/m^3	50 µg/m^3	24 hours	70th percentile	2019
$PM_{2.5}$	8.1 µg/m^3	25 µg/m^3	24 hours	70th Percentile	2017
	7.3 µg/m^3	8 µg/m^3	12 months	Annual average	2017
NO_2	8.2 µg/m^3	250 µg/m^3	1 hour	70th percentile	2019
	7.7 µg/m^3	60 µg/m^3	12 months	Annual average	2019
CO	25 µg/m^3	31,240 µg/m^3	1 hour	70th percentile	2003-2016
	22 µg/m^3	11,250 µg/m^3	8 hours	70th percentile	2016
H2S (odour)	n/a	0.15 µg/m^3	3 minutes	n/a	n/a
H2S (toxicitiy)	n/a	510 µg/m^3	3 minutes	n/a	n/a

11.2.7 Impact Assessment

Dust Impacts from construction activities

Air quality emissions during construction

Proposed construction activities at the Project site which may impact air quality include vegetation clearance, excavation and earthworks. In addition, heavy vehicles transporting material to, from and around the Project site may impact air quality. Dust generation can occur from these activities and during high wind events due to exposed soil. There is no source of odour emissions during construction.

Air quality receptors relevant to construction emissions

Potential sensitive receptors R14, R15, and R16 are the closest to the Project site and located directly downwind of the prevalent wind direction (Figure 11-1). Aerial imagery, site visits and consultation campaigns have verified structures are present and receptor 15 is uninhabited while receptors 13,14 and 16 are occupied. The air quality assessment has conservatively assumed each property to have a place of residence. In addition to these assumed places of residence, other sensitive receptors include the South Australian Gun Club, Southern Go Kart Club (both approximately 250 m south) and St Kilda Playground (approximately 3 km west of the Project site) as well as businesses including Steve White's Tipper Hire (630 m north), Mark Lee Fish Farm (land-based aquaculture, 850 m north east), and Big Chief Hire (1 km east). As these businesses are anticipated to be occupied up to 12 hours a day and the residential properties are closer and assumed to be occupied 24 hours a day, ensuring no significant impact to residents will also ensure no significant impact to businesses as a result of dust and particle emissions.

Dust has the potential to cover leaves and reduce the photosynthetic output of vegetation in the area. Remaining vegetation onsite and nearby is described in Chapter 10 (Biological Environment). Other vegetation receptors include the Adelaide Zoo feedlot north of the Project site and the market gardens identified in Chapter 8 (Land Use and Site Conditions). Other biological receptors include the marine environment (noting that the coast is located approximately 3 km west of the Project site).

Health impacts from construction dust emissions

Dust generation from construction activities is not expected to have an impact on public health.

The potential impacts of dust on human health are well known and limits for dust (PM_{10} and $PM_{2.5}$) are set in the Air Quality EPP. Compliance within these standards (refer Table 11-3) is considered to protect human health for all receptors and thus not result in an impact.

The potential for dust generation during construction activities is well understood, as are the mitigation measures implemented to reduce dust generation. Adjacent sites, including the SA Water earthworks occurring south, and sludge management activities occurring west of the Project site, currently represent the same risks and demonstrate industry standard controls are adequate to manage this risk in this environment.

Appendix 11 includes an assessment of construction dust against the IAQM methodology. This assessment concluded while the scale of earthworks and construction works was large and the receptor sensitivity was high, the overall risk was assessed as low due to low sensitivity from dust soiling and dust health effects. The sensitivity relates to the number of residences within 100 m of site and the existing background dust levels. Standard dust management and mitigation measures are considered appropriate. Construction activities are short term and temporary and will be staged to minimise the exposed area that can generate dust during high wind events. Dust management strategies will be developed as part of the CEMP and will include those highlighted in Table 11-4 and Appendix D of Appendix 11 (Air Quality Assessment).

While it is considered **Possible** that construction activities will increase the background levels of PM_{10} and $PM_{2.5}$ after implementation of mitigation measures, the levels will be below the Air EPP limits and thus only a **Minor** consequence is expected. The level of risk to human health from construction impacts is **Low**.

Amenity impacts from construction dust emissions

Dust generation from construction activities will not impact the amenity of the local area.

The components of dust which have the greatest impact on amenity include deposited dust (DD) and Total Suspended Particulates (TSP). The Air EPP does not prescribe specific limits for DD or TSP and regulation of air quality amenity is under the general environmental duty (section 25 of the *Environment Protection Act 1993*) which requires use of best available technology economically achievable (BATEA).

The assessment under IAQM methodology, described above, has indicated a low risk of dust as a result of construction activities. The management strategies that will be implemented to manage dust to prevent human health impacts will also manage dust to prevent amenity impacts. In order to prevent amenity impacts to the local area the BATEA principles will be implemented where possible as detailed in Table 11-4 and Appendix D of Appendix 11 (Air Quality Assessment) will be included in the CEMP.

It is considered **Possible** that construction activities will increase background levels of dust after implementation of mitigation measures. The increase in dust levels would only be noticeable at a local scale for a limited time period thus the consequence is considered **Minor** resulting in an overall **Low** risk to local amenity from dust.

Operation

Air emissions during operations include:

- Particulate matter emissions from the manufacturing process (milling plants and mill train exhausts), pneumatic product transport systems and truck haulage operations.
- NO_2 and CO emissions from natural gas burning (kiln, flash dryer, and steam boilers).
- H_2S emissions from the alkaline gas scrubber stacks.
- Air quality receptors for operational emissions

Sulfuric acid used in the process will remain in liquid form and no sulphuric acid mist is anticipated. The air quality receptors for particulate matter and other pollutants (NO_2, CO) during operations are considered the same as for construction. Additional receptors that may be impacted by odour include commercial operations in the area that may rely on tourism for revenue, including the Southern Go Kart Club and the South Australian Gun Club both 250 m south and St Kilda Adventure Playground, approximately 3 km west of the Project site.

Health impacts from operational air emissions

Manufacturing emissions (including particulate matter, NO2 and CO) during operations will not have an impact on community health.

The Air EPP sets out maximum criteria for PM_{10}, $PM_{2.5}$, NO_2 and CO which, if met, will not impact upon sensitive receptors. The modelled air quality impacts of the Project (Appendix 11) enabled assessment of the distance from the project where these limits will be met, when implementing the control strategies set out in Table 11-4.

The model used background climate data from the Edinburgh AWS (5.5 km from the Project site) and air quality monitoring data from the Elizabeth Downs monitoring station (12 km from the Project site). This data was collected over a number of years (between 5 and 17 years of data) and is considered

representative of the Project site and reflective of temporary changes in climate and air quality. The PM_{10}, $PM_{2.5}$, NO_2 and CO emissions are all generated from fuel combustion which is a well understood process and there is a high level of confidence the emissions from this process are representative. The modelled weather conditions are considered to reflect an appropriate worst-case scenario and align with the requirements and guidelines for air quality modelling under the Air Quality EPP and associated guidelines provided by the EPA SA.

The air quality model shows minimal increases in PM_{10}, $PM_{2.5}$, NO_2 and CO at all sensitive receptors (including residences, businesses, and private interest groups) under worst case meteorological conditions, compared with the background levels and all pollutants within the limits prescribed by the Air Quality EPP. While it is **Possible** increases in air pollutants could occur at sensitive receptors the consequence of such an increase is **Minor** resulting in an overall risk rating of **Low**.

Impacts from operational air emissions on infrastructure

Graphite portions of air emissions will be managed to prevent impacts on powerlines in the area.

Dust containing graphite will be generated from product loading and unloading, milling, grinding and bagging. Graphite dust can pose a specific issue for powerlines due to the electrical conductivity properties, whereby sufficient quantity of dust can create a circuit between powerlines and 'trip' the lines. The nearest powerline is the 66 kV line running along Robinson Road.

Graphite milling, grinding and bagging activities will include localised dust management systems such as bag filters to capture and reclaim the graphite fines. Additionally, these activities will take place within negative pressure environments and transfer of graphite products will be via pneumatic conveyancer systems. Dust from roads, disturbed areas and other sources will primarily consist of silica soil and particles and will not be conductive enough to impact on powerlines.

It is **Unlikely** sufficient graphite dust could build up outside the site to the point it creates electrical connections and short circuits infrastructure, if this occurred it would result in a **Minor** impact resulting in an overall risk rating of **Low**.

Amenity impacts from operational air emissions

Operational dust emissions will not impact the amenity of the local area.

As described for construction there is no set dust emission limit to protect amenity but refers to use of BATEA to minimise impacts as far as reasonably practicable. Graphite fines from the manufacturing process represents a saleable by-product from this process (refer to Chapter 14 (Climate Change and Resource Efficiency) and emissions from the facility will be controlled. Mitigation measures to reduce emissions include using negative pressure within buildings for milling processes with fines capture at the emission points. A draft air quality management plan has been provided (Appendix D of Appendix 11, Air Quality Assessment) and will be integrated into the CEMP and OEMP.

The air quality model shows management of dust results in minimal increases at sensitive receptors (TSP and DD are expected to follow the same trend as PM_{10} and $PM_{2.5}$). While it is **Possible** increases in TSP and DD at sensitive receptors could occur, the consequence of such an increase is **Minor** resulting in an overall risk rating of **Low**.

There will be no impacts from hydrogen sulfide gas on adjacent receptors.

The only potential source of odour onsite are the alkaline gas scrubbers which can emit H_2S. Air quality modelling has been undertaken for H_2S against worst case climatic conditions. The model showed worst case concentration at the nearest sensitive receptor (R16) of 0.00040 µg/m^3 for a 3-minute average incremental. The Air Quality EPP set a limit of 0.15 µg/m^3 to prevent odour impacts and a limit of 510 µg/m^3 to prevent toxicity impacts. The modelled concentrations are several orders of magnitude lower than the lowest limit in the Air Quality EPP. Background H_2S data was not available, however, the modelled increase in H_2S concentrations as a result of the project is minimal and thus the lack of background data is considered acceptable.

It is considered **Rare** that H_2S will increase sufficiently to generate a noticeable odour at the nearest receptors. Such an increase would be **Minor** resulting in an overall **Low** risk.

11.2.8 Summary of Key Mitigation Measures

A summary of key mitigation measures has been included below in Table 11-4.

Table 11-4: Air Quality Mitigation Measures

Mitigation Measures	Construction	Operation
Staged vegetation clearance and construction activities to minimise dust generation	✓	
Dust generating activities will be minimised during dry and windy conditions.	✓	
All disturbed areas will be stabilised as soon as practical to minimise wind blown dust.	✓	
All trucks containing soils or other loose material will be covered.	✓	✓
Dust management will be included as part of CEMP/OEMP.	✓	✓
Burner management systems installed on gas burners with automated trigger alarm / shutdown of equipment.		✓
Dust collectors installed on stacks and discharge points for negative pressure buildings.		✓
Negative pressure designs to be incorporated into mechanical shaping and bagging buildings to reduce airborne graphite fines from exiting the buildings (subject to detailed engineering design).		✓
Incorporation of dust collection into pneumatic conveying systems (as required and subject to detailed engineering design).		✓

11.2.9 Conclusion

Impacts of the proposed Project on air quality, for identified health, amenity and environmental sensitive receptors as described, are expected to be managed using standard industry mitigation measures within acceptable limits set out in the Air Quality EPP and Air Quality NEPM.

11.3 Noise

Key noise sources from the Project associated with construction primarily include heavy vehicle movements and equipment used for site works and infrastructure installation. Operational noise sources include haulage of product, the graphite milling process, kilns and the water treatment plant.

11.3.1 Key Findings

- Construction activities will occur between 7 am and 7 pm, Monday to Saturday. Activities outside of these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d) and EP Act to ensure no adverse impact on amenity.
- Operational noise levels excluding traffic noise have been modelled and shown to be below existing ambient levels.
- A Noise Assessment with associated modelling has been undertaken and is included in Appendix 12.

11.3.2 EIS Assessment Requirements

The EIS Assessment Requirements for noise are set out in Table 11-5.

Table 11-5: EIS Assessment Requirements – Amenity and Environmental Quality, Noise

Library Ref	Environmental Attribute	Objective	Assessment level
Noise			
Objective: To ensure the development does not have unacceptable adverse noise impacts on the surrounding receiving environment, in particular sensitive receivers in proximity to noise sources.			
AEQ2	Noise	Provide an impact assessment of noise associated with the construction and ongoing operation of the proposed development, prepared in accordance with the Environment Protection (Noise) Policy 2007 by a suitably experienced professional acoustic engineering consultant.	STANDARD
		Describe and design strategies to mitigate noise impacts and how environmental management objectives for noise would be achieved.	

Table 11-6: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Impact of noise on native fauna	Chapter 10 – Biological Environment

11.3.3 Requirements in Legislation

The *Environment Protection Act 1993* (EP Act) creates a general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm. This requirement includes noise. Further definition of the noise standards are detailed in the *Environment Protection (Commercial and Industrial Noise) Policy 2023* (Noise EPP).

As detailed in the *Guidelines for the Use of the Environment Protection (Commercial and Industrial Noise) Policy 2023* (EPA SA, 2023c) (Noise EPP Guidelines), noise is commonly defined as unwanted sound. Noise is measured on a weighted scale to approximate the human response or experience of noise known as the 'A' scale with units being 'A' weighted decibels (dB(A)). References in this chapter are to dB(A) unless noted otherwise.

Construction Noise

Noise requirements related to construction, demolition and related activities are outlined in EPA 425/23 Construction noise Information Sheet (EPA, 2023d) . This division does not set a maximum allowable noise criteria for construction during the hours of 7 am to 7 pm Monday to Saturday but focuses on ensuring all reasonable and practicable measures to reduce noise have been undertaken. Outside of these hours construction noise limits are 45 dB(A) for continuous noise with a maximum noise limit of 60 dB(A) unless background noise exceeds these limits. Baseline noise monitoring showed an average daytime ambient noise level of 57 dB(A) L_{eq} or more and a night time ambient noise level of 52 dB(A) L_{eq} or more. Based on this the background noise level of 57 dB(A) L_{eq} is considered an appropriate threshold for daytime construction between 7 am and 7 pm on Sundays. These provisions allow for the fact construction work is inherently noisy and often there is limited options for mitigation.

Operational Noise

Acceptable levels of noise for different land uses are set out in Part 1 section 5(9) of the Noise EPP. The level of noise acceptable is different for Day (7 am to 10 pm) and Night (10 pm to 7 am). Land uses are defined by the zoning in the Planning and Design Code. The surrounding land use to the Project site is zoned as Rural Horticulture and for the purposes of this assessment the rural industry noise criteria were applied. Noise that has qualities that increase the level of annoyance associated with them (including tonal, modulating, low frequency or impulsive characteristics) have additional penalties applied (i.e. 5 dB(A) less for a single characteristic, 8 dB(A) less for two characteristics or 10 dB(A) less for three characteristics). No noise characteristic penalties were considered in the noise modelling conducted for the Project. Review of noise sources onsite indicate truck movements are one of the key sources and hence character for this source was considered. As existing truck movements on Robinson Road currently contribute significantly to background noise, a character penalty for truck noise sources from within the subject site was not considered necessary or required.

In accordance with Part 5 of the Noise EPP, the predicted noise levels were compared with 5 dB(A) less than the relevant indicative noise factor.

11.3.4 Views of Stakeholders

Concerns regarding noise were raised from members of the St Kilda community. Specific concerns include:

- Concern that St Kilda is currently impacted by a number of noise sources including turbines and whether the proposed development would shield the noises or contribute to them.
- Impact of noise on the St Kilda residents

These concerns have been addressed in section 11.3.7, below. The Environment Protection Authority are responsible for regulation of noise under the legislation and guidelines outlined above, which set out their views.

11.3.5 Assessment Method

The method of impact assessment has followed that set out in Chapter 7 (Impact Assessment Methodology). Modelling of noise outputs from the Project was undertaken and is attached in Appendix 12 Environmental Noise Assessment (Resonate, 2023). Background noise monitoring was undertaken for two periods of 7 days each (21 – 28 November 2022 and 16 February – 3 March 2022). Noise emissions were calculated using the Conservation of Clean Air and Water in Europe (CONCAWE) model using meteorological category five for daytime and meteorological category six for night time in accordance with Noise EPP Guidelines. Operational noise was compared to the surrounding land use (rural industry) noise limits less 5 dB(A) in accordance with Part 5 of the Noise EPP (52 dB(A) for day and 45 dB(A) for night). The noise source measurements were based on measurements taken from similar projects and noise levels in Resonate's database. Mitigation measures that were considered in the noise modelling are commitments of the Project and are included in Table 11-9 below. A full description of the noise modelling methodology has been provided in section 6 of Appendix 12 Environmental Noise Assessment.

11.3.6 Description of the Existing Environment

Noise monitoring was conducted at 5 locations (existing site, Robinson Road and St Kilda Road), however, one monitor was not able to be recovered (stolen). Average noise levels are set out in Table 11-7. The land use is rural industry predominantly used for market gardens, Adelaide Zoo feedlot, and the Bolivar WWTP. Other surrounding land use that could contribute to background noise levels include the South Australian Gun Club, Southern Go Kart Club and a number of industrial activities including steel fabrication in the vicinity. Operational hours of the Gun Club include Saturdays and the Southern Go Kart Club is operational 7 days a week from 7am until 6:30 pm.

Potential sensitive receptors for noise include the residences, offices and sheds in the surrounding area and shown in Figure 11-2. The background noise monitors along Robinson Road recorded high maximum noise levels as a result of traffic (especially heavy vehicle traffic) along the road.

Table 11-7: Background Noise Levels

Location ID	Location Name	Background Noise - Day			Background Noise - Night		
		Average measured noise level dB(A) $L_{eq, 15\ min}$	Average measured noise level dB(A) $L_{90, 15\ min}$	Maximum noise level dB(A) L_{Fmax}	Average measured noise level dB(A) $L_{eq, 15\ min}$	Average measured noise level dB(A) $L_{90, 15\ min}$	Maximum noise level dB(A) L_{Fmax}
NL1	SEA Gas pump station	56.7	45.7	97.2	51.8	42.9	92.9
NL2	Adj. 79 Robinson Rd	57.4	41.4	97.7	52.1	39.3	96.6
NL3	Adelaide Zoo	61.4	37.8	98.7	55.8	36.9	88.3
NL4	Adj. 102 Robinson Rd	67.1	43.3	91.6	62.3	38.9	90.0
NL5	Adl, 87 Robinson Rd	Noise monitor was not recovered, noise data is unattainable					



Figure 11-2: Location of Noise sensitive receivers

The Waterloo Corner and Bolivar Corridor Strategic Growth Framework (Holmes Dyer, 2022) sets out a plan with the intention to rezone the area directly east of the site to 'Employment' sometime in the next 35 years to encourage more commercial development in this area. Potential changes in land use are likely to reduce the sensitivity of the receiving environment to noise impacts.

11.3.7 Impact Assessment

Impacts of construction noise

Construction noise is not expected to decrease the amenity of sensitive receptors

Construction activities include a number of noise sources such as light and heavy vehicle traffic accessing the site, excavators, dozers and static construction equipment such as generators. The location of sensitive receptors is detailed in Figure 11-2. The Noise EPP sets out acceptable levels of noise for overnight construction and minimum required noise mitigation measures to be employed, there are no day time noise limits provided the mitigation measures are followed.

Construction activities, including mitigation measures, are predicted to reach up to 68 dB(A) at receptor 14 between 7am to 7pm Monday to Saturday. Construction outside these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d) and EP Act to ensure no adverse impact on amenity. Construction will only occur for a short period (approximately 20 months) and all reasonable and practicable noise mitigation measures will be applied to reduce noise impacts.

It is considered **Possible** noise will be noticeably increased at sensitive receptors, with the mitigation measures implemented the increase will have a **Minor** consequence leading to an overall risk of **Low**.

Impacts of operational noise

Operational noise may have a minor impact at the nearest sensitive receptors (R14, R15 and R 16)

Background noise monitoring has indicated Robinson Road currently experiences high noise as a result of existing heavy vehicle movements. Background noise levels are 57.4 dB(A) $L_{eq\ 15min}$ during daytime with a maximum noise level of 97.7 dB(A) and average of 52.1 dB(A) $L_{eq\ 15min}$ overnight with a maximum of 96.6 dB(A) at the nearest baseline monitor to the Project. These noise levels are potentially due to vehicle movements on Robinson Road, some of which are likely to be heavy vehicles. Tonkin undertook traffic counts during November 2023 (Appendix 13B), and the traffic count data shows that the Annual Average Daily Traffic (AADT) (two-way) on Robinson Road is 124 vehicles per day, with a heavy vehicle content of approximately 9%. No heavy vehicle movement was recorded between 10 pm and 7 am during the 6 day period of this specific survey in November 2023. It is important to note that even though this survey has not recorded heavy vehicle movement at night time during this specific 6 day period, it is still possible that heavy vehicles use Robinson Road at night time.

Noise modelling has been undertaken in accordance with the Noise EPP and associated guidelines for a worst case scenario. The scenario modelled included all equipment turned on at the same time with worst case meteorological conditions, this situation is unlikely to occur especially during night time operations.

The modelling included the mitigation measures detailed in Table 11-9, and was run with and without truck movements. Night time trucks are required for efficient and flexible project operations.

When truck movements were not included, the model results show operational noise will meet all compliance criteria during Stage 1 of the Project, with one exceedance during Stage 2 of 2dB(A) at R16 for night time operations.

Monitoring and future design will ensure compliance criteria are met at Stage 2 of the Project.

When truck movements were included the model indicated an exceedance of the compliance criteria during Stage 1 and Stage 2 of up to 6 dB(A) at R14, R15 and R16 for night time operations. It should be noted that this would only occur twice for a 5 minute period per night per truck as the trucks access and exit the site. Renascor require night time trucking operations to ensure a continuity of supply of graphite concentrate from the mine. Logistic analysis has identified 1 truck per night would be required during stage 1, and 1 to 2 trucks per night during stage 2. Thus, the worst case scenario shown in the model with exceedance of up to 6 dB(A) would only occur up to 4 times per night (during stage 2) should all equipment be operating and worst case meteorological conditions occur.

This would be well within the current background level of noise along Robinson Road as measured through the baseline studies. Given the receiver is exposed to noise from a major road (similar noise levels and with a higher frequency of vehicle movements), the EPA's Guidelines for the use of the Noise EPP infer that no action is required under the Noise EPP as the existing noise on Robinson Road as measured through baseline studies has similar (or higher) noise levels. The compliance criteria exceedance related to truck movements is still 1 dB(A) below the ambient noise levels and would not have any additional impact on the existing residents on Robinson Road.

An iterative modelling approach was undertaken to identify which mitigation measures have the largest impact on resulting noise levels. All reasonable and practicable measures have been undertaken to reduce noise levels onsite. The noise model indicates that with the proposed mitigation measures implemented the noise model is most sensitive to night time heavy vehicle movement onsite. It is noted that heavy vehicle movement along Robinson Road is not subject to restrictions and existing noise levels are high due to heavy vehicle movement along this road (including at night time).

Mitigation measures to reduce noise from heavy vehicles were explored for the Project and are discussed in Table 11-8.

Table 11-8: Considered mitigation measures for traffic noise

Mitigation Measure	Discussion
Use of smaller/ quieter trucks	While smaller trucks could reduce maximum predicted noise levels to some extent, a greater number of trucks would be required, resulting in an increase in the number of noise 'events' during the night time
Noise barriers along the eastern site boundary (Robinson Road)	Noise barriers were found to provide a negligible reduction in noise emissions for the following reasons: • The heavy vehicle access requires a relatively large opening, which would significantly diminish the acoustic effectiveness of noise barriers. • The highest predicted noise levels at sensitive locations are caused by trucks within the part of the site near the access crossover. Potential noise barriers would only mitigate truck noise emissions from truck path further from receivers and/or already shielded by other structures, were predicted noise emissions are already relatively low at receiver locations. • Other (fixed plant) noise sources have had all reasonable noise mitigations applied at the source, and barriers of a reasonable height have been determined not to provide material additional benefit

Mitigation Measure	Discussion
Noise barriers at the gate	The use of solid sliding access gate(s) was found to be not reasonable or practicable for the following reasons: • Trucks would need to idle or stop/start while waiting for the gates to open, which could increase noise at receivers compared to a situation with no gate or a fast-opening boom gate. • The gate itself may introduce an additional noise source (motor and rollers). • When the gate is open it would cease to act as a noise barrier for the truck entering.
Site access point relocation: • near the southern point of the site, and/or; • alternative access arrangement via SA Water land, with trucks entering and exiting the site from the western side	Relocating the site access point can likely reduce noise emissions from trucks within the site. In both relocated access scenarios however, trucks would need to travel further south along Robinson Road and directly past R16. Noise emissions from trucks within the site are expected to be lower than noise emissions from the same trucks travelling at higher speeds and closer to receivers on Robinson Road. Therefore, the highest noise levels at noise sensitive receiver locations, due to trucks travelling along Robinson Road, would be the same or worse under this scenario, notwithstanding the fact that this noise is excluded from the Noise EPP.
Mitigation at the receiver such as: • Fencing • Facade treatments ○ Replacement of existing glazing with acoustic glazing ○ Installation of secondary acoustic glazing ○ Installation or replacement of window and door seal ○ Replacement of external doors ○ Installation of alternative (mechanical) ventilation to allow for adequate indoor air quality with windows closed, where required	Acoustic effectiveness of fencing can be significantly limited where openings for access are required, as is the case for the Project. Facade treatments can significantly reduce internal noise levels and provide a comfortable acoustic environment. Renascor has undertaken noise consultation with closest landowners and will continue to remain open to discussions relating to noise mitigations, should the landowners contact Renascor in the future.

Once the BAM facility has been constructed, noise monitoring will be undertaken to gather site specific data on the operation of all equipment and mitigation measures. This monitoring will be used to inform Stage 2 design and continuous improvement opportunities.

Renascor has undertaken noise consultation with closest landowners and will continue to remain open to discussions relating to noise mitigations, should the landowners contact Renascor in the future.

The consequence of noise exceeding the Noise EPP limits at nearest receptors (noting the similar level to background levels) is **Minor**. The likelihood of the scenario described above is **Possible** resulting in an overall risk of **Low.** Impacts at St Kilda are not expected to be above background levels (Appendix 12).

11.3.8 Summary of Key Mitigation Measures

A summary of key mitigation measures has been included below in Table 11-9.

Table 11-9: Noise mitigation measures

Mitigation Measure	Construction	Operation
Construction activities primarily 7 am to 7 pm, Monday to Saturday. Activities outside of these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d)	✓	
For construction, where reasonable and practicable, particularly noisy activities will not commence before 9 am (further details to be provided in the CEMP)	✓	
Adopt standard construction noise mitigation measures as required by the Noise EPP	✓	
Compressors and generators will be fully enclosed.	✓	✓
Equipment will be shut or throttled down when not in use.	✓	
Noise reduction devices (e.g. mufflers) will be fitted and operating effectively.	✓	✓
Equipment will be maintained to reduce noise.	✓	✓
Micronising & Spheronising Mill buildings will be covered in metal cladding with fibre cement sheet (or equivalent) to walls and roof. Roller doors and other external doors to be shut except to allow for timely ingress and egress of staff and vehicles. Silencers will be installed on all stacks from these buildings.		✓
Kiln building will be enclosed with profile metal cladding with fibre cement sheet or similar. Silencer will be installed on kiln exhausts.		✓
Purification plant will be enclosed with metal cladding with fibre cement sheet directly flush to the metal cladding on the internal side or similar.		✓
Workshop and warehouse building will have profile metal cladding to external walls and roof with the roller doors closed at all times unless allowing for the timely ingress and egress of staff and vehicles.		✓
Treatment Plants (process water treatment plant and demineralisation plant) will have equipment selection and detailed design to limit contribution to L_{eq} 35 dB(A) or less at nearest receptors.		✓
Broadband reversing alarms will be used.	✓	✓
Forklifts will be gas or electric.	✓	✓

11.3.9 Conclusion

Noise impacts during construction can be adequately managed to prevent impacts to sensitive receptors, both human and fauna. Minor impacts from operational noise may occur at receptors R14, 15 and 16 during night operations and are expected to be below existing ambient noise levels.

11.4 Transport and traffic

The proposed Project will generate a number of different traffic movements including delivery of supplies and building materials to the Project site (during construction), haulage of concentrate via roads from the Siviour Graphite Mine to the BAM facility, supplies and consumables delivered to site during operations, transporting the product from the BAM facility to the port for shipping, and transport of workers to and from the site daily. No impact is expected on rail, aviation or maritime transport activities as detailed in the Development Application.

11.4.1 Key Findings

- Potential public safety impacts from increased heavy vehicle traffic has been managed to as low as reasonably practicable (ALARP) levels and are consistent with existing risks
- Risk to traffic flow and delays is considered low.
- The vast majority of the haulage route between Siviour and Bolivar is on state maintained highways which are major South Australian haulage routes
- Risk of deterioration of the condition of the public roads is considered minor in a worst case scenario and noted that some roads (eg. Robinson Road) will be upgraded prior to the Project commencing to improve the road condition
- A Traffic Impact Assessment and Heavy Vehicle Route Assessment has been undertaken for the Project and has been included in Appendices 13 and 14 respectively.

11.4.2 EIS Assessment Requirements

The EIS Assessment Requirements for traffic are set out in Table 11-10.

Table 11-10: Amenity and Environmental Quality, Transport and Traffic

Library Ref	Environmental Attribute	Objective	Assessment level
Transport and Traffic			
Objective: To ensure impacts to the safety and efficiency of transport modes and the broader transport and traffic system and infrastructure are avoided or mitigated.			
AEQ3	Transport and Traffic	A Transport and Access Impact Assessment should be prepared by a suitably qualified traffic engineer, evaluating current and proposed traffic generation and access arrangements including the effect on the network (including arterial roads) and car parking and vehicle interface with the local road network. The assessment must address: - Implications for the entire supply chain. - Implications for road safety, particularly with respect to existing road users in the locality. - Impacts over the construction, operation, maintenance and decommissioning phases. - Any upgrades or modifications to transport infrastructure required to support the development or mitigate its impacts.	STANDARD
		The assessment should determine the transport system asset improvements, asset management / maintenance requirements, and operational management	

Library Ref	Environmental Attribute	Objective	Assessment level
		requirements to accommodate the increase in movements and / or vehicle sizes / mass for affected transport assets and services across all modes for the proposal's construction / implementation and operational phases.	

Table 11-11: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Transport of dangerous goods	Chapter 15 – Hazard and Risks
Management and maintenance of traffic assets	Out of scope

11.4.3 Requirements in Legislation

The key legislation and standards applying to traffic and transport in the area of the Project include:

- Heavy Vehicle National Law (SA) Act 2013 (HVNL)
- DIT Route Assessment Guidelines
- Dangerous Substances Act 1979
- Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code)
- AUSTROADS Guide to Road Design
- AUSTROADS Guide to Traffic Management
- Highway Capacity Manual Volume 2 (HCM)

The HVNL applies to all heavy vehicles over 4.5 tonnes. The HVNL is supported by state specific regulations and covers vehicle standards, mass, dimensions and loadings, fatigue management, the Intelligent Access Program, heavy vehicle accreditation and on-road enforcement. The HVNL prescribes mandatory standards for heavy vehicles using public roads.

The *Dangerous Substances Act 1979* and associated regulations and transport code set out operational and technical requirements in the management of dangerous goods transportation, including a licencing scheme for transport carriers. Transport of some of the consumables used in the PSG process will fall under this legislation, including sulphuric acid and sodium hydroxide.

11.4.4 Views of Stakeholders

No community stakeholder feedback has been received specifically related to traffic. Reviewing other projects in the area (including the Northern Expressway project) stakeholder concerns relating to traffic included traffic noise, impact on public transport and the efficiency of freight transport. It is assumed this would be representative of stakeholder views and values.

11.4.5 Assessment Method

The method of assessment has followed that set out in Chapter 7 Impact Assessment Methodology. Tonkin Consulting have undertaken a Traffic Impact Assessment (Appendix 13) and a Heavy Vehicle

Route Assessment (Appendix 14). The Heavy Vehicle Route Assessment considered the geometry of turning circles and noted what roads are currently gazetted for use. Where inspections have noted concerns with the condition of pavement (eg. Robinson Road) these have been noted in the report.

It is noted there is a separate third party project being undertaken to upgrade Robinson Road to allow for heavy vehicle traffic. This is part of a separate third party process. The following impact assessment has assumed upgrades are complete prior to project commencement.

11.4.6 Description of the Existing Environment

The Project site is located on Robinson Road, a local street with two way traffic and approximately 1,200 vehicles per day in the northern section. Waterloo Corner Road is a sub-arterial road connecting Robinson Road to the North-South Motorway. It currently transports 3,000 vehicles a day in the western areas. Neither Robinson Road nor this section of Waterloo Corner Road connecting Robinson Road to North-South Motorway is gazetted for road trains. The North-South Motorway is a DIT controlled road that experiences approximately 50,000 vehicles along areas near the Project site and is gazetted for all road trains with the exception of 53.5 m trucks. Figure 11-3 shows the proposed access route to the site and predicted increase in vehicle movements per day.

Traffic users in the local area currently include light vehicle traffic commuting to work or local attractions (Go Kart facility, Southern Gun Club) as well as heavy vehicle traffic associated with the market gardens and other industry operations (salt farming, Bolivar WWTP). There is no existing public transport system servicing the area around the Project site nor are there bike paths or other signs of frequent use by pedestrian or bike traffic.

SA Water are making plans to upgrade Robinson Road to support B double truck movements required for their ongoing operations. Renascor understand the SA Water plan to upgrade the road commencing within the first half on 2024 and have agreements in place regarding the first 200 m of road to be upgraded suitable to support AB Triple trucks. As this work will be undertaken by a third party it is not within the scope of this assessment or approval but is provided for context.



Figure 11-3: Proposed access route to site and worst case predicted increase in traffic volumes during operations stage 2

11.4.7 Impact Assessment

Construction Traffic Levels

The predicted increase in construction traffic as a result of the proposed development is summarised in Table 11-12. This traffic will be a mix of light and heavy vehicles transporting workers, construction materials and machinery to site. It is noted construction activities will only occur for a short period of time.

Table 11-12: Predicted increase in traffic during construction

Road link	Existing Traffic Volumes per day	Construction Total Daily % Volume Increase	Construction - Daily increase number of vehicles
Robinson Road (North)	1213	0.07	2
Waterloo Corner Road (West Section)	2700	2.88	78
North-South Motorway (North Slip Lane)	750	2.13	16
North-South Motorway (South Slip Lanes)	3400-3700	0.59	42
Waterloo Corner Road (between Motorway and Port Wakefield Road)	6300	0.19	62
Waterloo Corner Road (east of Port Wakefield Road)	9600	0.06	6
Port Wakefield Road (North)	13400	0.02	2
Port Wakefield Road (South)	15800	0.03	4
North-South Motorway (Northbound)	25200	0.14	37
North-South Motorway (Southbound)	25200	0.08	21

Operations Traffic Levels

The increase in traffic levels for operations were calculated for both stage 1 and 2 with stage 2 representing worst case (Table 11-13). The Traffic Impact Assessment (Appendix 13 A) modelled stage 1 construction, stage 1 operations and stage 2 construction, and stage 2 operations. The combination of stage 1 operations and stage 2 construction has a higher number of light vehicles (250 per day) than stage 2 operations, however the heavy vehicle traffic was about half the volume of stage 2 operations. Due to the number of heavy vehicles, stage 2 operations has been presented here as the worst case scenario. Road and facility maintenance is considered as part of business as usual during operations and has been factored into the traffic levels.

Table 11-13: Predicted increase in traffic during Stage 2 operations (worst case)

Road link	Existing Traffic Volumes per day	Operations – Stage 2 Total Daily % Volume Increase	Operations - Daily increase number of vehicles
Robinson Road (North)	1213	0.65	8
Waterloo Corner Road (West Section)	2700	8.51	230
North-South Motorway (North Slip Lane)	750	3.07	24
North-South Motorway (South Slip Lanes)	3400-3700	3.83	136
Waterloo Corner Road (between Motorway and Port Wakefield Road)	6300	3.65	230
Waterloo Corner Road (east of Port Wakefield Road)	9600	0.38	36
Port Wakefield Road (North)	13400	0.29	30
Port Wakefield Road (South)	15800	0.18	30
North-South Motorway (Northbound)	25200	0.36	92
North-South Motorway (Southbound)	25200	0.27	68

Decommissioning Traffic Levels

Traffic levels during decommissioning have not been predicted at this stage, as decommissioning is considered to be in excess of 40 years' time – with potential to be much longer into the future depending on graphite feedstock availability over the coming decades. Decommissioning will involve many of the same or similar activities to construction and will also be for a defined, short period. Thus impacts from decommissioning are expected to be similar to construction.

Impacts to road safety

The risk of interaction between pedestrians, light and heavy vehicles during all stages of the Project has been reduced to as low as reasonably practicable.

The increase in traffic volumes will result in an increased potential for interactions between pedestrians, light vehicles and heavy vehicles. The Heavy Vehicle Route Assessment (Appendix 14) has considered the safe turning of heavy vehicles along the proposed route and recommended a number of upgrades to intersections (included in the mitigation measures detailed in Table 11-14). The current traffic in this area has a large volume of industrial traffic associated with horticultural operations, salt production and major transport routes (Port Wakefield Road and North-South Motorway). The increase in traffic at its greatest point (stage 2 operations) is less than 10% above background at the west section of Waterloo Corner Road, with most other traffic increases less than 4% above background. While Robinson Road is not gazetted as a heavy vehicle route, traffic counts undertaken (Appendix 13B) have indicated a small percentage of Class 10 and 11 vehicles currently access the road.

Updated traffic assessment (Appendix 13B) has assessed the base and future cases at the Waterloo Corner Road / Robinson Road intersection and concluded the road geometry is sufficing to support all vehicle combinations expected to support RNU operations.

In addition, a Heavy Vehicle Route Assessment (Appendix 14) was undertaken for Port Wakefield road including the intersection with Waterloo Corner Road. Along this route only one high risk was noted with two low risks. The high risk was associated with the signal clearance time for traffic turning right off Port Wakefield Road onto Waterloo Corner requiring modification to allow right hand turn for heavy vehicles. Renascor understands the Department for Infrastructure and Transport has already implemented this modification.

The consequence of a collision between a heavy vehicle and pedestrian or light vehicle cannot be lowered from **catastrophic** however the likelihood of this occurring, considering mitigation measures, is **Rare** with an overall risk of **High**. Due to the consequence of this risk it is unable to be lowered further however the mitigation measures are considered to reduce the likelihood to ALARP and is considered to be consistent with the existing risks in the area.

Increase in traffic volumes will not disrupt the existing transport network.

Increased traffic volumes due to construction and operations could increase wait times at intersections or otherwise disrupt the flow of traffic in the area. Tonkin Consulting undertook a traffic impact assessment (Appendix 13 A) which considered the worst case scenario for traffic volumes (all workers arriving by vehicle during peak hour traffic). Construction will likely involve deliveries of over dimension loads, transport of these loads is subject to the National Heavy Vehicle Law and associated state law and regulations. Assessment of impacts from over dimension loads, including increased wait times, will be assessed under this legislation and permit requirements.

The largest increase in traffic volumes is at Waterloo Corner Road (west section) which only increases by 8.51% of background during stage 2 operations with most intersections under 1% above background. Analysis of the wait time at intersections was conducted using the SIDRA Intersection 9.1 methodology for Robinson Road/Waterloo Corner Road and Waterloo Corner Road/North-South Motorway. The increase in wait times determined during peak periods. For both intersections the increased wait time was less than 5 seconds and is not considered to impact the transport network.

It is considered **Almost Certain** traffic volumes will increase as a result of construction work, however, with the mitigation measures implemented the increase will have a **Negligible** consequence leading to an overall risk of **Low**.

Increased traffic from construction and operation may result in minor deterioration of road pavements. Due to Project requirements some road pavements will be upgraded and thus improved as a result of the Project.

The Project will result in increased heavy vehicle traffic as a result of construction and operation with the potential to deteriorate road pavements on public roads. However, in order to ensure the access road to site is suitable for the Project requirements, Renascor are working with SA Water and the City of Salisbury to upgrade Robinson Road to allow for heavy vehicle traffic and reduce ponding of water on the pavement. The further from site, the less intense the increase in traffic will be (as not all traffic will follow the same route to and from site) and thus any potential impacts on road pavements will be less. Heavy vehicle traffic associated with the Project will access the North-South Motorway at the closest access point which is designed as a heavy vehicle thoroughfare and unlikely to be impacted by the 0.14% increase from background traffic (northbound).

It is **Likely** there will be an increase in traffic on roads not designed for high numbers of heavy vehicle traffic (e.g. Waterloo Corner Road) with the consequence of this expected to be **Minor** resulting in an overall risk of **Medium**. This is considered to be the worst-case scenario impact There are also areas where there will be a positive impact in the road pavement conditions (particularly Robinson Road) as a result of road pavement upgrades.

11.4.8 Summary of Key Mitigation Measures

A summary of key mitigation measures has been included below in Table 11-14.

Table 11-14: Transport and Traffic Mitigation Measures

Mitigation Measure	Construction	Operation
Upgrade of road pavement along Robinson Road and intersection of Robinson Road with Waterloo Corner Road to support Heavy Vehicle Traffic (outside scope of this EIS)	✓	✓
Following rules, procedures and guidelines for traffic, heavy vehicle traffic and transport of dangerous goods.	✓	✓
Community engagement regarding the Project and potential impacts to traffic	✓	✓
Upgrades to Robinson Road to facilitate two way heavy vehicles traffic (outside of the scope of this EIS).	✓	✓
Intersections have been assessed for line of sight distances for heavy vehicles (Heavy Vehicle Route Assessment – Appendix 14).	✓	✓

11.4.9 Conclusion

All potential impacts from increased traffic have been assessed to be managed to ALARP levels. In some cases there is likely to be improvements (e.g. upgrades to road pavement along Robinson Road) as a result of the project.

11.5 Visual Amenity

Development of new infrastructure and industry will have different impacts depending on the scale and distance from receptors. Close receptors may be impacted by the amount of disturbance at ground level while more distant receptors may find tall structures to be more visually prominent.

11.5.1 Key Findings

- Visual Points were identified with baseline photographs taken, and visual renders of the Project completed including proposed screening measures.
- Residents of Robinson Road and St Kilda Road will experience altered visual character mitigated by vegetation screening.
- Project elements will not detract from the visual character of the landscape from main roads.
- Minor visual impacts will be noticeable from tourism locations within St Kilda.

11.5.2 EIS Assessment Requirements

The EIS Assessment Requirements for visual amenity are set out in Table 11-15.

Table 11-15: EIS Assessment Requirements – Amenity and Environmental Quality, Visual Amenity

Library Ref	Environmental Attribute	Objective	Assessment level
Visual Amenity			
Objective: To ensure adverse effects on visual amenity, landscape and open space values are avoided or minimised and opportunities to enhance these values are maximised.			
AEQ4	Visual Amenity	Provide a description of the landscape character, features and values of the development area and its environs.	DETAILED
		Describe the effects of the development on visual amenity and landscape quality for residents and visitors for both near and distant views, from important viewing points. This should include construction, operations and closure/rehabilitation aspects of the proposal and address light spill from the development.	
		Provide a visual analysis of the development from key viewpoints, including photomontages or perspectives showing the proposed and likely future development.	
		Describe the rationale for the major design elements of the proposed development and measures to mitigate their visual impact.	
		Describe how the design and construction of all buildings and structures will be controlled to ensure cohesive visual amenity, including details of construction materials, colours and landscaping for all buildings and structures.	
		Describe the use of screening / amenity / landscape plantings and potential broad scale revegetation, including the opportunities for the use of locally endemic species.	

Table 11-16: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Impacts of light spill on Edinburgh RAAF base	8 – Land Use and Site Conditions
Impacts of shadowing on adjacent horticultural land.	8 – Land Use and Site Conditions
Impacts of visual amenity on known future land use changes.	8 – Land Use and Site Conditions
Construction materials, colours and landscaping	16 – Design Quality

11.5.3 Requirements in Legislation

As there is no specific South Australian legislation or guidelines which regulate the assessment of impacts to visual amenity, general guidance for assessment and management of visual impacts of infrastructure is provided through the State's statutory planning framework.

The Planning and Design Code provides for the design and siting of structures to reduce aesthetic impacts to rural vistas, minimise impacts on the natural environment, avoid obscuring existing public views to landscape and minimise impacts from key public vantage points and scenic routes. The planning assessment (including visual impact of the Project) against the Code is provided in Chapter 5 Planning Assessment.

The Visual Impact Assessment was also designed to align with 'best practice' by utilising the following documents:

- Guidance Note for Landscape and Visual Assessment (2018), Australian Institute of Landscape Architects
- Western Australia Environmental Assessment Guideline for Environmental factors and objectives (EPA WA 2018)
- Western Australian Planning Commission (2007) Visual Landscape Planning in Western Australia – A manual for evaluation, assessment, siting and design,
- Swanwick, C (2013), Guidelines for Landscape and Visual Impact Assessment, 3rd ed. United Kingdom: Landscape Institute and Institute of Environmental Management and Assessment
- Lothian, A (2000), Landscape Quality Assessment of South Australia. PhD Thesis Adelaide University.

11.5.4 Views of Stakeholders

No community stakeholder feedback has been received specifically related to visual amenity. It is our understanding that the City of Salisbury are interested in ensuring visual impact of development from the Northern Connector highway is considered through appropriate design and mitigation.

11.5.5 Assessment Method

Assessment for visual impacts of the Project involved the following steps in line with the methodology set out in *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects, 2018):

- Identify background visual landscape character, including views of potential sensitive receptors
- Identify Project components with the potential to impact on the visual amenity.

- Identify sensitive receptors with potential impacts (considering residences, tourist destinations, and major roads)
- Identify visual mitigation measures to reduce impacts (including lighting design and cladding materials)
- Evaluate the significance of the visual change taking into consideration:
    - Visual Landscape Character
    - Change from existing landscape
    - Visual prominence of project
    - Visual factors that draw attention (e.g. lighting, reflective surfaces, ability of cladding to blend with surroundings); and
    - Potential future land use changes and impacts.

11.5.6 Description of the Existing Environment

Visual Landscape Character

The City of Salisbury Landscape Plan (City of Salisbury, 2007) identifies the Project as being within the Coastal Plain Landscape Character Zone. This zone covers the western area of Salisbury incorporating the St Kilda mangroves and the Torrens Island samphire flats. Much of the original landform has been altered for urban development.

The Project is located on a flat plain and surrounded by predominantly horticultural and industrial activities. Due to the topography, existing industrial land uses (including the SA Water's WWTP, Torren's Island Power Station, powerlines and towers and grain silos) are highly visible from most points within the landscape (see Figure 11-4 and Figure 11-5). The rural character is formed from these simple horizontal views with industrial land uses visible in the background. Vegetation is a mix of native trees and low shrubs, grazing land and market gardens. Colours are muted browns, greens and greys with bright colours (such as the white silos in Figure 11-5 standing out).

At a local scale the landscape is broken up by closer industrial buildings from both industrial and horticultural activities (see Figure 11-6). In addition, the widespread problem of illegal dumping creates pockets that detract from the visual amenity of the area (see Figure 11-7).



Figure 11-4: Photograph showing visual landscape character (taken from the southeastern point of site showing Torrens Island Power Station in background)



Figure 11-5: Photograph of Visual Landscape Character taken from St Kilda Road (north east of site showing grain silos at St Kilda)



Figure 11-6: Photograph of Visual Landscape Character taken on the eastern boundary of the Project site (looking north along Robinson Road)



Figure 11-7: Illegal dumping detracting from visual landscape, end of Undo Road west of North-South Motorway

Sensitive receptors

The tallest component of the Project is the kiln building at approximately 25 m above ground level. Sensitive receptors have been selected both adjacent to the site, where visual impacts will be dependent upon immediate barriers such as degree of vegetation screening, and those at a distance showing the impact on the overall landscape. The visual impact on these further receptors will be unable to be screened by vegetation and is more dependent upon the design of the plant such as the cladding of the buildings as to how it stands out or blends with the landscape.



Figure 11-8: Location of photomontage points for visual impact assessment

Residents

There are a number of residents directly east and north of the site along Robinson Road and St Kilda road. Representative locations (Figure 11-8) were chosen to undertake photomontages to demonstrate the anticipated impact from project locations (Appendix 15). It has been assumed that all residences are occupied as a worst case scenario. These residences will be impacted both by the visual appearance of the Project and potential light spill however the immediate visual screening around the site and other barriers (e.g. fencing, industrial warehouses and greenhouses) in the immediate vicinity are likely to screen the proposed Project.

Due to the flat landscape it is possible the Project may be seen from residences further from the site. The nearest urban areas with potential to view the site include St Kilda (west of the Project) and Burton (east and south east of the Project). These residences are represented by visual points V10, V11 and V12 (Figure 11-8).

Tourism locations

The area directly west of the project contains several tourism locations including:

- The Tramway Museum (visual point V9)
- St Kilda Playground (visual point V11)
- St Kilda Marina (visual point V10)
- St Kilda Mangrove Boardwalk (visual point V10).

Due to the type of attractions, and opening hours it is assumed visual impacts only occur during daylight hours and thus there is no potential impacts of light spill.

Major Roads

Major Roads in proximity to the Project include the recently constructed / upgraded North-South Motorway, Port Wakefield Road (part of A1 highway route) and St Kilda Road. Details on the approximate traffic volumes for these roads are described in Section 11.4.6. Visual Points V8, V9 and V12 are considered to represent the visual impact of the Project from these sites. It's noted that road users will be travelling between 50 km/h (Robinson Road) and 110 km/h (North South Motorway) depending on the road and thus are only exposed to the potential visual impacts for a short period of time.

Airport

The Project site is located within the Controlled Lighting Installation Area for Edinburgh airport. This area represents locations where uncontrolled light spill from developments could cause distraction to pilots. The airport is considered a sensitive receptor for light spill only.

Future Land use Change

Currently the Project is predominantly within land zoned Rural, with the proposed pipeline being within the adjoining land zoned Infrastructure. The Waterloo Corner and Bolivar Corridor Strategic Growth Framework (Holmes Dyer, 2022) sets out a plan with the intention to rezone the area directly East of the site to 'Employment' sometime in the next 35 years to encourage more commercial development in this area. Under this plan the area to the North-East of the site is suggested to be retained for Rural Horticulture. It is not predicted this would introduce more sensitive land users into the area. The land use changes are likely to support similar projects moving into the area to create a

hub for employment in the green energy space in accordance with the Eco-Industrial Precinct proposed in the Strategic Growth Framework.

11.5.7 Impact Assessment

Potential impacts of light spill on the Edinburgh RAAF base and potential impacts of visual amenity on any known land use changes have been assessed in Chapter 8 Land Use and Site Conditions. To facilitate the below assessment of visual impacts from the project. Visual renders of the project were created based on the site layout for stages 1 and 2. These renders are included for representative viewpoints shown in Figure 11-8.

Visual impacts to adjacent landowners

Residents of Robinson Road, east of the site will experience altered visual character

Adjacent residents are located within 100 m to the east of the Project boundary. The existing visual character for these residents is shown in visual points V4 (Figure 11-9). Views contain a number of man-made features including transmission lines, culverts and high chain link fences. This view is dominated by trees in the foreground and do not offer long distance views.

Clearance of vegetation along the eastern boundary is required for management of stormwater and overland flows and will incorporate elements of water sensitive urban design such as green buffers. Juvenile trees will be planted to screen the site (Figure 11-10) which depicts the worst case. Project buildings have been set back from the road by 75 m, due to building size and site layout there are no alternative locations for these buildings. Section 2.4.2 details why this site was selected to minimise environmental impacts from the project. Consultation is ongoing with residents along Robinson Road regarding potential impacts from the project. Renascor will endeavour to retain existing vegetation along the Project site's eastern boundary as much as reasonably practicable. Juvenile trees will be planted along the eastern boundary of the site, hence the impact shown in Figure 11-10 is the worst case scenario and will decrease with time as the trees mature. A Landscape plan will be developed in accordance with the City of Salisbury Landscape Plan (City of Salisbury, 2007).

The three receptors along Robinson Road (R14, R15 and R16) will receive the greatest visual impact (represented by viewpoint V4 (Figure 11-10)). These receptors will experience a **Moderate** change in landscape which is **Almost certain** leading to an overall risk of **High** which would persist until the juvenile screening trees have matured sufficiently to screen the operations.

Residents of Robinson Road and St Kilda Road, north of the site, will experience minor alterations in visual character mitigated by vegetation screening.

Residents to the north of the Project, along Robinson Road and St Kilda Road may be able to see elements of the built form. Renders of the Project from representative viewpoints V6 and V8 (Figure 11-12 and Figure 11-14, respectively) show the top of the plant is visible above immediately adjacent vegetation which screens lower parts of the facility.

Lights for night operations will comply with relevant standards and existing tree screening will mitigate the effect of light spill. Mitigation measures include directing lighting towards where required and away from sensitive receptors, visual screening in place between manufacturing facility and sensitive receivers, avoiding reflective surfaces, using muted colours in material selection to visually blend the plant with the surrounding landscape as well as maintaining vegetation screens along roadsides. Final

lighting design is the subject of further engineering design and will be provided in subsequent approvals (e.g. building rules consent) which will assess the lighting design against Australian Standards. Should vegetation clearance limit the effectiveness of screening, amenity plantings will be undertaken with juvenile trees. A Landscape plan will be developed in accordance with the City of Salisbury Landscape Plan (City of Salisbury, 2007).

Including the proposed mitigation measures the Project would represent a **Minor** change in the landscape similar to the existing landscape character. The likelihood of this change is **Almost certain** leading to an overall risk of **Medium**.



Figure 11-9: Visual Point V4 existing visual character



Figure 11-10: Visual Point V4 Project render



Figure 11-11: Visual Point V6 existing visual character



Figure 11-12: Visual Point V6 Project render



Figure 11-13: Visual Point V08 existing visual character



Figure 11-14: Visual Point V08 Project render

Visual impact from main roads

Project elements will not detract from the visual character of the landscape from main roads.

The major transport routes in the vicinity of the Project are Port Wakefield Road (1.2 km west), the Northern Connector (650 m west) and St Kilda Road (650 m north running to 2.6 km east). The views along these roads are represented by visual points V12 (Port Wakefield road and Northern Connector), V08 (St Kilda road north of the site) and V09 (St Kilda Road east of the site). The existing conditions for these sites are shown in Figure 11-15 (V12), Figure 11-13 (V08) and Figure 11-17 (V09).

The current visual landscape has a number of man made features including high chain link fences, transmission lines and illegal dumping. The eastern extent of St Kilda Road (represented by Visual Point V09) has more panoramic views visible between trees, however, at a further distance from the Project footprint (1.6 km) the percentage of the view taken up by the Project facilities is much smaller (Figure 11-18).

The speed limit at this point on Port Wakefield road is 90 km/h, St Kilda road is 80 km/h and the Northern Connector is 110 km/h and thus the Project would be visible for a maximum of 2.2 minutes[3] while driving past. Due to the flat landscape a number of other industrial developments are viewable in the distance including the Torrens Island Power Station (Figure 11-4) and grain silos (Figure 11-5). The Strategic Growth Framework indicates further development is planned for this area in the employment and eco-industry sectors thus it is expected future land use changes will make the area less sensitive to visual change (rather than more). Mitigation measures include avoiding reflective surfaces, using muted colours in material selection to visually blend the plant with the surrounding landscape as well as maintaining vegetation screens along roadsides. A Landscape plan will be developed in accordance with the City of Salisbury Landscape Plan (City of Salisbury, 2007).

The change in the visual character of the landscape as a result of the project and mitigation measures is **Negligible** with a likelihood of **Almost certain**. The overall risk is **Low**.

[3] Assuming the viewshed calculated using Google Earth Pro which shows visibility for ~4 km along Northern Connector and Port Wakefield road.



Figure 11-15: Visual Point V12 existing visual character



Figure 11-16: Visual Point V12 Project render



Figure 11-17: Visual Point V09 existing visual character



Figure 11-18: Visual Point V9 Project render

Visual impact to tourism locations

Minor visual impacts will be noticeable from tourism locations within St Kilda.

Tourism receptors in the area that will potentially be able to view the Project include:

- South Australian Gun Club
- Southern Go Kart Club
- Tramway museum
- St Kilda Mangroves boardwalk
- St Kilda Adventure Playground

The Southern Go Kart Club, South Australian Gun Club and Tramway museum are not considered to be sensitive to changes in the visual landscape. The nature of these activities involves either viewing tram and street infrastructure or sites are selected to minimise impacts from their activities on adjacent users (eg. noise from go karts or safety concerns from the gun club).

The St Kilda mangroves boardwalk (visual point V10) and St Kilda Adventure Playground (visual point V11) represent more visually sensitive receptors. These tourism locations are valued for aesthetic reasons. The view from the St Kilda mangroves boardwalk and marina (V10, Figure 11-19) contains panoramic views over salt fields with minimal visual clutter while the Adventure playground (V11, Figure 11-21) has a number of trees and natural features in the midground. Given the distance to the Project (approximately 2.5 – 3 km) the percentage of the landscape that would be occupied by infrastructure in the visual landscape would be minimal. With further mitigations such as construction with muted colours and non-reflective surfaces to blend in with the background it is likely to be a small, but noticeable change from the Mangrove board walk and Marina (Figure 11-20). The change will be less noticeable from the St Kilda playground due to the visual clutter that will distract attention from a single point on the landscape (Figure 11-22).

The section of St Kilda Road between the Northern Expressway and Robinson Road represents the main route tourists will use to access St Kilda and surrounds. Visual Point 13 (Figure 11-23) represents the view from this stretch of road with Figure 11-24 showing this view with the project render included. While the built form of the project sheds will be clearly visible, they blend with the existing horticultural sheds and do not detract from the character of the landscape which contains a number of man-made elements visible from this viewpoint. It is important to note this is also a transitory landscape of approximately 500 m with viewers travelling at 60 km/h and so is visible for an average of 30 seconds.

Following mitigation measures, as described above, the visual impact of the Project at this location is expected to be similar to Torrens Island Power Station or the St Kilda grain silos. The visual impact at this receptor is **Negligible** with a likelihood of **Almost certain**. The overall risk is **Low**.



Figure 11-19: Visual Point V10 existing visual character



Figure 11-20: Visual Point V10 Project render



Figure 11-21: Visual Point V11 existing visual character



Figure 11-22: Visual Point V11 Project render



Figure 11-23: Visual Point V13 (Gateway to St Kilda) existing visual character



Figure 11-24: Visual Point V13 (Gateway to St Kilda) project render

11.5.8 Summary of Key Mitigation Measures

Table 11-17: Key mitigation measures visual amenity

Mitigation Measure	Construction	Operation
Green buffer along northern, western and southern site boundaries to be maintained (if additional planting is required will be undertaken with juvenile trees)		✓
Operational lighting to be directed downwards and comply with National Airports Safeguarding Framework Guideline E: Managing the risk of distractions to pilots from lighting in the vicinity of airports	✓	✓
Lighting will be directed towards where illumination is required and away from sensitive receptors,	✓	✓
Visual screening in place between manufacturing facility and sensitive receivers.		✓
Final lighting design is the subject of further engineering design and will be provided in subsequent approvals (e.g. building rules consent) which will assess the lighting design against Australian Standards.		✓
Cladding of plant (including mill, purification plant and kiln) to be a matte finish in muted colours representative of the landscape (eg. browns, greens and greys)		✓
Landscaping plan to be developed with consideration for the City of Salisbury Landscape Plan.		✓
Consultation with RAAF and CASA regarding outdoor lighting design.		✓

11.5.9 Conclusion

Minor visual impacts are expected for adjacent landowners and locations within St Kilda. Mitigation measures are considered to reduce this to ALARP. Changes will be similar to visual impacts from other industry in the area.

12 Social and Economic Impact

This chapter describes how the construction and operation of the Project may affect social and community, and local, regional and state economies.

Social and community is discussed below in Sections 12.1 – 12.7 inclusive. Local, regional and state economies are discussed in Sections 12.8 to 12.12 inclusive below.

12.1 Social and Community

12.1.1 Key findings

- The Project is expected to have a net social and community benefit via increased employment, increased support of local goods and services providers, and sponsorship opportunities for community, social and sporting clubs
- There will be minimal amenity impacts on sensitive receptors due to the Project's location in a primarily industrial area
- Negative impacts to affordability or availability of housing, amenities, services or general cost of living due to the Project activities are expected to be negligible
- There are no expected impacts to community cohesion, safety or wellbeing as a result of the Project
- The implementation of mitigation measures will reduce the risk of all potential impacts to ALARP.

12.2 Setting the context

This section provides information to explain the context within which impact assessment is undertaken. It describes:

- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- The assessment methodology used to identify baseline values and to undertake the impact assessment

12.2.1 Key Terms and definitions

Table 12-1: Key Terms and definitions

Term	Definition / Explanation
ABS	Australian Bureau of Statistics
IAIA	International Association for Impact Assessment
SIA	Social Impact Assessment
'State average' or 'average'	Average values calculated provided in the whole state of South Australia dataset as defined by ABS in its 2021 Census.
Salisbury	The area within the City of Salisbury Local Government Area, as defined by ABS 2021 Census dataset: LGA47140.
Waterloo Corner or WC	The suburb of Waterloo Corner as defined by ABS dataset: SAL41547.

12.2.2 EIS Assessment Requirements

The EIS Assessment Requirements require an assessment of community wellbeing and social impact as shown in Table 12-2.

Table 12-2: EIS Assessment Requirements – Social and Community

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
SC2	Community Wellbeing / Social Impact Assessment	To ensure adverse effects on the community near the development are avoided or minimised including with regard to community cohesion, access to services and facilities and health impacts and capitalise on opportunities to enhance benefits for communities.	Provide a social impact assessment (SIA) of the development which addresses: • the existing social environment of communities potentially impacted by the project • the potential social impacts (both positive and negative) of the project, and how they will be managed and monitored • workforce management, housing and accommodation • local business and industry procurement • health and community wellbeing	STANDARD

Additional aspects of assessment requirements addressed in other EIS chapters are outlined in Table 12-3.

Table 12-3: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Health and community wellbeing impacts relating to air and noise emissions, traffic and transport.	Chapter 8 – Land Use and Site Conditions Chapter 11 – Amenity and Environmental Quality
Section 5.10 Consultation process	Chapter 6 – Stakeholder and Community Engagement

12.2.3 Requirements in Legislation and other Standards

Standards

There are no social impact assessment guidelines issued by the South Australian Government.

Guidelines considered in this social impact assessment methodology included international impact assessment principles and methods set out by Vanclay et.al. (2015) and endorsed by the International Association for Impact Assessment (IAIA) in addition to other industry standards such as the New South Wales Department of Planning and Environment's *Social Impact Assessment Guideline for State Significant Projects* (2023).

A general description of all primary legislation pertaining to the Project can be found in Chapter 4 (Statutory Framework).

12.2.4 Views of Stakeholders

Renascor undertook stakeholder engagement as part of Project planning including meetings and other forms of consultation with SA Water, City of Salisbury, KYAC, Adelaide Zoo, government agencies including EPA, and the St Kilda and Surrounds Progress and Tourism Association Inc. Views raised in relation to social impact were:

- Amenity impacts including noise, dust, traffic and treated process water (refer Chapter 9 Physical Environment and Chapter 11 Amenity and Environmental Quality)
- Protection of Cultural heritage values (refer Chapter 13 Cultural Heritage).

12.3 Assessment Method

The method for undertaking the social impact assessment was consistent with the approach used throughout this EIS as described in Chapter 7 (Impact Assessment Methodology). The potential impacts identified were categorised as either 'major', 'moderate' or 'minor' using the definitions provided in Section 7.9 of Chapter 7 (Impact Assessment Methodology).

12.3.1 Scope

The objectives of the social impact assessment were to:

- prepare a population and demographic profile for the study area
- assess the potential socioeconomic impacts (both positive and negative) of the Project at local and regional scales, as well as at a State level
- recommend mitigation measures to reduce or eliminate potential negative socioeconomic impacts.

12.3.2 Approach

A qualitative desktop assessment was undertaken of the potential social impacts of the Project using publicly available information. Key information sources used were ABS 2021 Census data, .iD Informed Decisions data, Government agency and community reports, PlanSA planning reports, Salisbury Council publications and other publicly available sources.

12.4 The Study Area

This assessment focuses on potential social impacts of the Project at a local and regional scale and draws comparisons to South Australia as a whole.

The study area is based on geographic boundaries used by the Australian Bureau of Statistics (ABS) and comprises:

- The suburb of Waterloo Corner (comprising ~26.5 km2) - representing the 'local' area of impact
- City of Salisbury Local Government Area (LGA) (comprising an area of ~158.1 km2) – representing the 'regional' area of impact.
- Figure 12-1 shows the Project site and socioeconomic study area.

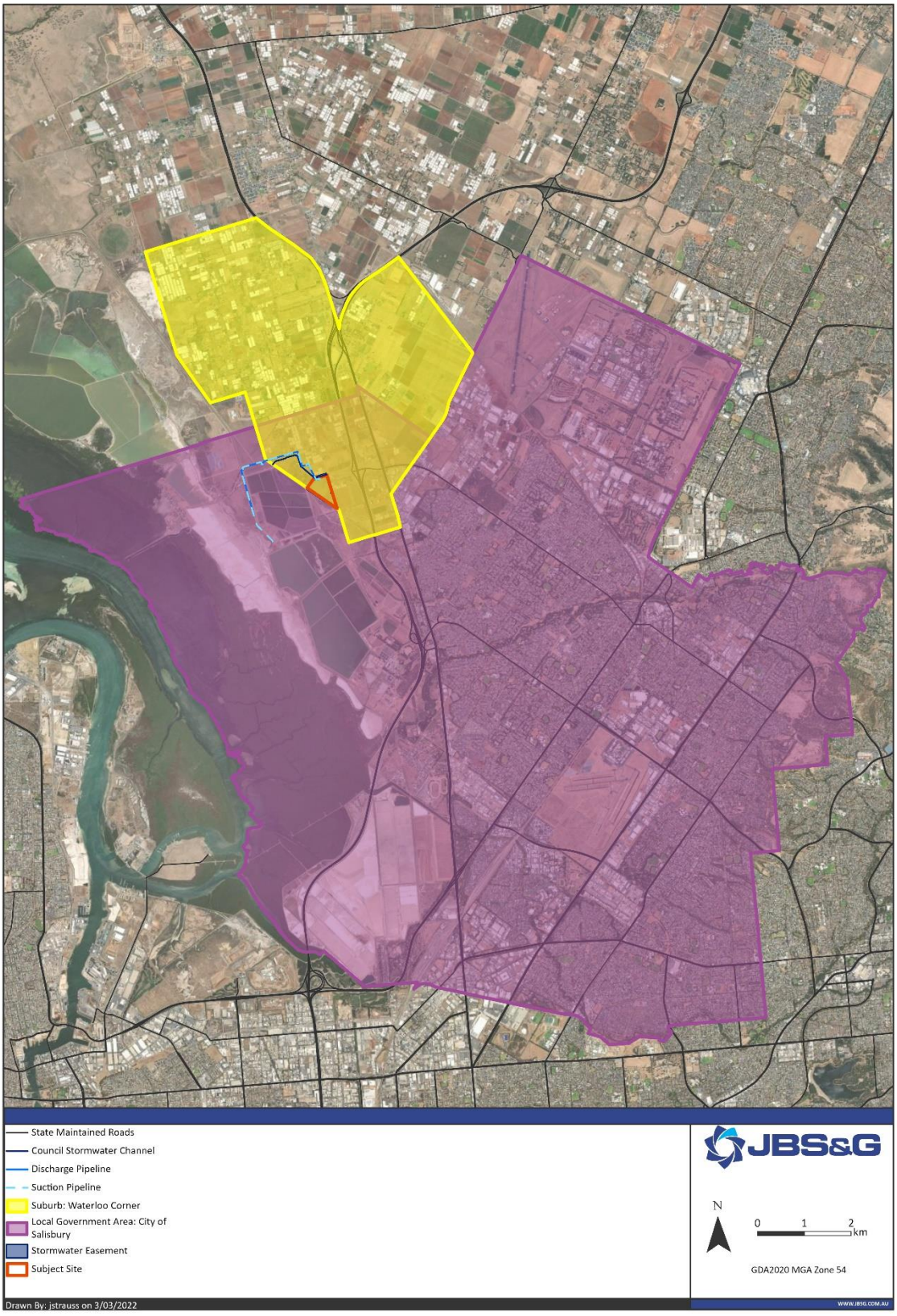


Figure 12-1: The socioeconomic study area and Project site

12.5 Description of the Existing Environment

This section describes the existing social environment of the Project, focussing on the local and regional scale.

12.5.1 Waterloo Corner Demographic Profile

This section describes the social characteristics local to the Project site, being the suburb of Waterloo Corner as defined by ABS dataset: SAL41547 and presented in Figure 12-2 .

Unless stated otherwise, all statistics reported in Section 12.5.1 have been sourced from ABS 2021 Census data relating to the suburb of Waterloo Corner[4].

All references to 'average' or 'State average' refer to the South Australia (whole state) population dataset from the ABS 2021 Census.

A summary of the key social characteristics of Waterloo Corner compared to the State are:

- older population
- larger migrant population
- lower income area
- higher level of socioeconomic disadvantage
- lower labour force participation
- lower education attainment
- higher proportion of households owned outright
- higher incidence of long term health conditions
- main employment industry is horticultural/market gardens.

[4] https://www.abs.gov.au/census/find-census-data/quickstats/2021/SAL41547

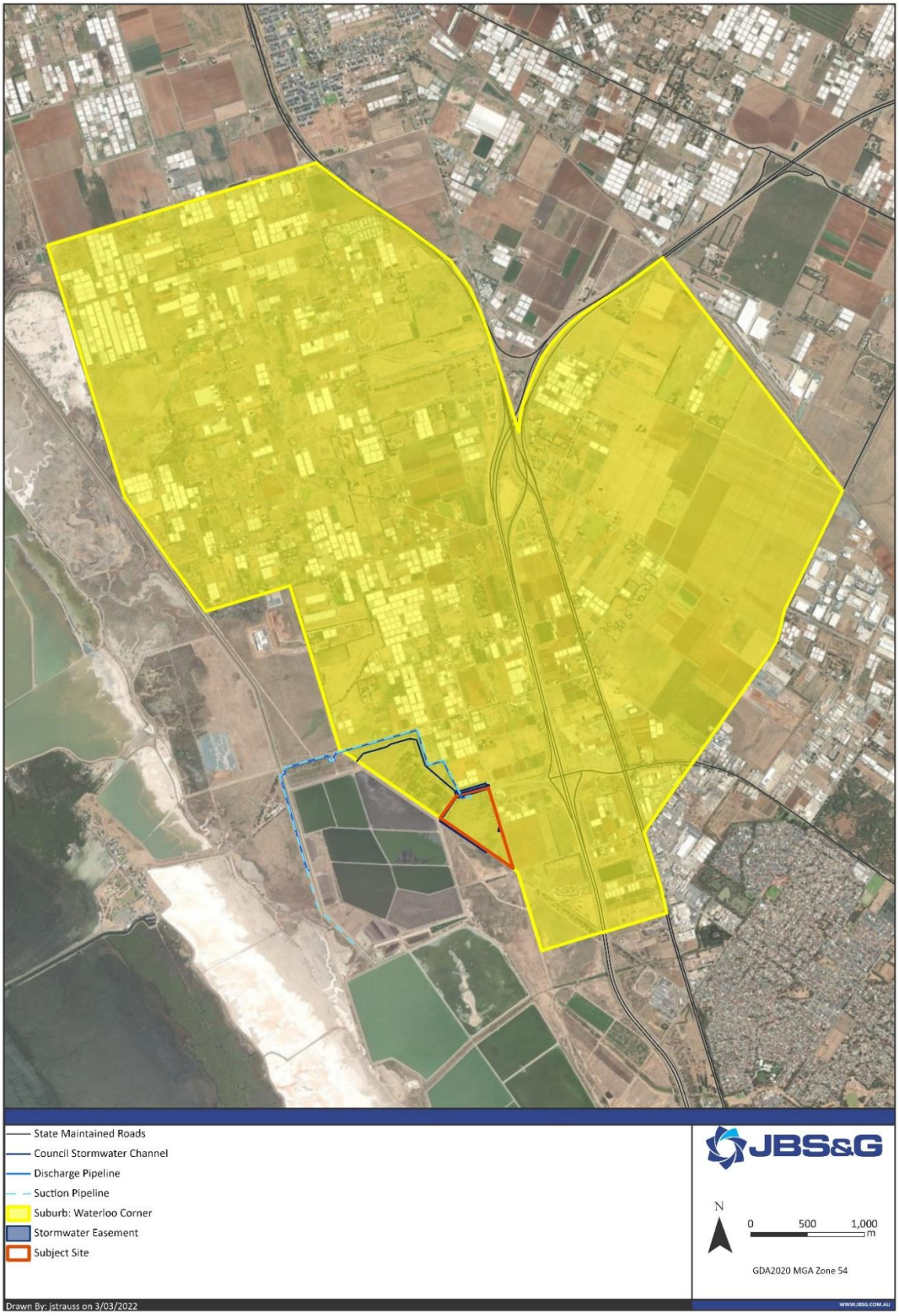


Figure 12-2: Waterloo Corner (yellow shading) and the Project site (red)

Overview

Waterloo Corner (WC) is a small rural suburb used primarily for horticulture, located 22 km north of Adelaide and covering an area of ~ 26.5 km^2. It is bisected by the heavily trafficked Port Wakefield Road (a four-lane, dual-carriage road) and the North-South Motorway Connector, which forms part of the National Highway A1 connecting Adelaide to the Yorke Peninsula and beyond. WC comprises mainly small acreage blocks with low density housing and a mix of horticultural and other commercial businesses.

Population and Demography

The 2021 Census recorded an estimated population of WC of 1,103 people, of which 1.1% identify as Aboriginal and/or Torres Strait Islander. With a median age of 58 years, Waterloo Corner is host to an older population than average in South Australia (41 years), as shown in Figure 12-3.

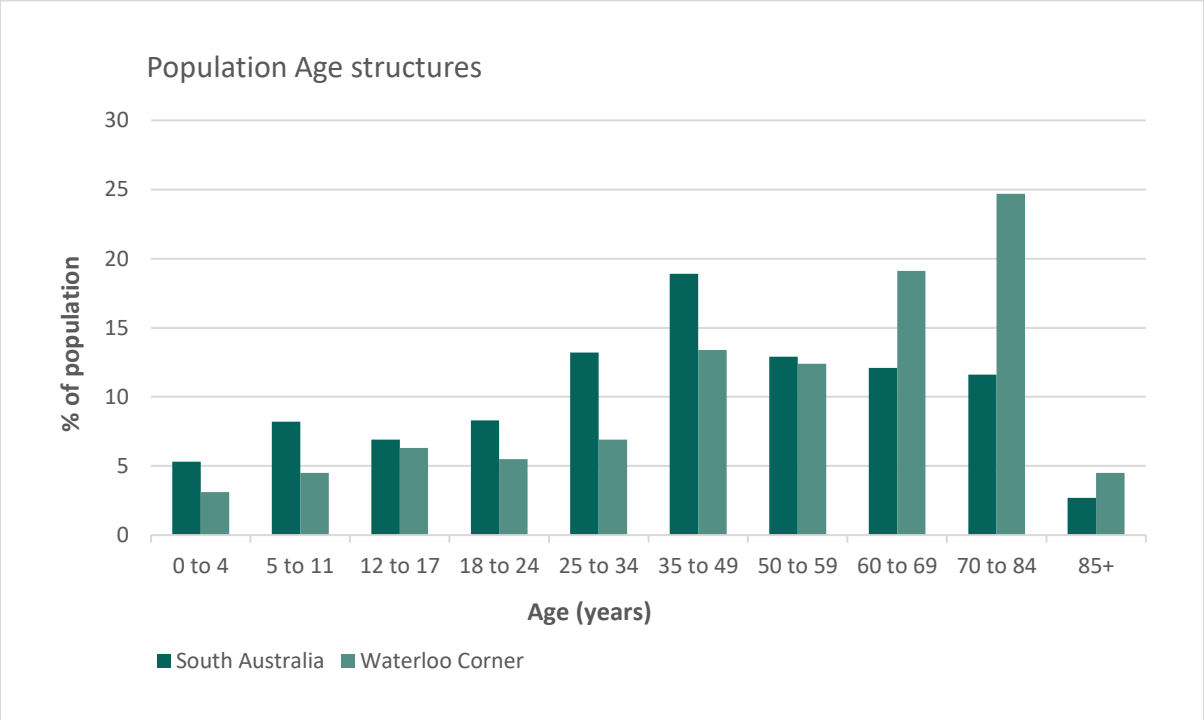


Figure 12-3: Population Age Structures

Education levels attained

Current day attendance at educational institutions (school attendance) is lower than average across all levels, with 20.4% attending primary school (compared to 30%), 18.5% attending secondary school (compared to 20.6%) and 15.3% attending a tertiary institution (compared to 24.3%).

Residents also have relatively low rates of higher education attainment, with only 6% receiving a university education compared to 22.7% across the State.

The lower levels of school attendance observed across all age groups could be attributed to the population's age structure, specifically the lower proportion of youth (under 20 years) living in the area. However, the rate of higher education attainment is not a factor of population age structure and could be a factor of economic, cultural, or gender influences.

Cultural diversity

WC is a culturally diverse community as indicated by the proportion of residents that speak a language other than English at home (29.9%), compared with the State average (19%). The main non-English languages spoken at home are Vietnamese (spoken by 13.2% of residents), Italian (5.7%), Khmer (3.9%), Arabic (2.9%) and Greek (1.7%). By comparison, the State averages are Vietnamese (1.2%), Italian (1.3%), Arabic (0.6%) and Greek (1.2%).

Household Composition

On par with the State average, households comprise mostly family households[5] (67.9%) and single (or lone) person households (30.1%), with an average occupancy of 2.3 people per house and an average of two children per family household.

Housing and accommodation

Housing tenure differs significantly from average with many more families owning their home outright (65%) than with a mortgage (18%) or renting (12%) (see Figure 12-4). Consistent with its rural zoning, housing in the area comprises almost entirely small acre blocks, with the only exception being a small residential retirement village located on the far northern boundary.

The higher rate of home ownership is likely due to the older average age of the population, combined with the predominance of low density rural housing and the absence of any medium or high density housing developments (due to primary zoning of Rural, Rural Horticulture and Recreational) that would attract younger renters or buyers to the area.

Nationally, 31% of homes are owned outright, 35% are owned with a mortgage and 30.6% are rented.

Figure 12-4 indicates the notably higher levels of home ownership in WC compared with the rest of South Australia.

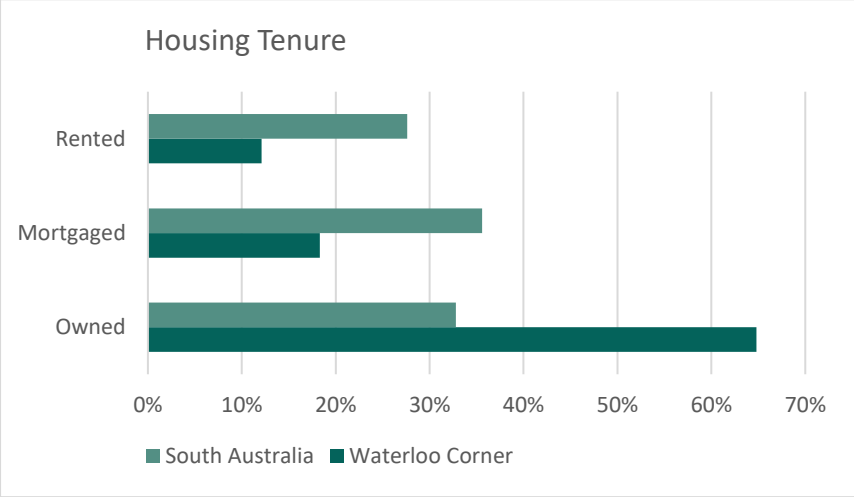


Figure 12-4: Housing Tenure

[5] 'Family' households are categorised as (i) couples with children, (ii) couples without children, and (iii) single parent households with children. Non-family households are categorised as (i) lone person and (ii) group households.

At 12.6%, housing vacancy rates are slightly higher than average (10.8%).

The median weekly rental payment for occupied private dwellings is $225 per week, which is lower that the State average of $300 per week. Conversely, where at least one person in the dwelling is Aboriginal and/or Torres Strait Islander, the median weekly rental payment is $330 per week, which is higher than the State average of $250 per week.

Housing affordability is challenging for mortgage holders (representing 18.3% of households) in WC due to the combination of lower household weekly incomes ($936 versus $1,455)and higher monthly mortgage repayments (median of $1,695 per month) than the State average (median of $1,500 per month), as indicated by the 2021 Census (ABS 2021a). Rental accommodation (representing 12.1% of households) in WC is slightly more affordable than average for most household, noting that for the 12 residents identifying as Aboriginal and/or Torres Strait Islander, the median weekly rental payment is higher than average.

Refer to Figure 12-5 for housing affordability as indicated by median rent and mortgage payments of WC versus the State.

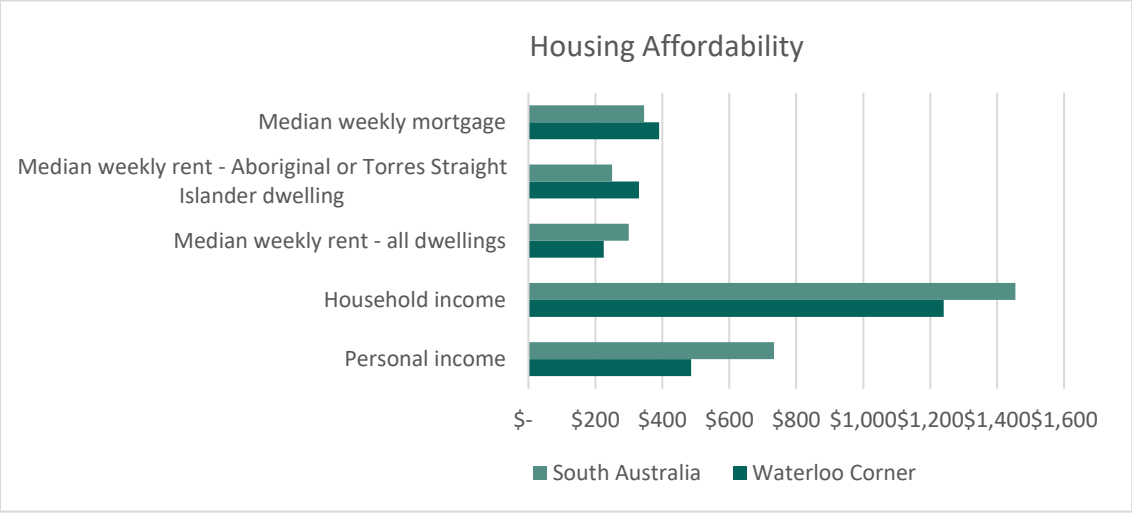


Figure 12-5: Housing Affordability

There are no hotels, motels or other publicly listed short term accommodation facilities within WC. The closest short term accommodation facilities identified are:[6]

- Highway 1 Caravan & Tourist Park (in Bolivar ~2 km to the south-east)
- V Hotel (in Virginia ~2.5 km to the north-east)
- St Kilda RV site (in St Kilda ~3 km to the west)
- Quest Mawson Lakes (in Mawson Lakes ~9 km to the south east)
- Mawson Lakes Hotel (in Mawson Lakes ~ 9.5 km to the south east)
- The Old Spot Hotel (in Salisbury Heights ~11 km to the east)

[6] Google search conducted 16 May 2023 at https://www.google.com/maps/search/Hotels/@-34.7152226,138.5250549,13368m/data=!3m2!1e3!4b1

- Blue Gums Hotel Motel (in Fairview Park ~18 km to the south-east).

Employment, income and industries

Employment

Family household employment, labour force participation and household incomes in WC are all below average for the State.

Overall employment rates[7] are consistent with the State average, however the total labour force (participation rate) is well below average at 37.7 % (compared with 60.7%).

Family household employment rates in WC are significantly lower than average:

- Both parents unemployed: 46.9% (23.1% average)
- Both parents employed full time: 13.7% (20.1% average)
- One parent employed full time, one parent employed part time: 7.6% (23.2% average).

Refer Figure 12-6.

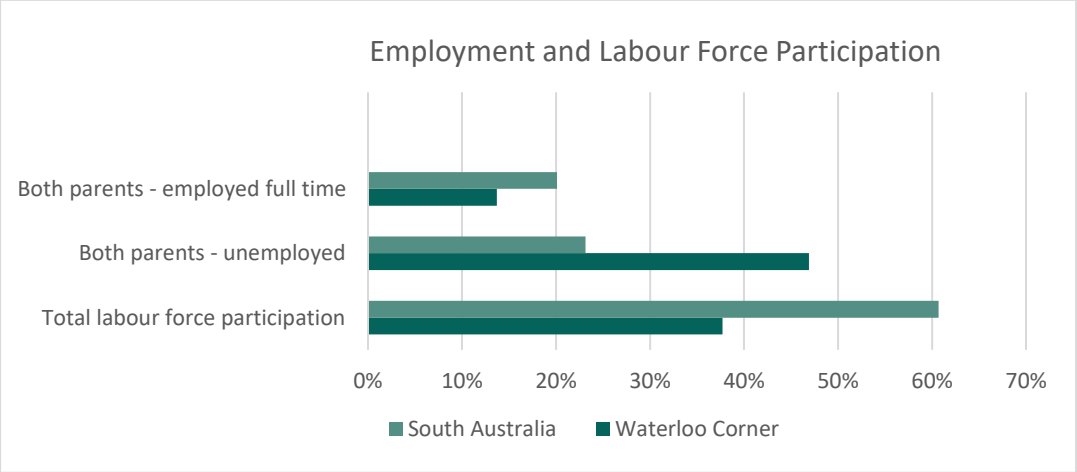


Figure 12-6: Employment and Labour Force Participation

The substantially lower labour force participation rate in WC is somewhat expected due to the 20.7% higher representation of age groups over 60 years (empty nesters, retirees and seniors), when many people have retired from formal employment.

Income

Median weekly incomes in WC are below average, with a median personal income of $486 per week (compared to $734) and a median household income of $1,240 per week (compared to $1,455). Refer Figure 12-7.

[7] Calculated employment and income percentages represent proportions of the population aged 15 and over.

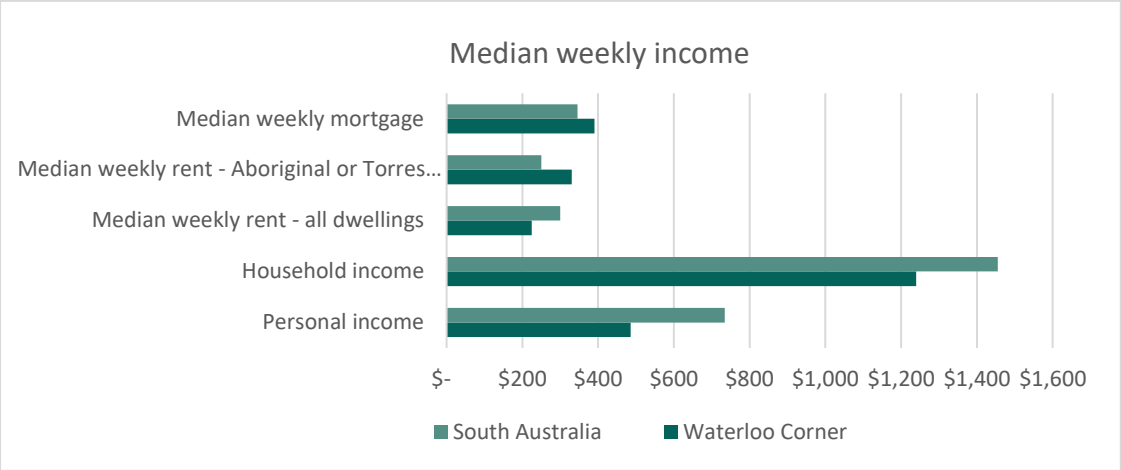


Figure 12-7: Median weekly income

Industries

The main employment industries in WC include vegetable growing, which accounts for 20.9% of jobs, followed by supermarket and grocery stores (2.8%), secondary education (2.5%) and other heavy and civil engineering construction (2.0%).

The largest employment occupations are managers at 28.8%, labourers at 12.4%, technicians, trades workers, machinery operators and drivers at 9.6%, clerical, administrative and sales workers at 9.0%, and professionals and community/personal services workers at 8.2%.

Social services and facilities

WC is a small rural area containing relatively few community services and facilities. Residents must travel to other nearby suburbs (e.g. Salisbury) to access health, education, and emergency services (described in Section 12.5.2). WC does not contain any schools or day care centres, community centres, hospitals/medical clinics restaurants/eateries, hotels or motels.

A Google search conducted in May 2023 identified the following social and recreational facilities in WC:

- Six (6) sports and recreational clubs - Southern Go Kart Club, South Australian Gun Club, Battle for Waterloo Skirmish Club, Adelaide International Raceway, Virginia Motorsport Park, Constellation Model Flying Club
- Two (2) places of worship – Chua Tu An Buddhist temple and the Khmer Krom Buddhist Monastery.

Social character and wellbeing

Health

Only 47.0% of WC residents report having no long-term health conditions, compared to 57.9% across the State. The most common conditions reported are arthritis (17.4%), diabetes (12.3%) and asthma (10.1%), which occur at rates that are respectively: 1.7, 2.1 and 1.1 greater than average.

The incidence of multiple long term health conditions in WC is also higher than average. Specifically, two long term health conditions occurs at a rate 1.4 times greater than average, and three or more long term health conditions occurs at a rate 2.2 times greater than average.

WC has poorer average health status as indicated by a higher incidence of long term health conditions within the population. These data are consistent with a population age structure more heavily weighted towards the older age groups (above 60 years).

Indexes of Socio-Economic Disadvantage

Socio Economic Index for Areas (SEIFA) is a summary measure of an area's relative socio-economic advantage or disadvantage using a combination of Census data pertaining to that area on income, education, employment, occupation, housing and family structure[8]. SEIFA is a combination of four indexes, each of which summarise a particular socioeconomic aspect in a geographic area. For each index, geographic areas are given a score, and then divided into five groups (or quintiles) ranking from most advantaged to most disadvantaged.

WC ranks in the lowest or second lowest quintile for all indexes, indicating it is amongst the most socioeconomically disadvantaged populations across all of Australia.

Table 12-4: The SEIFA Index rankings for Waterloo Corner

Area	SEIFA	IRSD	IRSAD	IER	IEO
Waterloo Corner	Most disadvantaged	Most disadvantaged	Most disadvantaged	Most disadvantaged	2nd most disadvantaged

Key: Socio Economic Index for Areas (SEIFA), Index of Relative Socioeconomic Disadvantage (IRSD), Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD), Index of Economic Resources (IER), Index of Education and Occupation (IEO).

12.5.2 Salisbury Demographic Profile

Unless stated otherwise, all statistics reported in this section have been sourced from the ABS 2021 Census data for the Local Government Area of Salisbury[9]

This section describes social characteristics in the broader region of the Project site, being the City of Salisbury, which comprises the area within the City of Salisbury Local Government Area defined by ABS 2021 Census dataset: LGA47140. Figure 12-1 shows the location of the Project site relative to Salisbury.

A summary of the key social characteristics of Salisbury are:

- larger migrant population
- lower income area
- higher level of socioeconomic disadvantage
- higher unemployment.

[8] https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release#index-of-relative-socio-economic-disadvantage-irsd-

[9] https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA47140

Overview

Salisbury is a city located in Adelaide's northern suburbs approximately 25 km from the Adelaide CBD, covering an area of 160 km^2. Salisbury is connected by rail and by road via Port Wakefield Road, which forms part of the National Highway connecting Adelaide to the Yorke Peninsula and beyond. In additional to residential, other major land uses in Salisbury are parks and reserves, commercial, industrial and rural horticulture.

Population and Demography

The population of Salisbury LGA (Salisbury) at the 2021 Census was 145,806 people, of which approximately 2.4 % identify as Aboriginal and/or Torres Strait Islander. Salisbury is a relatively youthful population, with a median age of 36 years, compared to the State average age of 41. Its population is growing at a faster rate than the State average and is predicted to reach 166,000 residents by 2036 (Holmes Dyer Pty Ltd, 2022).

Education level

The highest level of education attained in Salisbury (of people aged 15 and over) is lower than the State average particularly at the university level**,** with only 15% receiving a university education compared to 22.7% across the State. However, this is changing, with current day attendance at educational institutions now at levels similar to State averages with 31.4% attending primary school (compared to 30%), 20.9% attending secondary school (compared to 20.6%) and 23.4% attending a tertiary institution (compared to 24.3%).

Cultural diversity

Salisbury has a culturally diverse population with 31.2% of households speaking a non-English language at home compared with the State average (19%). These languages include Vietnamese (4.0%), Hazaraghi (2.4%), Punjabi (2.4%), Khmer (1.8%) and Arabic (1.6%).

Household composition

Household composition in Salisbury comprises 71% family households and 25.7% single (or lone) person households. The average house occupancy is 2.6 people per house.

Housing and accommodation

In Salisbury, 27.4% of homes are owned outright (compared with 32.8%), 40.2% are owned under mortgage (compared to 35.6%) and 29% are rented (27.6%). Of these homes the large majority are separate houses (83.5%), followed by semi-detached, townhouses (11.8%) and flats or apartments (4.2%).

Median house prices are lower than average at $520,000 for a house (compared to $680,000) and $362,000 for a unit (compared to $438,000)[10]. Housing affordability and availability in the 12 months to December 2022 was as follows:

- 3% of housing inventory was affordable to very low income earners
- 17.7% of housing inventory was affordable to low income earners
- 65.9% of inventory was affordable to moderate income earners.

[10] https://housing.id.com.au/salisbury

Median weekly rental payments are consistent with the State average of $300 per week.

The City of Salisbury Community Perceptions Report (City of Salisbury, 2020) states the first and third most common reasons cited by residents for living in the area were the cost of housing and the availability of housing, respectively.

There is an abundance of short term accommodation facilities in Salisbury including hotels, motels, caravan parks, and private properties available via Airbnb and similar platforms.

Employment, income and industry

At 58.7%, the labour force participation rate[11] is just below the average rate of 60.0%, and the unemployment rate (7.4%) is higher than average (5.4%).

Median weekly incomes are below average at $643 (personal income) and $1,356 (household income) compared with $734 and $1,455 respectively.

The highest industries of employment are aged care residential services and hospitals (except psychiatric hospitals) at 4.0%, supermarket and grocery stores (3.7%), other social assistance services (3.2%) and takeaway food services (2.7%).

The main employment occupations were community and personal service workers (14.8%), labourers and technicians and trades workers (14.5%), professionals (14.0%), clerical and administrative workers (12.7%), machinery operators and drivers (9.8%), and managers and sales workers (8.7%).

A recent economic report commissioned by the Salisbury Council (Holmes Dyer Pty Ltd 2022) found that Salisbury's primary industries of employment have shifted from the traditional manufacturing roles to advanced manufacturing, requiring fewer but more skilled workers. Structural changes that occurred from 2006 to 2016 were credited with causing significant growth in defence related industries, construction and logistics. The study also found that the Salisbury economy relies heavily on neighbouring areas such as Tea Tree Gully and Port Adelaide Enfield for employment opportunities. Likewise, Salisbury draws skilled workers from the surrounding areas to fill job positions.

Social services and facilities

There is an abundance of health, education, emergency and social services available in Salisbury and nearby suburbs including the Lyell McEwin hospital (Elizabeth), Modbury Hospital (Modbury), the Calvary Central Districts Hospital (Salisbury), the University of South Australia (Mawson Lakes Campus) and Technical and Further Education (TAFE) SA (Parafield and Salisbury campuses).

There are numerous schools (public and private) and day care centres, places of worship, sporting facilities and clubs, recreation clubs, parks, reserves, wetlands and walking tracks, restaurants / eateries, shopping centres, community centres, hotels, motels, caravan parks and other short term accommodation facilities.

Some of Salisbury's key recreational assets are the St Kilda Adventure Playground, St Kilda Tramway museum, the Adelaide Planetarium, Globe Derby Park, Cobbler Creek Recreation Park, Dry Creek and Linear Park, and Adelaide International Bird Sanctuary National Park.[12]

[11] Calculated as a proportion of the population aged 15 years and over
[12] https://profile.id.com.au/salisbury/about

Social character and wellbeing

Health

59.4% of the population reported having no long-term health conditions which is similar to the State average of 57.9%. Of the long term health conditions reported, the highest incidences were of mental health conditions (9.7%), arthritis (9.4%) and asthma (9.3%). This is slightly lower than the State average reported as 9.8%, 10.1% and 8.9% respectively.

Safety

The City of Salisbury Community Perceptions (2020) published in December 2020 reported that 60% of the Salisbury residents interviewed felt safe within their council area, an increase from 55% recorded in 2018.

However, almost 1 in 5 residents (18%) reported feeling unsafe, with the major reasons being:

- Crime (42%, up from 22% in 2018)
- The people in the area (40%, up from 38% in 2018)
- Drugs and alcohol (23%, up from 17% in 2018)
- Hooning (16%, up from 14% in 2018)
- Lack of policing (18%, up from 9% in 2018)
- Not safe at night

Indexes of Socio-Economic Disadvantage

Salisbury ranks in the lowest or second lowest quintile for all indexes shown in Table 12-5, indicating it is one of the most socioeconomically disadvantaged populations in Australia.

Table 12-5: The SEIFA Index rankings for Salisbury

Area	SEIFA	IRSD	IRSAD	IER	IEO
Salisbury	Most disadvantaged	Most disadvantaged	Most disadvantaged	2nd most disadvantaged	Most disadvantaged

Key: Socio Economic Index for Areas (SEIFA), Index of Relative Socioeconomic Disadvantage (IRSD), Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD), Index of Economic Resources (IER), Index of Education and Occupation (IEO).

12.6 Impact Assessment

Table 12-6 identifies and describes the potential positive and negative social impacts of the Project in the study area.

Table 12-6: Potential Social Impacts of the Project

Aspect	Construction	Operation
Workforce management, housing and accommodation		
Employment A key benefit of the Project is the additional employment opportunities it will generate over its estimated three years of construction and 40 years of operation.	***Minor/moderate positive impact*** **The construction phase is estimated to generate approximately 200 FTE direct and indirect jobs for a period of two years.**	***Minor/moderate positive impact*** **The operational phase is estimated to generate approximately 200 FTE direct jobs for its 40 year lifespan.** Renascor is committed to employing local where possible and practicable. Recruitment from within the local and regional area will be possible and preferred for the majority of on-site jobs. However, some jobs will require specialist technical expertise for which recruitment from across greater SA / interstate / international is likely to be required.
Housing and accommodation	***No measurable impact*** **Increased employment opportunities from the Project construction phase will not lead to measurable impacts on temporary accommodation in the study area.** The majority of the construction workforce is likely to be drawn from within the greater Adelaide or Northern Adelaide region and will commute daily to work. However, there may be a need to temporarily accommodate some construction workers and / or technical staff for periods of time throughout Project construction and commissioning. There is a large inventory of short-term accommodation options in Salisbury and the greater northern Adelaide region. The demand for temporary accommodation due to the Project will easily be absorbed by existing inventory and will not lead to a measurable impact on temporary accommodation in the study area.	***No measurable impact*** **Increased employment opportunities from the Project will not lead to measurable impacts on house pricing or housing availability in the study area.** The majority of the Project employees are likely to be drawn from within the greater Adelaide or Northern Adelaide region. These employees will be able to commute to work from their existing homes. A smaller proportion of employees (e.g. from interstate or overseas) will need to secure new accommodation within a commutable distance (such as within 30 minutes' drive) of the site. There are vast suburbs containing a range of housing options located within a 30 minute drive of the site. The addition of 10 to 50 more house seekers (= the estimated number of direct FTE required to move from interstate / overseas) to the regional housing market will not lead to measurable impacts housing availability or pricing in the study area.

Aspect	Construction	Operation
Local Business and Industry Procurement		
Use of Local Businesses	***Minor positive impact*** There will be opportunities for local businesses to provide goods and services to support the Project during construction. Renascor will develop procurement policies and procedures to facilitate the sourcing of products and services from local suppliers.	***Minor positive impact*** Some increase of local goods and services procurement, to support ongoing operations will be required. Renascor's procurement policies will facilitate the sourcing of relevant products and services from the local area.
Health and Community Wellbeing		
Health and social services	***No measurable impact*** There are numerous health and socials services available in the Salisbury area and surrounding suburbs to absorb any increase in demand.	***No measurable impact*** The City of Salisbury currently supports a population of ~148,000 residents with a vast array of health and social services. These resources are easily capable of absorbing the increased demand posed by a potential influx of 20-200 employees to the area.
Safety/Security The Project will not require a construction camp to accommodate workforce.	***No measurable impact*** The construction workforce will mainly be sourced from the local area and will not negatively impact safety and security in the area. Perceptions of a decrease in safety and security (as often expressed in rural areas from FIFO construction workforces being accommodated in construction camps) are therefore not anticipated.	***No measurable impact*** The immediate area may experience an increase in perceived safety and security due to a 24 hour operated facility with security fencing and lighting.
Support of local community, social or sporting clubs	***Minor/moderate positive impact*** Renascor is committed to providing financial assistance to local community, social or sporting clubs by way of sponsorships, which may be annual team sponsorships, or the sponsorship of community events.	***Minor/moderate positive impact*** Renascor is open to opportunities to provide financial assistance to local community, social or sporting clubs by way of sponsorships, which may be annual team sponsorships, or the sponsorship of community events.

Aspect	Construction	Operation
Cumulative amenity Changes to air quality, noise, traffic and to the visual environment, arising from the proposed Project, have the potential to diminish the quality of life of local residents, decreasing land values in the area, or increase land values as a result of increased development.		
Noise	***Minor negative impact*** Project construction noise levels are expected to comply with the Noise EPP, with only minor noise impacts expected at the nearest sensitive receptors. Refer to Chapter 11 Amenity and Environmental Quality for a full description of potential noise impacts and mitigation measures.	***Minor negative impact with mitigation measures in place*** In the absence of mitigation measures, operational noise from the Project is expected to exceed regulated allowable limits at three dwellings located on Robinson Rd (designated as receptors R14, R15 and R16). To reduce operational noise levels to acceptable and compliant levels at each of these receptors, Renascor will implement several noise mitigation measures. Discussions with the affected landowners will be undertaken. Refer to Chapter 11 Amenity and Environmental Quality for a full description of noise impacts and mitigation measures.
Air Quality / Odour	***No measurable impact*** Impacts on air quality due to construction activities will be minor and are of low risk to amenity. Refer to Chapter 11 Amenity and Environmental Quality for a full description of air quality and odour impacts and mitigation measures.	***No measurable impact*** Impacts on air quality due to operational activities will be minor and are of low risk to community health and well-being. Refer to Chapter 11 Amenity and Environmental Quality for a full description of air quality and odour impacts and mitigation measures.
Visual	***Minor negative impact*** Residents and the Edinburgh RAAF base may experience minor negative impacts during construction such as light spill. Refer to Chapter 8 Land Use and Site Conditions and Chapter 11 Amenity and Environmental Quality for a full description of visual amenity impacts and mitigation measures.	***Minor negative impact*** The highest location of the facility is likely to be visible above the immediately adjacent vegetation which screens the lower part of the facility. Residents in the area currently have views of man-made features such as transmission lines, culverts and high chain link fences, although these viewpoints are dominated by trees in the foreground and do not offer long distance views. The potential impacts of light spill on the Edinburgh RAAF base have been assessed in Chapter 8 Land Use and Site Conditions. Impacts can be reduced to ALARP by the implementation of mitigation measures. Refer Chapter 8 Land Use and Site Conditions and Chapter 11 Amenity and Environmental Quality.

Aspect	Construction	Operation
Traffic	***Minor negative impact*** There is a minor risk of deterioration of the condition of the public roads in a worst case scenario, noting that some roads (e.g. Robinson Road) will be upgraded prior to Project commencement. Potential safety impacts from increased heavy vehicle traffic can be reduced to a risk level of ALARP by the use of mitigation measures. Refer to Chapter 11 Amenity and Environmental Quality for a full description of traffic mitigation measures.	***Minor negative impact*** Impacts to transport and traffic in the area will be minor in nature with the implementation of mitigation measures. Refer to Chapter 11 Amenity and Environmental Quality for a full description of traffic mitigation measures.
Midge reduction	***Minor positive impact*** Renascor has committed to installing midge reduction screening (planting) during construction activities in collaboration with SA Water.	***Minor positive impact*** Renascor has committed to installing midge reduction screening (planting) during construction, which will be maintained during operations in collaboration with SA Water.

12.6.1 Summary of Key Mitigation Measures

Table 12-7 sets out the key mitigation measures for Social and Community, noting that mitigation measures relating to cumulative impacts on amenity values in relation to air quality, odour, noise, visual and traffic are provided in Chapter 8 (Land Use and Site Conditions) and Chapter 11 (249Amenity and Environmental Quality).

Table 12-7: Social and economic impact mitigation measures

Mitigation Measures	Construction	Operation
Additional employment opportunities and commitment to prioritising local employment	✓	✓
Commitment to provide sponsorship opportunities to local community, social and sports clubs and events	✓	✓
Commitment to prioritise purchasing of local and South Australian good and services as much as possible (excludes capital expenditure on major technical equipment)	✓	✓
Planting and maintenance of midge reduction vegetation screening along western site boundary	✓	

12.6.2 Conclusion

The social impacts of the proposed Project are expected to provide an **overall net benefit** to the local and regional community due to opportunities for employment, the use of local businesses for various products and services, and the provision of sponsorships to local community, social and sporting clubs and events.

The proposed Project will negatively impact immediate local amenity by **Minor** to **Moderate** increases in noise, traffic and visual impacts, especially for the three nearest residences located on Robinson Road. However, with the proposed mitigation measures these impacts are expected to be reduced to a **Minor** level of impact. Refer Chapter 8 (Land Use and Site Conditions) and Chapter 11 (Amenity and Environmental Quality).

12.7 Local, Regional and State economies

12.7.1 Key findings

- The Project will create over 1,200 full time equivalent (FTE) jobs supported every year throughout the economy (approximately 200 FTE in an ongoing basis in operations, and ~480 in suppliers to the activity, with the balance in flow through effects)
- Jobs created in Northern Adelaide is estimated as ~840 FTE (out of the >1,200 total jobs)
- The use of local businesses for the procurement of goods and services will provide an overall net benefit
- The payment of State and Federal taxes, and mineral royalties from the Siviour Graphite Mine will provide a positive impact
- The project will generate a total positive impact on Gross State Product of an estimated $2.6 billion over the life of the project
- No noticeable negative impacts on businesses and adjacent land uses will occur following implementation of mitigation measures that reduce the risk of impact to ALARP
- The PSG from the BAM Facility will be utilised in electric vehicles and other supporting modern technological operations which will contribute to climate change management in a global perspective.

12.8 Setting the context

This section provides information to explain the context within which impact assessment is undertaken. It describes:

- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the Project to meet
- The assessment methodology used to identify baseline environmental values and to undertake the impact assessment.

12.8.1 EIS Assessment Requirements

The EIS Assessment Requirements require an assessment of the effect of the Project on local, regional and State economies as set out in Table 12-8.

Table 12-8: EIS Assessment Requirements – Land, Regional and State Economies

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment Level
LRSE1	Local, regional and state economies	To ensure adverse economic impacts arising from construction and operation of the development are avoided or mitigated, and net economic benefits to the region and state are created	• Provide a full economic analysis of the development including the long-term economic viability and efficiency of the operational aspects of the development, incorporating a regional impact analysis (RIA) and cost-benefit (risk return) analysis (CBA). • The RIA should focus on the direct impact of the project on the local, regional and state economies. The identification of economic impacts should include the prediction of spending on goods, services, taxes etc. during construction and operation of the project and the distribution of income generated by the project. • The CBA should assess the impact of the project on the economic welfare of the economies of interest by estimating a dollar value for as many economic, social and environmental benefits and costs as can reasonably be predicted.	DETAILED

Additional aspects of assessment requirements addressed in other EIS chapters are outlined in Table 12-9.

Table 12-9: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Section 5.10 Consultation Process	Chapter 6 – Stakeholder and Community Engagement
SC2 Community Wellbeing / Social Impact Assessment	Section 12.1 – Social and Community (refer above)

12.8.2 Requirements in Legislation

There are no legislative requirements or standards specifically relating to assessing economic impact assessment in South Australia. The *Australian Jobs Act 2013* (Cth) requires Australian entities have full, fair and reasonable opportunities to bid for the supply of key goods and services.

Renascor will be obliged to pay state and federal taxes, including payroll, and other financial imposts as part of its overarching Project, including royalties to the Crown from authorised mining operations on Mineral Lease 6495 pursuant to Section 17 of the *Mining Act 1971* (SA).

A general explanation of all primary legislation pertaining to the Project can be found in Chapter 4 Statutory Framework.

12.8.3 Views of Stakeholders

No specific issues were raised regarding economic impacts during stakeholder engagement undertaken for the Project.

The City of Salisbury undertook community consultation on its *Strategic Growth Framework Waterloo Corner and Bolivar Corridor* [13]in April and May 2022. The following views from stakeholders were received during that consultation process which have the potential to also apply to the BAM Facility given its location in that area:

- Encourage more business growth, both new and existing
- Positive feedback on potential for high paying, specialist employment opportunities for local residents
- Develop commercial buildings and warehousing.

12.9 Assessment Method

Renascor commissioned Barry Burgan from ERC Pty Ltd (ERC) to undertake an economic evaluation of the Siviour Project including the graphite mine near Arno Bay and the proposed BAM Facility at Bolivar (Appendix 16).

The economic evaluation was based on details provided by Renascor including expenditure for the Siviour Project and the required workforce. The expenditure has been allocated to the respective industries in which it occurs and then been modelled in a whole of economy model[14] which traces the induced effect of the expenditure to provide an estimate of the total economic contribution of the Project.

The ERC summary includes a cost benefit analysis as outlined in the Assessment Requirements for the Project. Details of the methodology are summarised below. For the purposes of the economic impact assessment, 'Northern Adelaide' considers the Northern Adelaide statistical region encompassing Salisbury, Elizabeth, Port Adelaide and Enfield LGAs.

[13] Strategic Growth Framework Waterloo Corner and Bolivar Corridor, City of Salisbury and Holmes Dyer, published 29 September 2022. https://www.salisbury.sa.gov.au/assets/downloads/Development/Strategic-Growth-Framework-Waterloo-Corner-Bolivar-Corridor-July-2022.pdf

[14] The economic model used for this evaluation is a 35 industry sector framework based on the 2019/20 national input output tables prepared by the ABS, with South Australian, Northern Adelaide and Eyre Peninsula tables prepared using the location quotient method and data from State Accounts, and State Labour Force and the 2021 census – updated to 2023 based on inflation. An input output model is a simple and unconstrained general equilibrium model – and given the long term nature of the investment produces similar results as would more complicated models as in the long term the constraints are generally limited.

12.10 Description of the Existing Environment

Gross Regional Product (GRP) is a measure of the net contribution of an activity to the regional economy and is measured as value of output less the cost of goods and services (including imports) used in producing the output.

The Project is located within the City of Salisbury LGA. A report commissioned by the City of Salisbury into the economic vision for the LGA (Deloitte, 2022) described the existing economy as:

- Contributing $6.5 billion in GRP and growing at a rate of approximately 1.8 % per annum
- Contributing approximately 6.2% of SA's Gross State Product (GSP)
- Containing 7,200 active businesses with 45,000 jobs
- A steadily increasing rate of business growth (increasing by approximately 3.3% per annum from 2014-2018). However, the increase in businesses is due to a number of small owner-operator businesses with large employer businesses declining in the area.

The Deloitte report (2022) identified a number of actions to grow the City of Salisbury's economic future. Of relevance to the BAM facility is growing Salisbury's existing industry base.

Industry of employment with the Salisbury LGA is depicted in Figure 12-8.

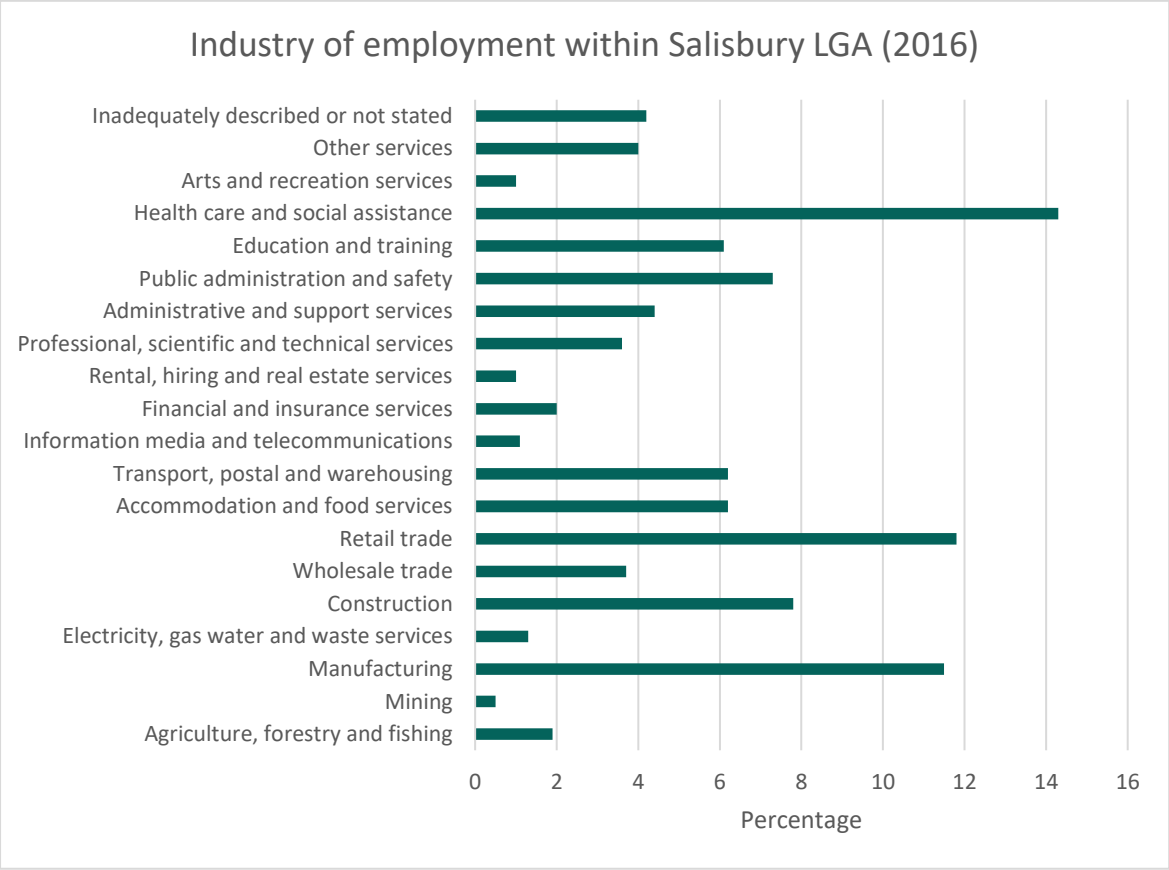


Figure 12-8: Employment in City of Salisbury LGA by Industry (as of 30 June 2021) – source ABS, 2023

12.11 Impact Assessment

12.11.1 Regional Impact Analysis Results

The Regional Impact Analysis was conducted for the entire Siviour Graphite Project (including the Siviour Graphite Mine near Arno Bay, transport via road and the proposed BAM Facility in Bolivar). The BAM Facility alone will contribute $2.6 billion to the GSP over the extended period including $1.4 billion in estimated wages and salaries to SA resident households and up to 1,286 Full Time Equivalent (FTE) jobs.

Specific benefits that have been considered for the BAM Facility include:

- Creation of over 1,200 full time equivalent jobs supported every year throughout the economy (approximately 200 FTE in an ongoing basis in operations, and ~480 in suppliers to the activity, with the balance in flow through effects)
- Job created in Northern Adelaide is estimated as 843 full time equivalents (out of the >1,200 total jobs)
- $1,425 million of employee compensation
- $2,636 million contribution to Gross State Product
- $158 million in taxes and other payment outcomes over the life of project.

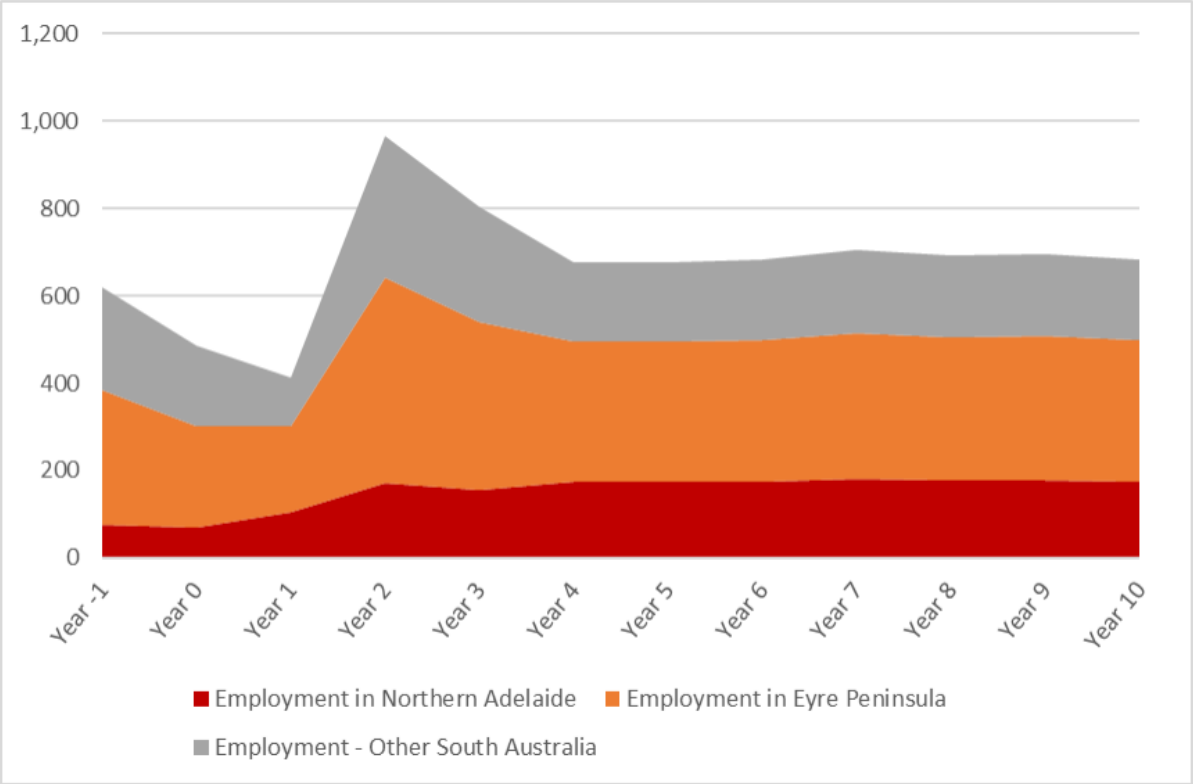


Figure 12-9: Projected Employment Outcomes – Mine Development and Operations

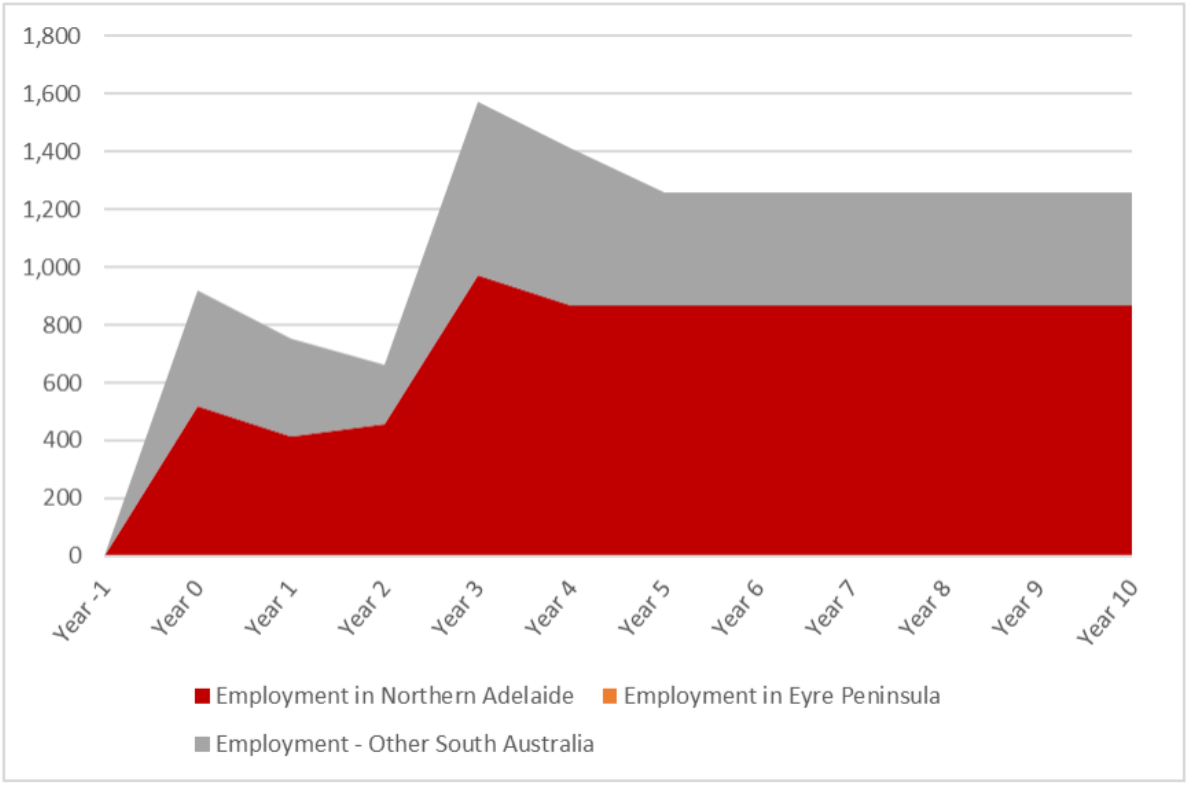


Figure 12-10: Employment Outcomes – BAM Facility

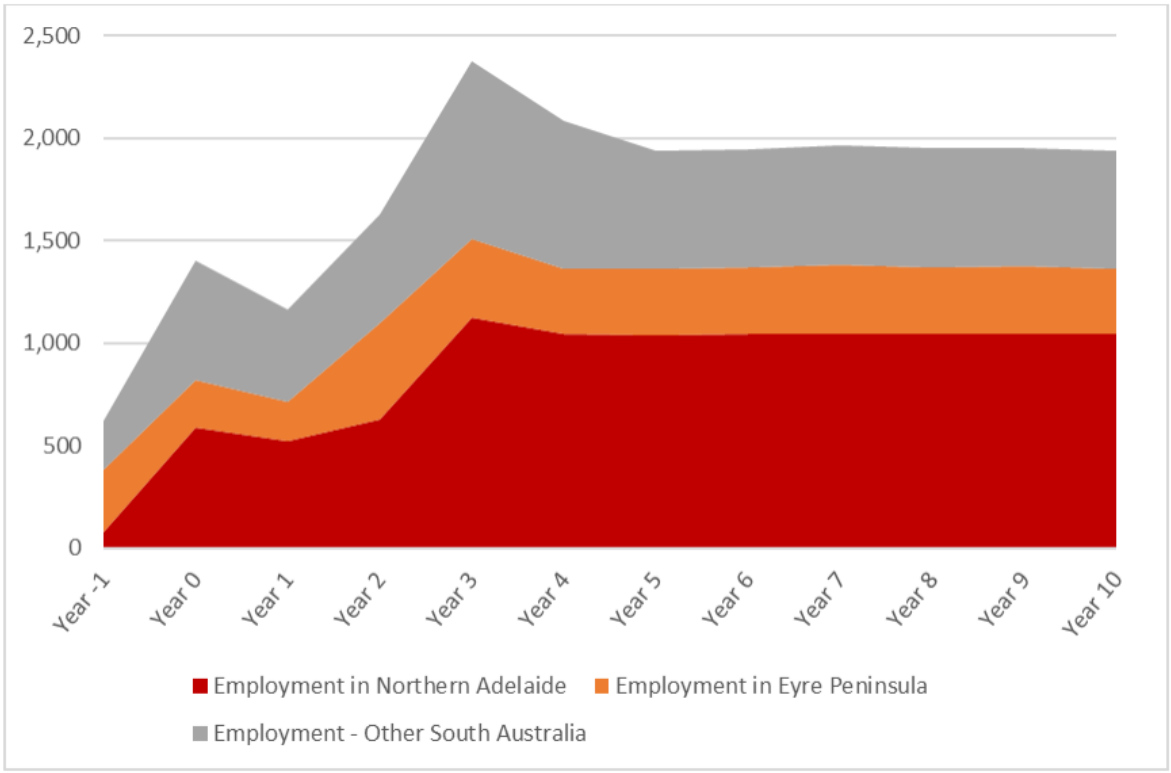


Figure 12-11: Mining and BAM Facility Combined Stages Employment Outcomes

12.11.2 Cost benefit analysis

ERC undertook a cost benefit cost assessment for the Siviour Project (mine and BAM Facility) and noted that the quantifiable economic impacts are considered to be:

- The economic contribution of the Project in terms of jobs created and incomes generated for South Australians, in particular for the Eyre Peninsula and Northern Adelaide regions
- The possibility of offsetting economic contribution linked to negative impacts of the mine development on existing or potential future land uses
- Diversifying the underlying export oriented economic activity in the Eyre Peninsula and Northern Adelaide regions, particularly given the limited employment growth for both regions over the past decade in wealth generating activities such as agriculture, mining and manufacturing employment outcomes.

The major benefits relate to the impacts on economic activity with the delivery to the State of an incomes generated net benefit of $4.3 billion per year over 40 years of the Project (mine and BAM Facility). Refer Table 12-10.

Given the current economic uncertainties with expectations of a recession in the short term, and the impact of climate change and market shifts in agriculture in coming years, this can be considered the core component of a cost benefit evaluation.

In particular, with current higher unemployment rates in the Northern Adelaide region (location of the BAM Facility) and on the Eyre Peninsula (location of the mine), and the lack of employment growth in export-oriented industries in the regions, the employment and associated wages generated by the BAM Facility and mine can be fully interpreted as a benefit.

Table 12-10: Modelling Results – Economic Contribution of Renascor Resources Graphite Project – PSG Facility

	Stage 1			Stage 2			Combined Stages		
	State	Northern Adelaide	Eyre Peninsula	State	Northern Adelaide	Eyre Peninsula	State	Northern Adelaide	Eyre Peninsula
Project Outcomes									
Gross State/Regional Product ($m)	$1,500.1	$922.8	$19.3	$1,136.2	$694.8	$15.8	$2,636.2	$1,617.6	$35.1
Compensation of Employees ($m)	$811.4	$517.8	$0.0	$613.3	$388.3	$0.0	$1,424.7	$906.1	$0.0
Average Annual Employment (FTEs) Created	697	458	13	589	385	12	1,286	843	24

ERC noted that there are limited cost impacts of the Project, with the major possibilities being:

- Some offsetting impacts in terms of traffic congestion and road use of the transport of the ore from the mine to the processing plant, and of the PSG product from the plant to the port for export, with an average three – four road trains per day in each direction, increasing to seven when stage 2 of the Project is implemented. This is considered to be a marginal increase on the roads given the relevant traffic on the roads (regional and roads to port).
- The BAM Facility will be located in an industrial area which will not significantly change the existing visual amenity.
- Processing activities at the BAM Facility will involve some treated process water and the normal outcomes of some dust and other emissions.

Other economic impact considerations that have not been included in the cost benefit analysis are taxation outcomes and other payments such as that generated through royalties, payroll tax, general taxes and other payments.

There is a major benefit from job creation and increase in GSP.

- Economic modelling (Appendix 16) has calculated the Project will create over 1,200 FTE jobs (including ~840 FTE jobs in the Northern Adelaide Region). In addition, the contribution to the GSP is estimated at $2.6 billion over the life of the Project. Additional jobs creation and GSP is associated with the Siviour Graphite Mine (outside the scope of the EIS).
- To ensure benefits are received in the local area Renascor will develop a procurement policy which supports their commitment to promote and maintain strong relationships with local businesses and where appropriate and possible, sourcing products and services from local suppliers.
- The benefits of job creation over a period of 40 years will impact multiple generations and is considered a **Major** positive impact to the community. The likelihood of this occurring, considering proposed mitigation measures to enhance the benefits felt locally, is **Almost Certain** leading to an **Extreme Positive Impact**.

No negative impacts to other businesses because of project development.

- Potential impacts on adjacent land uses that could have economic impacts have been assessed in Chapter 8 (Land Use and Site Conditions) and concluded no noticeable impact on businesses will occur following implementation of mitigation measures. Due to minor nature of impacts these have not been quantified. The consequence of these impacts was classified as Minor consequence and Unlikely to occur resulting in a Low risk.

Additional Benefits

- Contribution to climate change management in a global perspective by inputting into the broader availability of batteries for electric vehicles.
- The PSG from the BAM Facility will primarily be utilised in car batteries, increasing the global supply of electric vehicles in addition to increasing the diversity of suppliers.
- In turn, this will enable countries and manufacturers to meet their targets of a move to electric vehicles in the future.

- The BAM Facility represents an important step towards achieving the Australian Government objectives regarding in-country critical minerals capacity and transitioning to a lower carbon emissions future.

12.11.3 Summary of Key Mitigation Measures

The impact assessment work undertaken by ERC Pty Ltd indicates all impacts to the local, regional and State economies from the Project will be beneficial due to employment opportunities and contributions to taxes and payment of mineral royalties. As such, few mitigation measures are either proposed, or needed. Those listed in Table 12-11 reflect Renascor's commitment to employ local wherever possible and practicable (noting that some specialist positions may not be able to be sourced locally) and to utilise local businesses to provide goods and services to the mine and BAM Facility.

In the first instance, developing an Industry Participation Plan will enable Renascor to plan for how it can utilise local, South Australian and Australian suppliers, manufacturers and contractors to increase positive economic impacts for the local community, region and South Australia generally.

Table 12-11: Local, Regional and State Economies Mitigation Measures

Mitigation Measure	Construction	Operation
Develop an Industry Participation Plan that sets out Renascor's strategy and intent for providing full, fair and reasonable opportunity to local, South Australian and Australian suppliers, manufacturers and contractors and complies with the *Australian Jobs Act 2013* (Cth).	✓	✓
Work with local business groups to identify local business opportunities and develop procurement policies and processes to facilitate the sourcing of products and services from local suppliers.	✓	✓
Identify contract packages that have the potential to be met locally or regionally.	✓	
Develop employment strategies to utilise the local workforce on Project components wherever practicable.	✓	✓

12.12 Conclusion

The economic impacts of Renascor's overarching Siviour Project (mine and BAM Facility) are beneficial in nature and include the creation of over 1,200 FTE jobs (either direct or through flow on impacts and including ~840 FTE jobs in the Northern Adelaide Region), revenue, mineral royalties, the payment of State and Federal taxes from the raw product and value adding, wages and employee benefits. CAPEX and OPEX include spending on goods and services and flow-on economic effects. In addition, the contribution to the GSP is estimated at $2.6 billion over the life of the project.

These benefits are supplemented by a number of potential additional benefits including a contribution to climate change management in a global perspective by inputting into the broader availability of batteries for electric vehicles and a step towards achieving the Australian Government objectives regarding in-country critical minerals capacity.

No negative economic impacts from the Project on the local, regional and State economies have been identified.

13 Cultural Heritage

This chapter describes how the construction and operation of the Project may affect Aboriginal and non-Aboriginal heritage values, including geological heritage.

Renascor recognises that impacts to cultural heritage may arise from the construction, operation and closure of the Project such as damage, disturbance or interference with known or unknown Aboriginal, or non-Aboriginal heritage sites.

Native Title in the vicinity of the Project is discussed in Chapter 8 Land Use and Site Conditions.

13.1 Key findings

- The Project is located within the traditional lands of the Kaurna People. The Kaurna Yerta Aboriginal Corporation (KYAC) is the Registered Native Title Body Corporate established to manage native title rights and interests on behalf of the Kaurna People
- There are no expected impacts to Aboriginal sites, objects or remains nor impacts to non-Aboriginal heritage over the area comprising the Project
- One identified heritage site located on the north-eastern fringe of the Project area will not be impacted by the Project and will be fenced off to ensure its protection prior to construction
- Cultural heritage surveys undertaken in June 2023 and July 2023 respectively did not identify any additional sites of Aboriginal cultural heritage significance in the Project area
- A search of the Central Archive, including the Register of Aboriginal Sites and Objects, was undertaken and identified several registered and recorded Aboriginal heritage sites within 5 km of the Project, the only site located within the Project area is that identified above. This site will be protected during construction and operation of the Project.
- A Cultural Heritage Management Plan (CHMP) has been developed and endorsed by KYAC in February 2024. It addresses the protection of identified sites in the vicinity and establishes discovery and reporting procedures for any sites that may be discovered during construction or operation
- There are no Commonwealth Heritage, National Heritage, State Heritage or Local Heritage Places within the Project footprint, with the closest located approximately 1.8 km to the south-east of the Project

Mitigation measures can be implemented to reduce the risk of impact to ALARP.

13.2 Setting the context

This section provides information to explain the context within which impact assessment is undertaken. It describes:

- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the Project to meet

- The assessment methodology used to identify baseline environmental values and to undertake the impact assessment.

13.2.1 EIS Assessment Requirements

The EIS Assessment Requirements for Aboriginal cultural heritage and Heritage Places and Areas are shown in Table 13-1.

Table 13-1: EIS Assessment Requirements – Cultural Heritage

Library Ref	Environmental Attribute	Objective	Assessment Requirement	Assessment Level
SC1	Aboriginal cultural heritage	Avoid adverse effects on Aboriginal cultural heritage values and maximise opportunities to appropriately complement and preserve these values	• Describe how the proposed location and/or design avoids and/or mitigate potential impacts and risks to known and unknown Aboriginal heritage. Where impacts to Aboriginal heritage cannot be avoided, provided detailed justification for this. • Undertake an on-ground cultural heritage survey undertaken by qualified heritage experts (ideally an anthropologist and an archaeologist) in consultation with the RARB/Traditional Owner representatives. This survey should cover the entirety of the project area. • Preparation of a subsequent Aboriginal heritage report which should: ○ be prepared by a suitably qualified heritage expert ○ clearly outline the results of the heritage survey, including the location of Aboriginal heritage within the project area, a well as any areas where unrecorded sub-surface Aboriginal heritage is likely to occur ○ consider the results of the AAR central archives search results, as well as any other searches of local archives or other relevant databases ○ consider the views of the RARB, or where no RARB is appointed, Traditional Owner representatives. Note that any sensitive or restriction information relating to Aboriginal heritage must remain confidential and should not be publicly disclosed ○ consider both the archaeological and anthropological/ethnographic values of the area, based on relevant literature, previously heritage assessments etc ○ consider the project's potential impacts to known and unknown Aboriginal heritage	DETAILED

Library Ref	Environmental Attribute	Objective	Assessment Requirement	Assessment Level
			○ provide recommendations for the management of Aboriginal heritage during project works, in light of the above. • Preparation of a Cultural Heritage Management Plan (CHMP) by an appropriately qualified heritage expert in consultation with the RARB/Traditional Owner representatives that: ○ Addresses the potential for the project to impact known and unknown Aboriginal heritage ○ outlines measures agreed with the RARB/Traditional Owner representatives to be taken in order to manage and protect Aboriginal cultural heritage wherever possible ○ establishes processes for the management and protection of Aboriginal heritage before, during and after the proposed development, which may include: ○ establishment of avoidance or 'no-go' zones to avoid known heritage or areas of identified high risk ○ establishment of bunting or fencing around known Aboriginal heritage ○ conditions access areas (e.g. limits on heavy machinery in particular areas) ○ the engagement of Aboriginal heritage monitors to observe ground disturbing works in high risk areas – noting that the location and details about the heritage must not be made public ○ includes an Aboriginal heritage discovery protocol, outlining the steps that will be taken in the event of an Aboriginal heritage discovery.	
SC3	Heritage Places and Areas	To ensure that the nature and scale of the development does not compromise the recognised heritage significance of a heritage place or heritage area.	• Provide details of the location, nature and known potential heritage values of all historical heritage potentially affected by the development, particularly State and Commonwealth-listed places and areas.	STANDARD

Additional aspects of assessment requirements addressed in other EIS chapters are outlined in Table 13-2.

Table 13-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Section 5.10 Consultation Process	Chapter 6 – Stakeholder and Community Engagement
SC3 Heritage Places and Areas	Chapter 8 – Land Use and Site Conditions
LUSC1 Land tenure, protected areas and land use	Chapter 8 – Land Use and Site Conditions
SC2 Community Wellbeing / Social Impact Assessment	Chapter 12 – Social and Economic Impact

13.2.2 Requirements in Legislation

South Australian legislation

The *Aboriginal Heritage Act 1988* (AH Act) (SA) is the principal legislation governing Aboriginal sites, object and remains. It affords blanket protection of sites, objects and remains whether known or unknown and makes it an offence for any to be damaged, disturbed or interfered with unless prior approval from the relevant Traditional Owners and the Minister for Aboriginal Affairs has been obtained. The AH Act also establishes the Register of Aboriginal Sites and Remains, including the Central Archive, which can be searched by development proponents to reduce risk of damaging, disturbing or interfering with a site, object or remains during construction or other activities.

The *Heritage Places Act 1998* is the principal legislation covering non-Aboriginal cultural heritage and aims to protect places or objects of geological, palaeontological, speleological or archaeological significance from being damaged, destroyed or disturbed without the prior written approval of the South Australian Heritage Council. It establishes the South Australian Heritage Register and provides for the identification of, recording and conservation of places and objects of non-Aboriginal heritage significance.

Guidelines

Aboriginal Affairs and Reconciliation within the Attorney-General's Department (AAR-AGD) (formerly within the Department of Premier and Cabinet) has published several guidelines to assist proponents with managing their obligations in relation to Aboriginal heritage.

The fact sheet *Managing Aboriginal Heritage in South Australia* provides information on Aboriginal heritage, the governing legislation, landscape features to be aware of that may host heritage values, and how to manage Aboriginal heritage during project planning (AGD, 2023).

The *Discovery of Aboriginal Sites and Objects* fact sheet provides guidance on what to do should an Aboriginal site, object or remains be found. Information on potential Aboriginal sites (e.g. areas within close proximity to creeks, rivers, watercourses etc) and reporting guidelines are provided (e.g. stop work procedures), together with managing any areas of discovery (DPC-AAR, 2021).

13.3 Views of Stakeholders

13.3.1 Aboriginal cultural heritage

Engagement and consultation with stakeholders specifically in relation to Aboriginal cultural heritage was undertaken as noted below. Also refer to Chapter 6 Stakeholder and Community Engagement.

SA Water

As the landholder of the Project site, SA Water advised Renascor early in discussions that there was a site of Aboriginal cultural heritage significance in the vicinity. SA Water advised its expectation was that Renascor would consult early with the Kaurna People and undertake a cultural heritage survey of the subject land to ensure any items of Aboriginal significance would be protected. SA Water also advised that while it had a CHMP with the KYAC, a bespoke CHMP between Renascor and KYAC would be required.

SA Water did not advise of any non-Aboriginal sites or locations of interest in the area.

Kaurna Yerta Aboriginal Corporation (KYAC)

Initial discussions with KYAC representatives commenced in July 2022. This led to Renascor being invited to present a Project update on 17 August 2022.

SA Water then assisted in organising Cultural Heritage Monitoring through coordination with the KYAC Board for a site geotechnical investigation to take place. This resulted in the geotechnical investigation being undertaken in Q4 2022.

More recently, Renascor provide another Project update to the KYAC Board on 8 May 2023 to also request assistance in the organisation of a cultural heritage survey to take place.

A cultural heritage survey was then completed in June and July 2023 in consultation with Kaurna representatives and preliminary advice provided. The advice indicates that there were no additional sites of cultural heritage significance identified. The full survey report and CHMP was endorsed by the KYAC in February 2024.

13.3.2 Heritage Places and Areas

No stakeholder views in relation to non-Aboriginal heritage values have been received.

13.4 Assessment Method

13.4.1 Aboriginal Cultural Heritage

The assessment methods used to determine whether there are any known Aboriginal sites, objects or remains within the subject site and the relevant Traditional Owners of the land with whom to engage, comprised the following:

- A search of the Central Archive, including the Register of Aboriginal Sites and Objects, maintained by Aboriginal Affairs and Reconciliation within the Attorney-General's Department (AGD-AAR)
- Discussions with the Kaurna Yerta Aboriginal Corporation (KYAC)
- Cultural Heritage monitoring during the conduct of geotechnical activities
- On-ground cultural heritage surveys conducted by a KYAC authorised survey team comprising eight Kaurna representatives, one anthropologist and one archaeologist, and two Renascor representatives (June and July 2023)
- Development of a draft CHMP in consultation with KYAC (endorsed by KYAC in February 2024).

13.4.2 Heritage Places and Areas

The method used to determine any registered non-Aboriginal cultural sites or places comprised a desktop assessment and search of the following databases:

- Australian Heritage Database administered by the Department for Climate Change, Energy, the Environment and Water (Cth) https://www.environment.gov.au/heritage/publications/australian-heritage-database
- South Australian Heritage Places Database administered by the Department for Environment and Water http://maps.sa.gov.au/heritagesearch/HeritageSearchLocation.aspx
- Location SA Map Viewer https://location.sa.gov.au/viewer/
- Local Heritage Places listed within the Planning and Design Code as administered by PlanSA, https://plan.sa.gov.au/
- Places of geological significance within the South Australian Resources Information Geoserver (SARIG) administered by the Department for Energy and Mining. https://map.sarig.sa.gov.au/.

13.5 Description of the Existing Environment

13.5.1 Aboriginal Cultural Heritage

Results of the search of the Central Archive

The search results identified several registered and recorded Aboriginal heritage sites within a 5 km buffer of the Project. One reported site is located on the north-eastern fringe of the subject site adjacent to Robinson Road. As noted in Section 13.1, this site will be fenced off prior to the commencement of construction.

In the broader vicinity, numerous sites of cultural heritage significance have been identified including burial mounds. None of these sites will be impacted by the Project.

Existing cultural heritage information

The recorded site adjacent Robinson Road has not been disturbed by modern activity and will be fenced off prior to construction to ensure no inadvertent damage, disturbance or interference will occur by Renascor, its staff and contractors, or SA Water.

Onsite cultural heritage assessment and subsequent survey

Cultural heritage surveys with Kaurna representatives were held on 20 June 2023 (archaeology) and 3 July 2023 (anthropology) respectively to identify surface heritage sites, objects and remains and define the extent of the recorded heritage site on the north-eastern area of the subject land. The survey reduced the risk of Renascor and its contractors encountering sites during the construction phase which would cause Project delays and provided the Kaurna People with a level of comfort that the risk of inadvertent damage to as yet undiscovered sites, objects or remains was reduced to a level of low.

No visible archaeological or anthropological sites were identified during the surveys and Kaurna survey participants are supportive of the Project within the current Project area. Given the significant evidence pertaining to previous Aboriginal occupation of the region, there is potential for disturbing subsurface archaeological sites, objects or remains that are largely undetectable on disturbed land or in areas of artificially modified ground surfaces. To mitigate risk of disturbance, recommendations have been provided to Renascor (Mott D, 2023[15]). Refer Section 13.7.1. Following this a Cultural Heritage Management Plan was developed in consultation with KYAC and endorsed by them in February 2024.

13.5.2 Heritage Places and Areas

There are no non-Aboriginal cultural heritage sites, including geological monuments, within the subject land. The closest is a SA Heritage Place located in Paralowie approximately 1.8 km to the southeast, a dwelling registered in 1993.

[15] Mott, D. 2023. Preliminary Advice. *Aboriginal Cultural Heritage Survey of a proposed Purified Spherical Graphite Plant, Bolivar, South Australia.* Confidential report to Renascor Resources under contract with Integrated Heritage Services Pty Ltd.

13.6 Impact Assessment

The following aspects of the Project have been identified as having the potential to impact cultural heritage sites, objects or remains.

13.6.1 Aboriginal Cultural Heritage

Construction

No impacts to Aboriginal sites, objects or remains are expected during construction activities given the search of the Central Archive, onsite cultural heritage survey, implementation of the CHMP and proposed mitigation measures.

Damage, disturbance or interference to unknown Aboriginal sites, objects or remains during construction

Proposed construction activities include vegetation clearance, excavation and earthworks. Inadvertent damage to unknown sites, objects or remains during these activities could occur.

The risk of damage, disturbance or interference with areas of cultural significance has been reduced to ALARP by engaging early with the KYAC; undertaking a desktop search of the Central Archive maintained by AGD-AAR; undertaking cultural heritage monitoring during geotechnical investigations; participating in onsite cultural heritage surveys of the subject site in June 2023 and July 2023; and developing a CHMP in consultation with KYAC to help manage any discoveries and potential disturbances to Aboriginal cultural heritage sites, objects and/or burials.

Careful planning, continued engagement with the KYAC and implementation of the CHMP by staff and contractors will reduce the risk of damage, disturbance or interference with unknown cultural heritage sites, objects or remains during construction activities.

Cultural heritage awareness and inclusion of cultural heritage management in site inductions for all staff, contractors and sub-contractors involved in any future ground disturbance activities for the Project area.

Higher risk ground disturbance works may be subject to Kaurna monitoring, and the CHMP includes roles and responsibilities for monitoring arrangements.

Placement of Project infrastructure

All Project infrastructure will be placed over areas cleared by the KYAC during the June 2023 and July 2023 cultural heritage surveys and subject to Kaurna monitoring in any identified high risk activities. Careful planning, continued engagement with the KYAC and implementation of the CHMP by staff and contractors will reduce the risk of damage, disturbance or interference with unknown cultural heritage sites, objects or remains during construction activities.

The CHMP framework provides information on Renascor's commitment to working with Traditional Owners to protect cultural heritage values during all phases of the Project, including monitoring arrangements and strategies that will be utilised should unexpected finds occur including.

Operation

No impacts to Aboriginal sites, objects, or remains are expected during operation of the Project

Damage, disturbance or interference to unknown Aboriginal sites, objects or remains during operations

Minor works may be required during operation of the Project. The risk of damage, disturbance or interference with areas of cultural significance has been reduced to ALARP by engaging early with the KYAC; undertaking a desktop search of the Central Archive maintained by AGD-AAR; undertaking cultural heritage monitoring during geotechnical investigation; participating in onsite cultural heritage surveys of the subject site in June 2023 and July 2023; and developing a CHMP in consultation with KYAC.

The CHMP will continue to be implemented during operations in the unlikely event of the discovery of any items of Aboriginal cultural heritage values.

Cultural heritage awareness and inclusion of cultural heritage management in site inductions for all staff, contractors and sub-contractors involved in any future ground disturbance activities for the Project area.

13.6.2 Heritage Places and Areas

There will be no impact to Heritage Places and Areas as a result of the construction and operation of the Project

Damage, disturbance or interference to Heritage Places or Areas during construction and operation

There is only one listed Heritage place within the general vicinity which will be easily avoided by Project activities given it is located approximately 1.8 km to the south-east of the subject site.

13.7 Summary of Key Mitigation Measures

13.7.1 Aboriginal Cultural Heritage

The assessment methods undertaken (section 13.6) have reduced the risk of any sites, objects or remains being discovered at the Project site. A risk remains that construction activities may uncover an unknown site, object or remains which could be inadvertently damaged, disturbed or interfered with.

The development and implementation of a CHMP in consultation with the KYAC is an additional mitigation measure to reduce risk. It also provides Renascor with a clear understanding of requirements and expectations for the protection of Aboriginal sites, objects and remains and the process to follow should something be discovered during construction.

The CHMP, which was developed in consultation with KYAC and endorsed by them in February 2024 includes the following elements:

- Mitigation and management controls including any recommended by a cultural heritage advisor or other specialist as a result of both a comprehensive desktop assessment and follow up site survey

- Cultural heritage awareness and inclusion of cultural heritage management in site inductions for all staff, contractors and sub-contractors involved in any future ground disturbance activities for the Project area
- Understanding monitoring requirements for higher risk ground disturbing works
- Aboriginal heritage discovery procedure, including stop work and notification requirements to be followed should an Aboriginal site, object or remains be discovered during any onsite works
- The establishment of any additional access conditions for workers and equipment
- A description of the types of sites or objects that may indicate cultural heritage values exist
- Requirements for the reporting of any potential human remains
- Review and update of the CHMP when appropriate.

All proposed mitigation measures for the protection of Aboriginal cultural heritage are provided in Table 13-3.

Table 13-3: Mitigation measures – Aboriginal cultural heritage

Mitigation Measure	Construction	Operation
Implement the CHMP endorsed by the Kaurna People which includes procedures to be followed should Aboriginal heritage sites, objects or remains be discovered during project construction and operations, and that comply with relevant legislation (including stop work and appropriate notification and assessment procedures).	✓	✓
Renascor has determined that it will consider an authorisation under the *Aboriginal Heritage Act 1988* to ensure that any Aboriginal sites, objects and/or ancestral remains (heritage) that may be discovered during project works and cannot be avoided, are managed appropriately. This consideration will include a risk assessment, implication to schedule, regulator recommendations, and traditional owner consultation to determine whether or not it will seek an authorisation under the *Aboriginal Heritage Act 1988*.	✓	✓
Site inductions and training will include: • Earthworks and excavations to be conducted with due care. • Obligations should an Aboriginal site, object or remains be discovered Avoidance of the identified cultural heritage area to ensure no damage, disturbance or interference with that site, object or remains. Should avoidance be impossible, Renascor will, in consultation with the Kaurna People and KYAC, submit an application to the Minister for Aboriginal Affairs pursuant to either Section 21 or Section 23 of the *Aboriginal Heritage Act 1988.*	✓	✓
Wherever practicable, the location of surface infrastructure will be placed in areas already disturbed, or cleared to disturb, to reduce the risk of damage, disturbance or interference with any unknown sites, objects or remains.	✓	
Construction works will be monitored by KYAC representatives where works require ground disturbance and are occurring in high risk areas to ensure existing sites are avoided and any new sites are subject to the procedures set out in the CHMP.	✓	
The fencing of the known registered site on the north-eastern border of the adjacent land will be maintained at all times to reduce the risk of inadvertent damage.	✓	✓

13.7.2 Heritage Places and Areas

No mitigation measures for non-Aboriginal cultural heritage are proposed. No impacts are expected as the subject site is relatively disturbed, does not comprise any known sites and is located at least 1.8 km away from the nearest registered site.

13.8 Conclusion

Renascor is committed to the protection of Aboriginal cultural heritage and has implemented controls to reduce the risk of damaging, disturbing or interfering with known or unknown sites, objects or remains. Renascor first established a relationship with the KYAC in 2022 and has been actively consulting with the KYAC and Kaurna traditional owners since that time. The CHMP was developed in consultation with KYAC and endorsed by them in February 2024. The Project CEMP will also outline requirements and responsibilities for all staff and contractors including site inductions, training and protocols for site discovery and reporting.

There is a low risk of non-Aboriginal cultural heritage site being uncovered as a result of the Project. There are no registered sites on any of the databases searched (refer section 13.5.2) and no stakeholders have raised the possibility that the land would have any European cultural heritage significance.

14 Climate Change and Resource Efficiency

14.1 Key findings

- A climate change risk assessment was commissioned by Renascor to identify the potential for a changing climate to impact upon the Project. Some potential risks were identified and control strategies will be implemented to reduce all risks to as low as reasonably practicable.
- Renascor commissioned a lifecycle analysis which calculates the emission intensity of the graphite product as 2.0 kg CO_2 eq per kg PSG.
- Greenhouse gas emissions have been reduced where possible through design and by conducting a lifecycle analysis. Renascor have started defining their carbon footprint to identify key focus areas to reduce emissions.
- The BAM Facility Project has been designed in consideration of the principles of a circular economy as well as contributing to the South Australian circular economy.
- Waste management will be designed in accordance with the waste management hierarchy and all streams identified with appropriate management and disposal measures to be implemented.

14.2 Context

14.2.1 EIS Assessment Requirements

Table 14-1: EIS Assessment Requirements –Climate Change and Resources Efficiency

Library ref	Environmental attribute	Objective	Assessment Requirements	Level of Assessment
CCRE1 Climate Change Adaptation				
CCRE1	Climate Change Adaptation	To ensure that development and design are climate resilient and risks from climate change are reduced.	• Undertake a climate risk assessment of the relevant potential impacts on the development of projected climate change over the lifetime of the development (e.g. increasing temperatures, extreme heat and heat waves, decline in rainfall, increased drought, extreme rainfall events, harsher fire weather, and sea level rise). Include proposed adaptive management strategies. • For developments with a lifetime to 2050 or before, the risk assessment should be based on climate projections from the RCP 8.5 scenario (high greenhouse gas emissions scenario). For developments with a lifetime beyond 2050, the risk assessment should be based on climate projections under both the RCP 8.5 and RCP 4.5 scenario (moderate greenhouse gas emissions scenario). • ▪ Examine the potential cumulative effects of climate change from a risk management perspective (including adaptive management strategies). • ▪ Outline the potential effects of, and identify strategies to protect against, extreme weather events, including a 1% AEP storm event and sea level rise as per Coast Protection Board policy and allowances from a risk management perspective,	Standard

Library ref	Environmental attribute	Objective	Assessment Requirements	Level of Assessment
			including adaptive management strategies. Include mitigation strategies should the structure not withstand such an event.	
CCRE2	Greenhouse Gas Emissions	To ensure the development minimises greenhouse gas emissions associated with its construction and operation so as to meet South Australia's goal to reduce greenhouse gas emissions by more than 50% below 2005 levels by 2030 and achieve net zero emissions by 2050.	• Undertake a greenhouse gas assessment that: ○ identifies all sources GHG emissions that would be generated ○ provides the estimated annual GHG emissions from each source ○ provides an estimate of yearly net GHG emissions and emissions intensity, including an uncertainty assessment ○ provide an inventory of projected annual Scope 1 and Scope 2 emissions for each GHG over the life of the development. Provide an estimate of annual Scope 3 GHG emissions for the life of the development. • Describe how the project will contribute to South Australia's emissions targets i.e. 100% renewable energy target by 2030, 50% emissions reduction below 2005 level by 2030 and zero net emissions by 2050. • Describe measures that have been incorporated in the design to minimise, reduce and ameliorate greenhouse gas emissions, particularly the use of alternative or renewable energy sources and off-sets, energy efficiency and energy conservation measures, and if it incorporates integrated passive design principles and climate-responsive techniques and features and identify barriers to implementation.	Detailed
CCRE3	Sustainable Use of Resources	To ensure opportunities to procure and use resources efficiently and sustainably are maximised, supporting South Australia's transition to the circular economy	• Describe the sustainability objectives of the development and the approach and methodology used to achieve these objectives. • Describe design guidelines for aspects of the development (including transport options) that would be adopted to ensure sustainability. • Describe how sustainability of the development will be audited. • Identify ways in which power use can be minimised or supplemented, especially using alternative energy sources, energy efficient measures and energy conservation. • Identify ways in which water use can be minimised or supplemented, especially using sustainable water sources, water efficiency measures, and recycling. • Describe the proposed approach to matters such as design, construction methods, materials and equipment to reduce energy use (including vehicle emissions), disposal of waste, water use efficiency during construction and operation over the life of the project. • Detail the infrastructure and service requirements for the development including power, water and waste management; identify required	Standard

Library ref	Environmental attribute	Objective	Assessment Requirements	Level of Assessment
			infrastructure upgrades or new installations; and consider access and easement requirements. • Assess the impact of resource use on existing users including food production / horticultural / agricultural activities, and commercial operations.	
CCRE4	Waste Management	To ensure that waste generated, transported or received as part of the development is managed in accordance with the waste hierarchy and in a manner that protects all environmental values.	• Identify, quantify and classify all the expected waste streams to be generated from the proposed project activities during the construction, operation, rehabilitation and decommissioning phases of the development. • Assess and describe the proposed management measures against the waste management hierarchy, namely: avoid and reduce waste generation, recycle, reuse, recover, treatment and disposal. This includes the generation, storage and transport of waste. • Prepare a waste management and minimisation strategy (for demolition, construction and operation where relevant), detailing the sources of waste, the location of waste storage (including separation of waste streams, such as recyclables, hard waste and e-waste) and disposal facilities on the site or development -related sites (e.g. laydowns) and provide details of how these facilities will be serviced. • Identify if any waste outputs require further treatment before waste can be disposed of (e.g. low level contaminated waste disposal) and describe any management measures.	Standard

Table 14-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Detail infrastructure and service requirements and consider access and easement requirements	3 – Description of the proposed Project
Assess the impact of resource use on existing users	8 – Land Use and Site Conditions
Waste management and minimization strategy	Appendix 17

14.2.2 Requirements in Legislation

The *Environment Protection Act 1993* (EP Act) sets out the general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm, including the management of waste. The EP Act is supported by the *Environment Protection (Waste to Resources) Policy 2010* which sets out regulation of waste in South Australia.

Green Industries SA (GISA)was formed in 2004 under the *Green Industries SA Act 2004* to enable and drive change and support the development of a circular economy. GISA developed the *South Australia's Waste Strategy 2020-2025 (supporting the circular economy)* (Green Industries SA, 2020) which sets out the strategy for management of waste within SA to support the principles of ecologically sustainable development as set out in the EP Act.

The concept of a circular economy encompasses a number of aspects including:

- Reducing waste (refer to the waste management hierarchy, Section 14.6)
- Improving material and energy efficiency (refer to sustainable use of resources, Section 14.5); and
- Reducing greenhouse gas emissions (refer to greenhouse gas emissions, Section 14.4).

The National Greenhouse and Energy Reporting (NGER) Scheme is an instrument under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). The scheme provides a national framework for understanding greenhouse gas information and provides methods for reporting on greenhouse gas emissions.

The *Climate Change and Greenhouse Emissions Reduction Act 2007* sets out a number of reporting obligations for the South Australian Government and mandates a biannual assessment by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) on the extent to which the targets under the Act are being achieved. The aim of the Act is to retain accountability for climate action and promote action to meet the specified targets.

14.3 Climate Change Adaptation

Renascor is committed to integrating appropriate climate change mitigation and adaptation practices, and ensuring climate change impacts are integrated into risk management systems across all its activities.

In line with the requirements of the EIS, Renascor commissioned a Climate Change Risk Assessment (CCRA) to identify and assess any climate related risks or opportunities linked directly to the BAM facility and its ability to operate through the lifetime of the asset, and to establish management and mitigation options where necessary. Using this information, a Climate Change Risk Register was produced to track, review and update climate change risks and the identified control measures on a periodic basis.

The CCRA approach taken is aligned with good practice as defined by the Task Force on Climate-Related Financial Disclosures (TCFD). The approach also follows guidance laid out in ISO 14090:2019: *Adaptation to Climate Change — Principles, Requirements and Guidelines*.

The creation and implementation of the CCRA and overall oversight of climate-related risks and opportunities for the site are the responsibility of Renascor's Sustainability Committee, which meets regularly and reports to the Board.

14.3.1 Methodology

To complete the CCRA, historical and current climate data analysis of the site area and future climate projections based on publicly available localised data for the site was used.

Once baseline information about the current climate and associated current climate risks was established, climate change projection data for the site was compiled. Projection data was compiled under an RCP4.5 and an RCP8.5 pathway.

Historical and current data was sourced from established research compiled for this EIS and complimented by supplementary review of BOM data.

Source data for future climate projections was drawn from Climate Change in Australia (CCIA), a resource delivered by CSIRO and the Australian Government's Department of Agriculture, Water, and the Environment (now known as DCCEEW) and the Bureau of Meteorology; and from the New South Wales and Australian Regional Climate Modelling Project (NARCliM).

Under these tools, climate projections under the RCP pathways are applied to local geographical sub-clusters (CCIA: Southern and South Western Flatlands East sub-cluster) or landscape regions (NARCliM: Green Adelaide landscape region).

Relevant raw data from these sources was complemented by desk research of qualitative information and commentary on climate change in the BAM facility location.

With this data as a foundation, a scenario planning group including site experts and senior Project leaders plus external experts was convened. The scenario planning process involved discussing and assessing the potential areas of materiality linked to climate change, and the implications of a range of plausibe future states under an RCP4.5 and RCP8.5 pathway.

The group workshopped a series of potential mitigation and management actions in response to the results of the scenario planning exercise. These have now been indexed in a company risk register to be reviewed at regular intervals and at any major project milestone of the BAM develoment.

In summary this approach reflected good practice in climate risk assessment, enabling the group to complete a CCRA comprising:

- Establishment of site context,
- Risk identification and analysis,
- Risk assessment/evaluation, and
- Initial risk adaptation/mitigation/treatment options.

14.3.2 Current climate context

Data and commentary about the current climate state at Bolivar is documented in Chapter 9 Physical Environment. This state led to the identification of a series of current climate related risks for the site, which served as the baseline for the study.

Table 14-3: Climate Related Risks relevant to the Project

Temperature	Rainfall and water	Fire
High temperatures	Declining rainfall and drought	Dangerous fire weather
Hot day frequency	Severe weather (incl extreme rainfall) events	Severe fire danger day frequency
	Water access	
	Coastal inundation	

14.3.3 Climate projections for the site area

The existing climate is described in Chapter 9 Physical Environment. Climate projections linked to each risk area were produced at an RCP4.5 and RCP8.5 level. A small number of common climate change trends were not assessed under the CCRA, as they were deemed not material to this Project. Wind, frost, evapotranspiration, ocean warming, and acidity were not assessed.

14.3.4 Temperatures

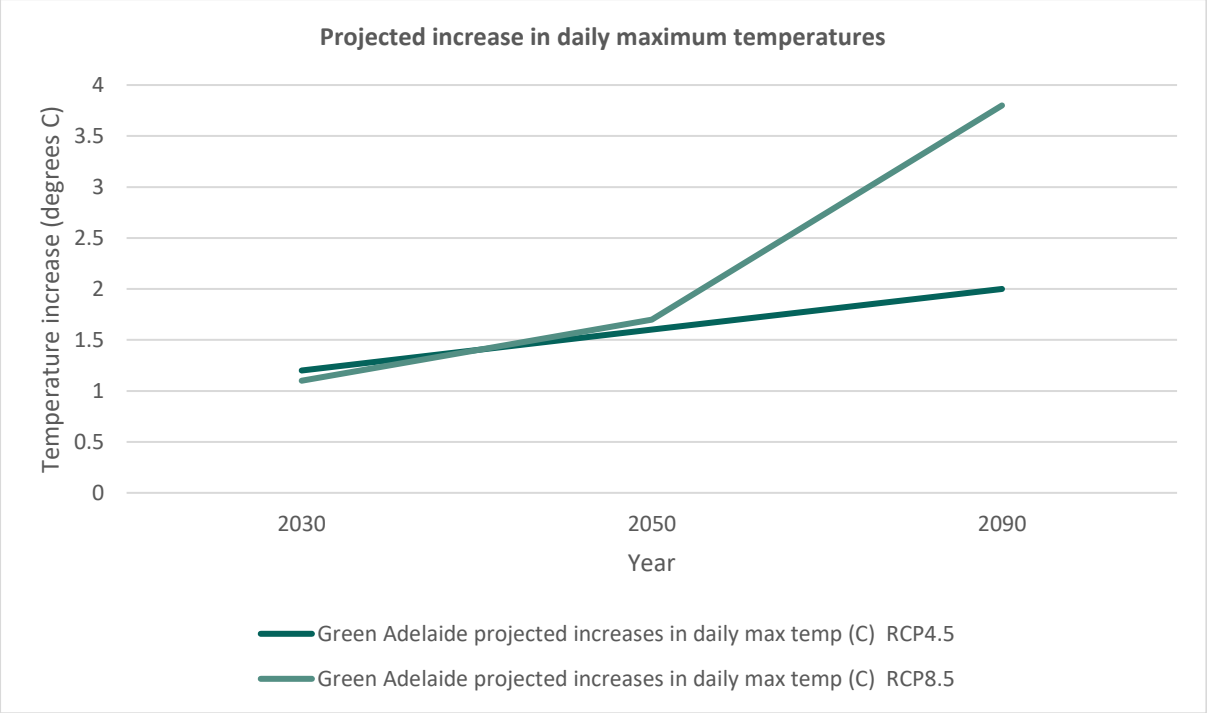


Figure 14-1: Projected increase in annual daily maximum temperatures (OC) in the Green Adelaide region by 2030, 2050 and 2090 (RCP4.5 and RCP8.5).source DEW (2022c).

In line with mean increases, CCIA states that the occurrence of hot days and warm spells in the Adelaide region are projected to increase. Extreme temperatures during these periods are also projected to increase at a similar rate to mean temperature (Figure 14-1 above), with a substantial increase in the temperature reached on hot days. The frequency of hot days, and the duration of warm spells are also projected to increase (CCIA, 2023).

14.3.5 Rainfall and water

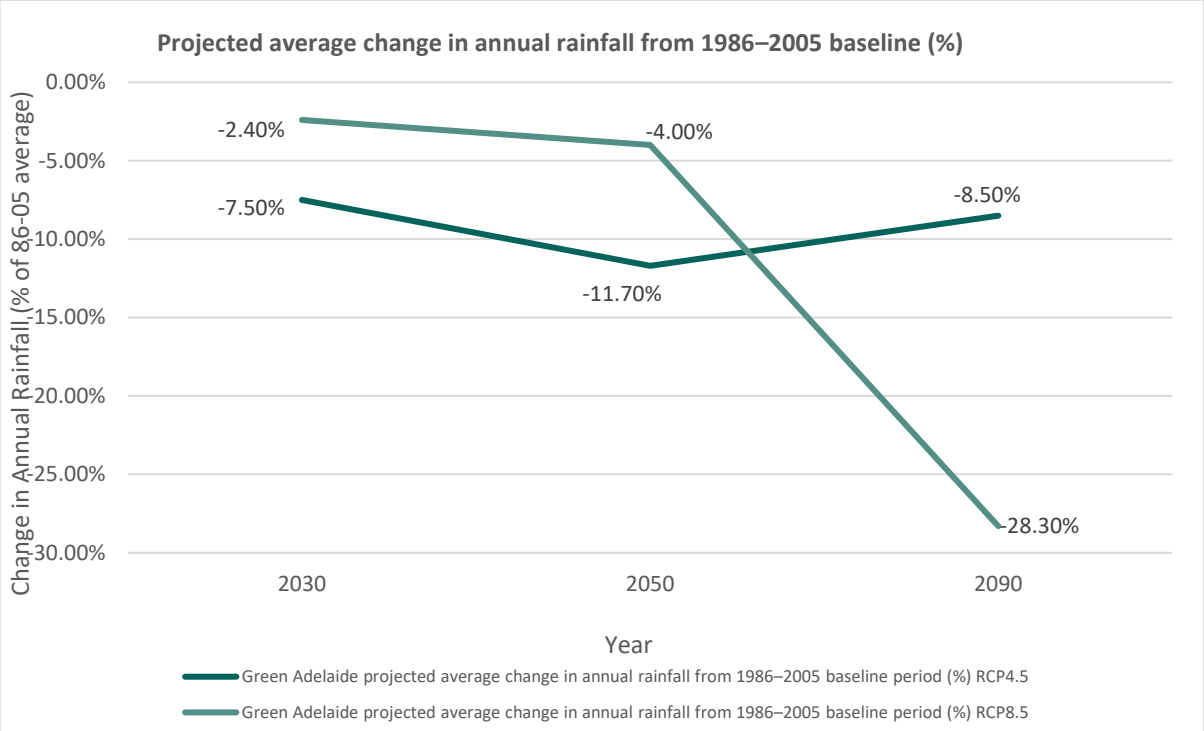


Figure 14-2: Projected change in annual rainfall (%) in the Green Adelaide region 2030, 2050 and 2090 (DEW 2022c).

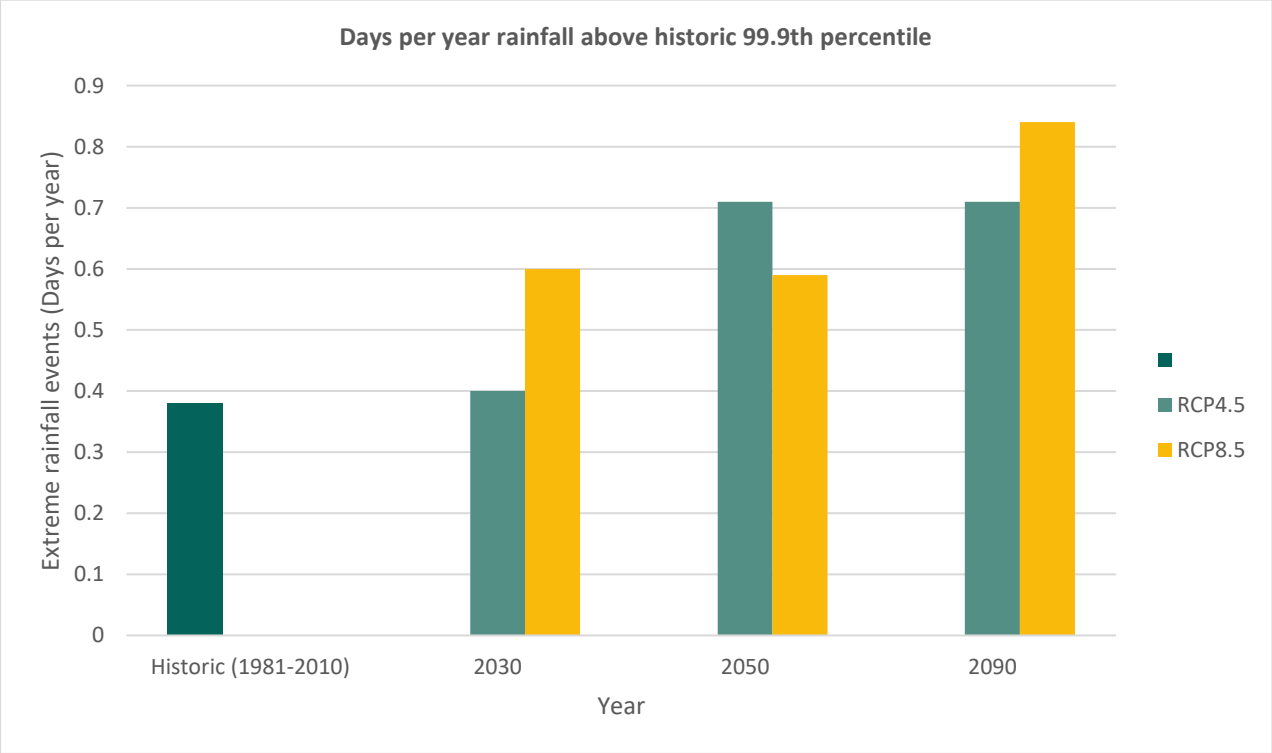


Figure 14-3: Projected day per year rainfall above historic 99.9th percentile.

While average rainfall is projected to decrease significantly, the instances and intensity of extreme rainfall events in Adelaide (as with the rest of the state) will increase.

Average rainfall will decline more under the RCP4.5 pathway through to 2050 before a significant divergence beyond 2050 where the RCP8.5 pathway will see accelerated declines in rainfall while RCP4.5 will see marginal improvements. In alignment with the data in Figure 14-2 above, time spent by the BAM facility operating in drought conditions will increase through to 2030 and then accelerate significantly under an RCP8.5 scenario beyond 2050.

14.3.6 Sea level rise

Mean sea level will continue to rise and the height of extreme sea level events will also increase (DEW, 2022c). For Port Adelaide, the closest relevant data point to the BAM facility, sea level rises under RCP4.5 and RCP8.5 projections broadly correlate through to 2050 before minor divergence to 2090. Under both pathways, an increase in extreme sea-level events such as coastal inundation is also projected with very high confidence (DEW, 2022c). While sea level rise is not predicted to result in coastal inundation on the site during the timespan of the study it has been included due to the proximity of the coast and concern of coastal inundation identified in the Assessment Requirements.

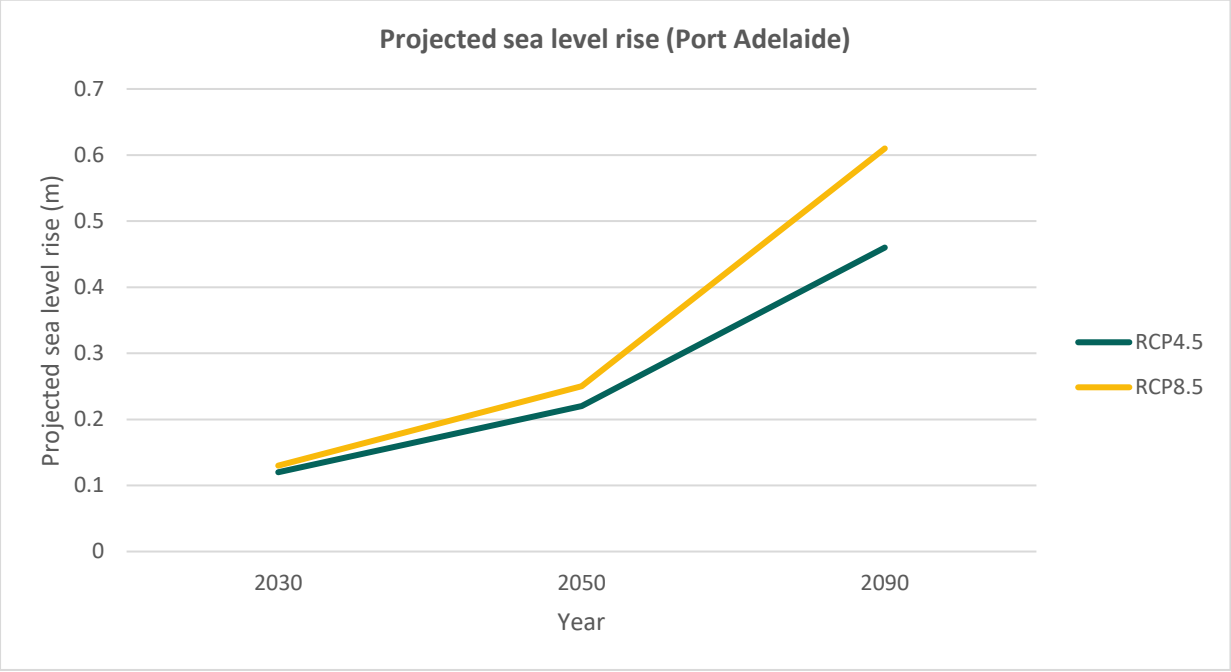


Figure 14-4: Projected sea level rise (meters) at Port Adelaide by 2030, 2050 and 2090 (CCIA, 2023)

14.3.7 Fire weather

By 2030, the number of days with a severe fire danger rating is projected to increase by 12% in the Southern and South Western Flatlands from the Forest Fire Danger Index (FFDI) baseline. Projections are not available for 2050 (2090 only) but projected warming and drying to 2050 means that the trend of increasing days of severe fire danger ratings will continue to 2050 and beyond.

These projected increases are significant, and the 2090 projection is of an increase of 64% in the number of severe fire danger days. But for the lifetime of the BAM facility, the projected increases are not critical. Indeed, other regions of South Australia (Rangelands (35%); Murray Basin (28%) by 2030) face significant higher near-term projected increases (DEW, 2022c).

Given the assessment above, and given the site profile of the facility, fire risk and increased fire risk under future climate conditions has not been identified as material and no risks directly linked to fire are currently listed in the Climate Change Risk Register.

14.3.8 Site risk assessment and evaluation

While the RCP4.5 and RCP 8.5 pathways do diverge to varying degrees across the climate trend areas (especially after 2050), the CCRA working group agreed that the likely impacts through to 2090 for the BAM facility were not significantly different. However, scenarios under both pathways were explored.

Taking the current identified risk areas as a baseline, the working group reviewed potential viable changes (increase/decrease and/or change in form) of known risks to operations and explored potential new risks or opportunities which could emerge under both RCP8.5 and 4.5 pathways. Both physical (risks from the physical climate to Renascor's operations) and transition (risk from changes in legislation and policy on Renascor's operations) risk scenarios were explored.

Fourteen risks were identified, with the majority representing physical risks. The group acknowledged that additional transitional risks may emerge and future investigation of transitional risk exposure may be warranted.

Of the 14 risks identified, 8 risks had control measures assessed as effective, 1 risk to be reviewed once the site is operational, 1 risk requiring ongoing monitoring and 5 risks are dependent on external factors (outside the control of Renascor).

14.3.9 Risk assessment methodology

Renascor developed a risk assessment methodology based on an approach developed by the New South Wales Government's Climate Change Risk Register Tool. Using this approach, each identified risk was assessed against Likelihood Criteria and Consequence Criteria resulting in a risk score of low, medium or high.

Table 14-4: Likelihood criteria

Rating	Recurrent risks	Single events
Almost certain	Could occur several times per year	More likely than not – probability greater than 50%
Likely	May arise about once per year	As likely as not – 50/50 chance
Possible	May arise once in 10 years	Less likely than not but still appreciable – probability less than 50% but still quite high
Unlikely	May arise once in 10 to 25 years	Unlikely but not negligible – probability low but noticeably greater than zero
Rare	Unlikely during the next 25 years	Negligible – probability very small, close to zero

Table 14-5: Consequence criteria

Consequence and success criteria	Health and safety	Environment	Financial
Catastrophic	Single fatality or severe trauma to multiple people.	Significant, extensive damage long term or irreversible impact.	>$15M AUD
Major	Permanent disability to one person.	Wide spread medium to long term damage to valued area.	$10M - $15M AUD
Moderate	Serious injury or impairment to one or more people.	Wide spread medium to long term damage to valued area.	$5M - $10M AUD
Minor	Medical treatment injury.	Localised short to medium term damage to an area of minor local significance.	$500K - $5M AUD
Insignificant	Low level symptoms requiring first aid treatment only.	Limited damage to a localised area. No lasting effects.	<$500,000 AUD

Table 14-6: Risk category definitions - CCRA

Consequence and success criteria	Operations	Strategy	Reputation	Legal
Catastrophic	Plant shutdown. > 2 months	Material impact on achieving Strategic Plan. Complete inconsistency with Core Values	Negative international publicity. Reputation severely tarnished. Share price affected. Contract termination by global Client.	Significant prosecution / fines. Very serious litigation including class action.
Major	Temporary plant shutdown. 1 to 2 months	Key dimension/s of Strategic Plan will not be achieved. Values compromised & unacceptable.	Direct criticism within industry media. Negative national publicity. Reputation tarnished. Loss of credibility with global Client.	Major breach of regulation. Major litigation.
Moderate	Temporary plant shutdown of between 15 days and a month	Requires internal restatement of strategic objectives. Impact on Values requires management.	Negative publicity within industry media. Negative regional publicity	Serious breach of regulation with prosecution or moderate fine possible.
Minor	Plant shut down of < 15 days or equivalent reduction in production volumes	Minor impact on Strategic Plan and Values. Adjustments to Strategic Plan unnecessary.	Negative publicity from local media. Client formal notice of non-performance.	Minor legal issues. Moderate non-compliances and breaches of regulations.
Insignificant	Temporary minor change to existing operating practices and parameters.	No impact on Strategic Plan. Values not compromised.	Local public concern / complaints. Client complaint.	Minor non-compliances and breaches of regulations.

14.3.10 Current risk areas and scores

Table 14-7 outlines the risks assessed in the CCRA and the preliminary risk ratings (before implementation of control measures) to Renascor's business from climate change. Control measures, identified in Section 14.3.11, will be implemented to reduce these risks to as low as reasonably practicable.

Due to its location and control measures planned to address risks associated with the current climate state, the CCRA did not identify any areas where there is an urgent requirement for additional adaption and/or mitigation strategy development to 2050.

It is important to note that identified high risk areas were limited to issues outside of Renascor's control, namely the risk of periodic or permanent damage to local transport and transmission infrastructure. No physical risk to operations was identified in relation to water or energy usage on site.

Table 14-7: Identified climate risks to operations and ratings

Risk description	Risk rating based on RCP4.5 pathway	Risk rating based on RCP8.5 pathway	Comments / Considerations
Higher frequency HVAC (Heating, Ventilation, Air Conditioning) system replacement requirements increased need to cool buildings.	Medium	Medium	To be reviewed once the site is operational
Increase in energy and water usage on site.	Medium	Medium	Control measures currently in place were seen as adequate through to 2050 but Renascor has committed to reviewing cooling management once the site is operational with potential future control measures to be assessed. Risk of resource competition with surrounding land uses has been addressed in Chapter 8 Land Use and Site Conditions.
Site infrastructure degradation	Medium	Medium	Substantially effective[16].
Declining access to ground water.	Low	Low	Substantially effective.
Degradation of local road and rail infrastructure.	Low	Low	Dependent on external factors.
More frequent and higher storm surges (incl 1% AEP storm event) leading to damage of infrastructure.	Medium	Medium	Substantially effective.
Increased frequency of tidal inundation leading to damage to infrastructure.	Medium	Medium	Substantially effective.
Drainage capacity issues for buildings.	Low	Low	Substantially effective.
Limited access and egress as result of permanent inundation of certain areas	Low	Low	Dependent on external factors.
Increased planning controls to manage associated impacts of local flooding (e.g. changes to development approvals/conditions, etc.)	Medium	Medium	Dependent on external factors.
Damage to facility infrastructure and assets (e.g. buildings, telecommunications)	Medium	Medium	Substantially effective.
Periodic or permanent damage to local infrastructure on which the	Medium	High	Dependent on external factors.

[16] 'Substantially effective' within this context means that a control measure currently planned for the development under current climate conditions will likely remain effective against the identified future climate related risk. Where current control measures may not be effective against a future climate related risks, or where risk control falls outside of the project proponent's control, this is indicated accordingly.

Risk description	Risk rating based on RCP4.5 pathway	Risk rating based on RCP8.5 pathway	Comments / Considerations
facility relies (e.g. energy transmission, pipelines, telco)			
Periodic or permanent damage to local transport infrastructure due to flooding.	High	High	Dependent on external factors.
Increased levels of rain/moisture penetration of facility infrastructure.	Low	Low	Substantially effective.

14.3.11 Risk mitigation, adaptation, and control

Due to its location and control measures planned to address risks associated with the current climate state, the CCRA did not identify any areas where there is an urgent requirement for additional adaption and/or mitigation strategy development to 2050.

Strategies to protect against extreme weather events, including a 1% AEP storm event and sea level rise

Within the broad technical guidance for the CCRA submission for the EIS there was one specific risk level stipulation:

> "Outline the potential effects of, and identify strategies to protect against, extreme weather events, including a 1% AEP storm event and seal level rise as per Coast Protection Board policy and allowances from a risk management perspective, including adaptive management strategies. Include mitigation strategies should the structure not withstand such an event."

Renascor commissioned independent climate change scenario analysis to assess whether planned control measures for the current climate state would be sufficient to protect against a 1% storm event and sea level rise aligned with RCP pathway projections.

While the location of the BAM facility does indicate a risk from both periodic flooding and coastal inundation events, it is important to understand the context of the site. It is predicted that rainfall intensities will increase as a part of climate change and that this is likely to increase the peak flow rates that drain towards the site. When assessing the future climate map prepared for the State Government's flood hazard project – which is aligned with the RCP8.5 pathway analysis featured in this report, the results only show minimal changes in flood extents in the vicinity of the Renascor site.

The site will be built up such that finished floor levels will be 300mm above adjacent modelled 1% AEP flood levels, based on TUFLOW modelling of the area. Additionally, there is significant flood storage in the surrounding areas. As such, increases in flood flows draining towards the site are not likely to materially increase flood levels.

The site is far enough elevated from the coastline that it is not likely to be impacted by raising sea levels given that flood levels in the area are in the vicinity of 5.5mAHD, compared to 2100 peak tide levels predicted to be in the vicinity of 4.0mAHD.

Notwithstanding the assessment, a stormwater management plan will be developed with a comprehensive risk assessment and mitigation process completed covering:

- A 1% AEP storm event
- More frequent and higher storm surges leading to damage of infrastructure
- Increased frequency of tidal inundation leading to damage to infrastructure.
- Drainage capacity issues for buildings.
- Limited access and egress as result of permanent inundation of certain areas
- Increased planning controls to manage associated impacts of local flooding (e.g. changes to development approvals/conditions, etc.)
- Increased levels of rain/moisture penetration of facility infrastructure.

All of the above scenarios were assessed as either a low or medium risk rating, with control measures seen as substantially effective through to 2050.

Areas identified for ongoing monitoring and review

While additional adaption and/or mitigation strategy development is not required at present, some areas were identified as requiring periodic monitoring and review to ensure the CCRA remains adequate. Information about these risk areas is commercially sensitive and is documented in the company climate risk register – however for the purposes of the EIS, they are summarised below:

- Higher frequency HVAC (Heating, Ventilation, Air Conditioning) system replacement requirements due to increased need to cool buildings.
- Increase in energy and water usage on site.
    - Control measures remain sufficient against all known scenarios as of the current time. However, the group acknowledged that the physical and transition context may change including legal requirements linked to the speed and level of facility decarbonisation. Specifically, there was an acknowledgement that changing future legal requirements to source an increasing proportion of energy from renewable sources could have commercial impact on energy costs but the projected financial consequence was deemed as “minor”.
    - Energy and water sourcing will remain under review as a standing item at each CCRA review.
- Supply chain and infrastructure integrity beyond battery limit
    - The group acknowledged several climate related risks to supply chain and resource infrastructure outside of Renascor’s control.
    - These risks have been logged in the climate change risk register and will be explored in more detail in the Group-level Climate Change Risk Assessment being completed this year.

14.3.12 Conclusions

As a result of the CCRA, the cumulative effects of climate change on the BAM facility, both under a RCP4.5 and RCP8.5 scenario do not pose a serious risk to the viability of the project through its lifetime.

As outlined above, several risk areas have been identified and the group acknowledge that circumstances may change. As such, all risk areas and risk scores will be reviewed periodically. If throughout the life of the asset, control measures are not deemed substantially effective, they will be

specifically reviewed on a regularly basis with further assessment and any subsequent action taken as needed. This process will be reported to the board through the Sustainability Committee.

14.4 Greenhouse Gas Emissions

The SA government have set a number of emissions and renewable energy targets to mitigate the impacts of climate change at a global scale. These targets are supported by a Climate Change Action Plan which sets out key objectives and actions to deliver on these targets. Renascor's BAM Facility addresses a number of actions from the Climate Change Action Plan including Action 1.1 to drive the continued development of renewable energy and energy storage. At a project scale Renascor have commissioned a Life Cycle Analysis (LCA) for the PSG product which identifies the emissions intensity of this product. The LCA provides a foundational understanding which identifies where to focus emissions reduction efforts to minimise the carbon footprint of the product. Renascor's Environmental Policy (Appendix 5) commits to continuous improvement via regular studies and evaluation of science and technology to protect the environment and mitigate impacts from their activities.

14.4.1 Contribution to South Australia's GHG targets

The *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA) sets out the framework and targets for GHG reduction. Supporting this legislation is the *South Australian Government Climate Change Action Plan 2021 – 2025* which has set more stringent targets for emissions reduction including:

- 50% emissions reduction by 2030 (compared with 2005 levels)
- 100% renewable energy by 2030
- Zero net emissions by 2050

The *South Australian Government Climate Change Action Plan 2021 – 2025* outlines seven objectives each supported by several actions, required to deliver the climate change targets identified above. Table 14-8 identifies the objectives and actions under these objectives that are relevant to the BAM Facility.

Table 14-8: SA Government's Climate Change Action Plan relevance to BAM Facility

SA Government Action	Relevance to BAM facility
Objective 1 Clean Energy Transformation	
1.1 Drive the continued development of renewable energy and energy storage	The BAM Facility is part of the energy storage industry the SA Government is committed to supporting.
Objective 2 Climate Smart Economy	
2.8 Grow the South Australian water industry as a local and global supplier of innovative water solutions	Utilising wastewater as the input stream and implementing water treatment technology to allow industrial development without placing water stress on existing sources
2.9 Support business and communities to adopt circular economy practices.	Refer to Section 14.5.5.
2.10 Implement South Australia's Waste Strategy 2020-2025.	Refer to Section 14.5.5.

SA Government Action	Relevance to BAM facility
2.15 Investigate climate change regulatory risk that may apply to the minerals sector in South Australia.	Renascor have commissioned a study to identify the risk posed by climate change to the BAM Facility and identify strategies to mitigate their risk. Refer to Section 14.3 for more information.
Objective 3 Climate smart agriculture, landscapes and habitats	
3.8 Increase climate resilient water supplies, water reuse and efficient use of water.	Utilising wastewater as the input stream increases water reuse. Returning/recycling water to the same resource results in the ability for other water users to access this resource.
3.11 Develop a climate smart, long term coastal strategy	Due to the proximity of the BAM Facility to the coast (approximately 3 km), Renascor have identified risks from coastal inundation and flooding (refer Section 14.3) and proposed mitigation measures (e.g. raising ground level to prevent site flooding) as an adaptation to mitigate against the impacts of climate change.
Objective 4 Low emissions transport	
4.3 Investigate mechanisms to reduce the emissions intensity of freight and heavy vehicle transport.	Renascor will investigate the accessibility of low emissions freight transport and its viability for use in the Project. Renascor will review this assessment on a regular basis with the aim of being an early adopter or fast follower of clean technologies where economically feasible to do so.
Objective 5 Climate smart built and urban environments	
5.7 Assess climate change risks on development applications referred to the Environment Protection Authority for direction.	Renascor have undertaken a climate change risk assessment to support their impact assessed development application (refer Section 14.3).
Objective 6 Resilient communities	
There are no relevant actions under this objective	
Objective 7 Government leading by example	
There are no relevant actions under this objective	

14.4.2 Life Cycle Assessment Methodology

Renascor Resources have commissioned a Life Cycle Assessment (LCA) of the PSG manufactured from the proposed BAM facility including the estimated carbon footprint. The LCA was completed in July 2023 in accordance with ISO 14044:2006 standard and is a commercially confidential document, however the following summary has been provided from this document in response to the Assessment Requirements.

The LCA was a “cradle-to-gate” study so the product life cycle was assessed from resource extraction to delivery of the final PSG product at Port Adelaide, South Australia. Environmental impacts from the PSG facility have been divided between the final PSG product and the graphite fines based on an economic allocation for expected sale value (94% PSG and 6% graphite fines). The study was a desktop analysis only using the Environmental Footprint 3.0 methodology and all data was provided by Renascor or sourced from public and private databases.

The following was excluded from the LCA:

- capital goods and infrastructure,
- emergency energy and materials,
- employee transport and accommodation,
- emissions associated with deposition of tailings at the Siviour mine site
- packaging materials,
- mine closure and,
- use and end-of-life phases including transport of the final product to consumers.

14.4.3 Greenhouse Gas Emissions

Sources

Sources of greenhouse gas (GHG) emissions are divided into three main source types:

- Scope 1: Direct GHG emissions (e.g. combustion of fuels)
- Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam
- Scope 3: Other indirect emissions such as the extraction and production of purchased materials and fuels, transport in vehicles not owned or controlled by the reporting entity including both “upstream” and “downstream” sources.

The LCA considered GHG emissions from the Mining and Concentrating undertaken at the Siviour Mine Site, product transport and the BAM facility (PSG Plant). Table 14-9 details the GHG sources related to the BAM facility operation which is summarised in Figure 14-5. Construction is considered to be a fraction of this with only a small amount of GHG emissions being created from diesel fuel from construction equipment (compared to operational equipment) and negligible emissions associated with clearance of vegetation.

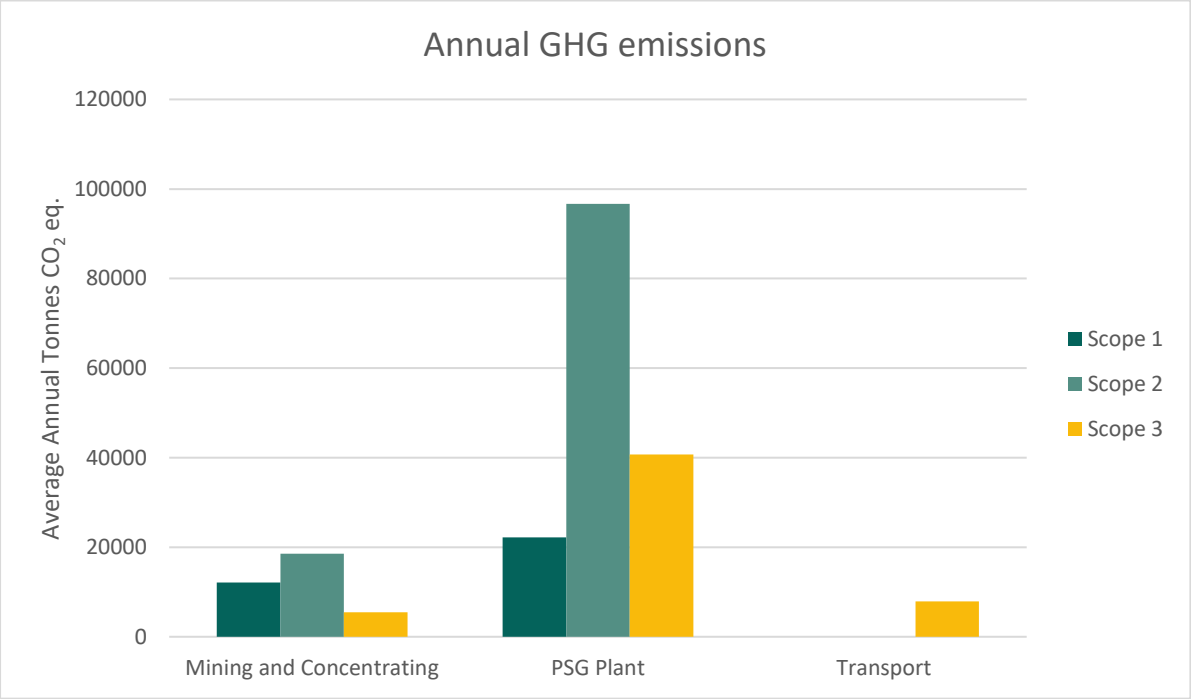


Figure 14-5: GHG emissions from the project

Scope 1

Scope 1 emissions are associated with burning of natural gas in the kiln onsite. Renascor undertook an options analysis including both natural gas and electric kilns. The natural gas option was assumed for the GHG assessment as a conservative scenario.

Scope 2

Scope 2 emissions assumed electricity sourced from the local grid with a reference make up of 41% wind, 37% natural gas, 14% rooftop PV, 5% solar, 2% photovoltaic non-scheduled generation and 1% other (based on 2021-2022 AEMO data). Roasting ovens and dryers in the PSG plant were assumed to be gas fired (and thus included under scope 1 emissions). Latest figures on the South Australian Grid show average natural gas grid make up over 12 months to be reduced to 29% of total with large increases in wind generation accounting for the difference and a reduction in solar generation (AEMO 2023).

Scope 3

Scope 3 emissions are associated with the production and transport of chemicals used onsite (including sulphuric acid, sodium hydroxide, lime, limestone and sodium hypochlorite) in addition to the transport associated with the ore (graphite concentrate) and the final product (PSG).

Estimated annual emissions

Total climate impact (including mining of graphite ore, concentration, transport and PSG plant) are 2.0 kg CO_2 eq per kg PSG with approximately 1.6 kg CO_2 equivalent coming from the PSG plant itself. The most significant contributions are from the burning of natural gas for the SA power grid (accounts for 0.9 kg CO_2 eq. per kg PSG) and from direct combustion of natural gas at the PSG plant (0.3 kg CO_2 eq per kg PSG).

Table 14-9: Greenhouse Gas Emissions and Intensity

Inventory	GHG intensity (kg CO_2 eq. per kg PSG)	Annual GHG emissions (ton CO_2 eq.)	Scope 1 (average annual ton CO_2 eq.)	Scope 2 (average annual ton CO_2 eq.)	Scope 3 (average annual ton CO_2 eq.)
Mining & Concentrating (Siviour)					
Subtotal	0.381	36,865	11,592	17,127	8,147
BAM facility (PSG Plant)					
Reagents	0.171	16,561	-	-	16,561
Direct Emissions	0.12	11,611	11,611	-	-
Grid Electricity (BAM facility)	0.905	87,567	-	87,567	-
Natural Gas	0.308	29,802	25,388	-	4,414
Treated process water	0.003	290	-	-	290
Subtotal	1.507	145,832	36,999	87,567	21,265
Transport					
Subtotal	0.095	9,192	-	-	9,192
Total	2.0	191,889	48,591	104,694	38,605

The data used to develop the LCA was based on desktop analysis. An assessment of the data quality concluded that a basic quality of data was obtained for all three key components (mining and concentrating, BAM facility and Transport) with information being sourced from Ecoinvent database (version 3.8, updated 2021) and Renascor's Definitive Feasibility Study. The impact of inaccurate data was tested via a sensitivity analysis.

A sensitivity analysis was conducted to highlight the impact of changes to the embodied climate change contribution for each aspect. The most sensitive contributor to changes in embodied climate change contribution was the electricity source for the BAM facility followed by the natural gas use at the BAM facility. With the forecast reductions in the SA grid's embodied climate change contribution, it is expected the GHG footprint will reduce significantly for the BAM facility.

14.4.4 Key Mitigation Measures to reduce emissions

The sensitivity analysis for the LCA has indicated the largest contributor to the embodied climate change contribution for the product is the natural gas from the state electricity grid. Thus, the biggest changes in the carbon footprint of the Project will be associated with alteration of the renewable energy percentage of grid power supply. In line with the SA Government Climate Targets and Climate Change Action Plan it is expected renewable uptake will increase with time and the carbon footprint of the product will decrease.

Renascor are considering potential options to further reduce the carbon footprint by using electric kilns, roasting ovens and dryers. Electrification of these sources would assist in decreasing the carbon footprint, noting the high percentage of renewable energy supply to the grid. Options for electrification include electrification during stage 2 only as well as retro-fitting stage 1 equipment depending on the viability of this technology.

Renascor's Environmental Policy (Appendix 5) outlines principles of continuous improvement and "conducting or supporting appropriate research, studies and evaluations to develop more effective methods for the protection of the environment and mitigation of impacts relating to our activities."

Mitigation measures to reduce GHG emissions can be divided into design elements and ongoing management. Design elements of the Project to reduce emissions included locating the BAM Facility on the transport route between the mine and the point of export (Port Adelaide) and placement of the facility co-located with a water source. Integration of water sensitive urban design, environmentally sustainable design principles and other relevant aspects of the Planning Code are discussed further in Chapter 5 (Planning Assessment). Ongoing management measures to reduce emissions include regular reviews of the available green technologies viable for the project, and ongoing monitoring and reporting of GHG emissions.

14.4.5 Conclusion

Renascor have a robust understanding of the potential GHG emissions from the whole of Project and have incorporated energy efficient principles (e.g. reuse of waste streams, site placement to reduce transport) into the design of the Project. By conducting an LCA, Renascor have started to define the carbon footprint associated with the Project and have identified areas of focus to reduce emissions through continuous improvement in line with their Environmental Policy. The BAM Facility will support

the state Climate Change Action Policy by increasing the capability of the state to produce critical minerals to support global production of EV battery and energy storage solutions.

14.5 Sustainable Use of Resources

14.5.1 Key Findings

- The Project will support transition to a circular economy by providing critical materials for renewable energy technologies.
- Key inputs of energy and water will use sustainable sources that do not impact on other users.
- The Project increases SA's capability to process critical minerals for production of renewable energy technologies.
- The process avoids the use of hydrofluoric acid.
- The site for the Project was selected to minimise the transport costs required for this facility, reducing fuel and energy use
- Two waste streams have been identified as potential products for other industrial processes and investigations to quantify the wastes, determine quality, and identify potential markets are underway.
- Water management throughout the process has focused on recycling where possible and treatment prior to returning to the SA Water outfall channel.

14.5.2 Sustainability Objectives

Renascor sustainability frameworks

Renascor's Environmental Policy (Appendix 5) acknowledges their commitment to minimising their environmental impact through identification and implementation of best practice environmental planning, management and monitoring and continuous improvement. Renascor's business is to supply raw materials for battery manufacture to support the transition to renewable energy (refer to Section 14.5.5 for more information). Acknowledging their key role in the transition to a global circular economy, Renascor are currently aligning their Environmental and Social Management Systems and standards with Equator Principles (EP4).

Examples of the EP4 principles are included throughout the EIS including:

- Principle 2: Environmental and social assessment (including climate change risk assessment)
- Principle 3: Applicable environmental and social standards
- Principle 5: Stakeholder engagement
- Principle 10: Reporting and transparency

The approach taken to align with EP4 principles includes a review of current Renascor policies, standards and management systems with a gap analysis against the EP4 requirements as well as a roadmap for reaching compliance.

Renascor is a member of the European Raw Materials Alliance (ERMA) which was set up to ensure reliable, secure and sustainable access to raw materials as key enablers for the global transition to the

circular economy. ERMA recognises the importance of graphite for manufacture of batteries to support the transition to renewable energies. While there are no current commodity specific sustainability frameworks for graphite, Renascor has been monitoring the emerging battery sustainability frameworks and the key ESG requirements to ensure Renascor align with expectations, including:

- Global Battery Alliance
- EU Battery Directive; and
- US Inflation Reduction Act of 2022.

South Australia sustainability objectives

Green Industries South Australia (GISA) is the government agency tasked with developing and implementing strategy to support South Australia's transition to a circular economy. Green Industries SA Strategic Plan 2020-2025 outlines 5 strategic principles to support the states transition to a circular economy:

1. Circular Products and Services – designing out waste to keep resources circulating in the economy and enabling sustainable procurement.
2. Circular Consumption – reducing wasteful consumption by sustaining products through repair and reuse, avoiding waste, and improving recycling and recovery.
3. Circular Resource Recovery – investing in state-of-the-art infrastructure to unlock the value of materials that would otherwise be sent to landfill.
4. Circular Sectors – creating economic growth and job opportunities by making targeted industry sectors resource efficient and carbon neutral.
5. Circular Capacity – capacity building through investment in training, education, innovation and research and development to nurture the next generation.

The Project will support strategic priority one (Circular products and services) by creating products to support use of batteries required for renewable energy transition. In addition, Section 14.5.5 outlines how the circular economy principles have been implemented into the Project design to reuse and improve the efficiency of energy and water use as well as identifying markets for waste products.

14.5.3 Design Guidelines

The Project has been designed to meet the following relevant standards, guidelines and codes of practice. A full list of references used to support the development of the EIS, including standards and guidance, can be found in Chapter 20 (References).

1. AS 1940-2004 The storage and handling of flammable and combustible liquids
2. AS 1289 Methods of testing soils for engineering purposes
3. AS 2758 Aggregates and Rock for engineering purposes
4. AS 4678 Earth-retaining structures
5. Australia and New Zealand Water Quality Guidelines
6. AUSTROADS Guide to Road Design
7. AUSTROADS Guide to Traffic Management
8. Environment Protection (Air Quality) Policy 2016 and associated guidance

9. Environment Protection (Commercial and Industrial Noise) Policy 2023 and associated guidance
10. Environment Protection (Water Quality) Policy 2015 and associated guidance
11. SA EPA Bunding Guidelines
12. SA EPA Construction Dewatering Guideline
13. Water Sensitive Urban Design Guidelines

Key aspects of the design have then been modelled and/or assessed against these guidelines to demonstrate compliance will be achieved, with relevant copies of these provided in the Appendices.

14.5.4 Sustainability Auditing

Renascor's Environmental Policy includes monitoring and reporting openly on environmental performance to shareholders and the community. Renascor have also committed to aligning with the requirements of EP4. Principle 7 of the EP4 Principles involves the independent audit of projects with potential for limited or significant adverse environmental and social risks. The PSG facility will have the sustainability aspects audited as part of EP4 alignment (or alternative) and plans to report on sustainability once operational.

14.5.5 Supporting transition to circular economy

SA circular economy

GISA produced Supporting the Circular Economy, South Australia's Waste Strategy 2020 – 2025 which identified the following priorities:

1. Transitioning to a circular economy
2. Market development (sustainable procurement)
3. Infrastructure capability and capacity
4. Food waste
5. Plastics and packaging

The Project will contribute to SA's transition to a circular economy by focusing on the first three priorities.

The Project will support transition to a circular economy by providing critical materials for renewable energy technologies.

GISA is working to transition the state to a circular economy, where production of goods and services reuses material to reduce raw material inputs and produces no waste or pollution. While the Project involves processing of raw graphite, it is used to produce critical minerals for battery manufacture. Battery technology is an essential part in increasing the use of renewable energy within the state and improving the efficiency of renewable resources.

Key inputs of energy and water will use sustainable sources that do not impact on other users.

The market development priority of the waste strategy focuses on increasing sustainable procurement especially of recycled materials. The water source for the Project is treated wastewater from the Bolivar WWTP which has no other users and is returned to the SA Water outfall channel. Water from

the process will be treated and returned to the channel at a comparable quality allowing for another user to access in future.

The project will obtain power from the state grid. In 2022, the average energy generation in South Australia was 29.5% gas, 1% Diesel and 69.5% renewable energy (AEMO, 2021). Where possible, electrical infrastructure has been selected to utilise the strong renewable contribution to the grid.

The Project increases SA's capability to process critical minerals for production of renewable energy technologies.

The infrastructure capability and capacity strategic priority focuses on investing and building capability for resource recovery within the state. The Project aims to increase the capability of SA to support secondary processing of materials for battery technology which allows more efficient capture and use of renewable energy. It also supports local processing of materials to reduce the associated environmental costs of transport.

Implementing circular economy principles within project design

The Project design has also considered the principles of the circular economy as detailed in Figure 14-6. This includes optimising the raw materials for the process including water and chemical reagents, reducing the packaging and transport required to produce batteries and identifying potential product streams from the waste.

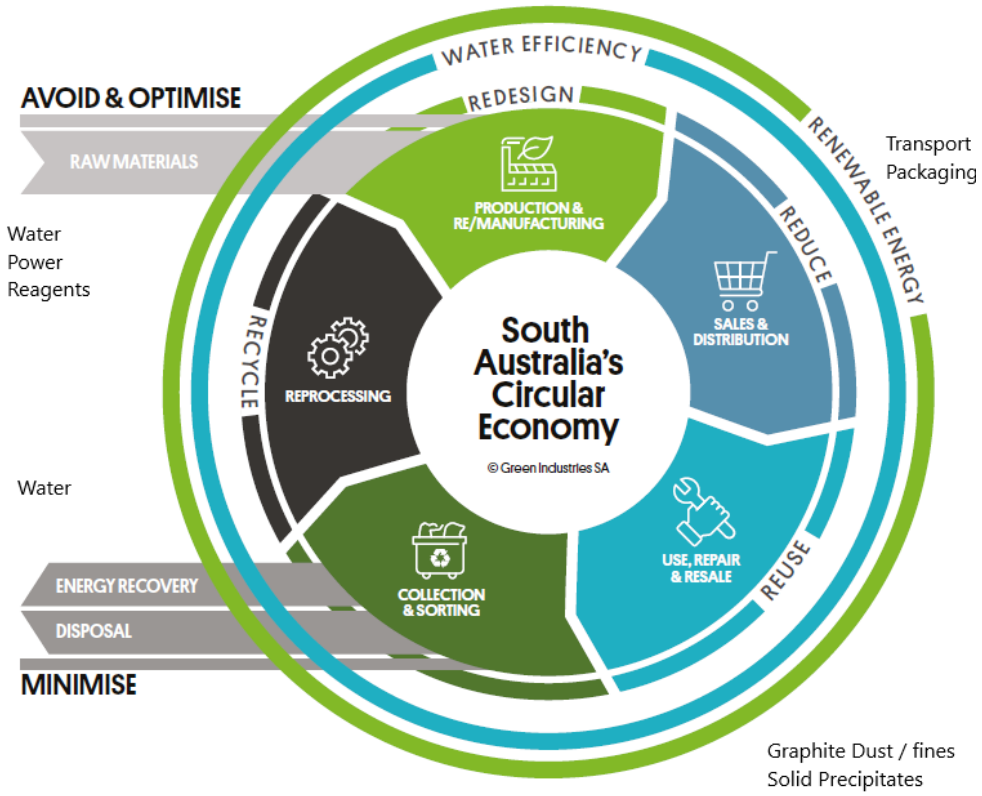


Figure 14-6: Circular Economy Principles as applied in design

The process avoids the use of hydrofluoric acid and obtains water and power from sustainable sources.

The process was redesigned to avoid the use of hydrofluoric acid (HF) which is extremely harmful to the environment. Optimisation of the key inputs of energy and water are detailed above. Water will be recycled through the processing circuit to reduce the water demand to approximately 4.8ML/day required for top up and the rest of the water demand is recirculated through the processing circuit.

The site selection of the Project was selected to minimise the transport costs required for this facility.

The site selection process for the BAM facility considered a number of critical factors including the proximity of land to the transport route between the source (mine site) and point of sale / export to reduce additional transport costs. The proximity to large sources of sustainable water and power was also considered to reduce the cost of transporting these resources and potential losses during the transport process. Reagents and other consumables onsite will be bought in bulk (where feasible to do so) to reduce the amount of packaging required with these products.

Two streams have been identified as potential products for other industrial processes and investigations to quantify the characteristiscs, quality and potential markets are underway.

Two by-product streams from the Project have been identified as potentially having value as a product and investigations into the marketability of these by-products is currently underway. With graphite dust / fines from the milling process, a market is currently being sought.

The solid precipitate material (including mixed silica aluminate and sodium silicate, mixed calcium and magnesium carbonate and calcium sulphate / gypsum) has been identified as potentially having value in industrial processes. Further studies are being undertaken to quantify the amounts and quality of this precipitate from the process and thus the potential market for this product, initial results indicate approximately 95% of the by-product is likely to be suitable for sale at secondary markets.

Water management throughout the process has focused on recycling where possible and treating prior to return to the SA Water outfall channel.

To minimise the amount of water required, water is recycled through the process where possible with top ups required to replace water that cannot be recycled further. Caustic is also recovered from the water treatment process and recycled for use in the purification process. Prior to return, water will be treated to a comparable quality as it was received. This means the water volumes and quality within the channel remain comparable, hence allowing for other uses.

14.5.6 Conclusion

The Project will contribute to the state's sustainability goals and enable transition to a circular economy by increasing the capability to manufacture renewable energy technologies. The Project itself will align with EP4 principles. The principles of the circular economy have been integrated into the design process.

14.6 Waste Management

Renascor have developed a Waste Management and Minimisation Strategy (Appendix 17) for the Project. The strategy details how the waste management hierarchy (Figure 14-7) has been incorporated into operating principles with avoidance and minimisation of waste preferred. All waste streams for construction, operation, maintenance and decommissioning have been identified along with approximate quantities and proposed management strategies in Table 14-10.

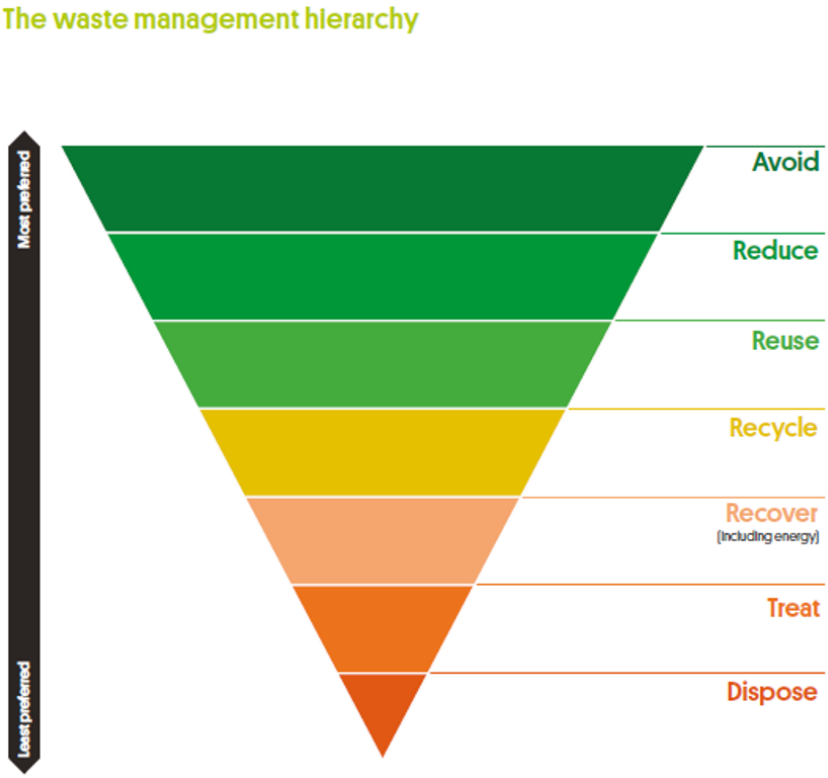


Figure 14-7: Waste Management Hierarchy (source: SA Waste Strategy 2020-2025)

Table 14-10: Waste Streams from BAM Facility

Waste Stream	Approximate quantity	Project Phase	Management (hierarchy step)
General construction: • Infrastructure and services • Laydown areas Temporary offices	3-4 temp buildings. Temporary buildings use for construction will be re-used on other construction projects	Construction	Reuse – temporary offices and other equipment and reusable construction materials to be transported to another site for use. Disposal – material to be removed to the appropriate facility (separated into recyclable material and that destined for landfill).
Processing water & brine	<4.8ML/d	Operations	Treat (RO plant and water treatment plant) & Dispose (return to channel)
Graphite dust / fines	50kt/a Sold to secondary markets (carburizer, lubrications etc.)	Operations	Recover – consider potential markets for graphite fines
Solid Processing Wastes:	Gypsum: ~100 tonne/day (30% moisture)	Operations	Recover (base case option) - investigating potential beneficial uses for third party industrial processes subject to testing and

Waste Stream	Approximate quantity	Project Phase	Management (hierarchy step)
• Mixed silica aluminate & sodium silicate • Mixed calcium and magnesium carbonate • Calcium sulphate (gypsum)	Mixed Ca-Al-Si -O precipitate and CaSiO3: ~3 tonne/day (25% moisture) Mixed CaCO3 and Na2SiO3 ~1 tonne/day (40% moisture)		classification to identify a market). If markets are identified, appropriate testing in accordance with EPA requirements for reuse will be undertaken. Disposal (where recovery is not possible) remove offsite – chemically neutral
Boiler blowdown and cleaning chemicals	Quantities to be determined through detailed engineering design	Operations	Disposal as trade waste
Clean fill and spoil from excavated materials (including PASS if encountered)	None, all used on site to build up the site	Construction	Reuse – use for areas requiring fill or spread over rehabilitation areas before placement of topsoil.
Vegetation and organic materials from land clearance	Quantities to be determined through detailed engineering design	Construction	Reduce – minimize clearance area Recycle – mulch or compost organic matter to provide material for screening vegetation and reestablishing construction laydowns etc. Mulched and composed material will be stockpiled onsite during construction, excess material not required for landscaping or revegetation will be disposed of to landfill.
Waste concrete	Unable to determine	Construction	Reuse – transport to another site for use. Where not possible, waste concrete will be collected in washout bays, solidified and transported to a licensed facility for reuse or disposal.
Steel and metal	Unable to determine	Construction	Reuse - sell excess for other developments or used metal for scrap.
Domestic waste	Unable to determine	Construction, operations and decommissioning	Recycle – separate waste streams at source (recycling, food waste and landfill) to reduce unavoidable landfill
Timber	Unable to determine	Construction	Recycle – mulch or compost organic matter to provide material for screening vegetation and reestablishing construction laydowns etc.
Excess hazardous materials and chemicals or spill clean up materials.	Unable to determine	Operations	Treat & Dispose – ensure all waste is appropriately disposed of in accordance with the relevant legislation. Onsite storage, while awaiting disposal, will be in bunded areas and spills cleaned up in accordance with the SA EPA guidelines.
Demolition of buildings	As per description of operations (all buildings on from project description).	Decommissioning	Reuse – disassemble plant and reuse or sell.
Asbestos material (identified in PSI)	Fragments of asbestos containing material spread over a 25 by 50 m area	Construction	Dispose – prior to construction commencing the identified asbestos on the site will be removed by a licenced contractor and disposed of in accordance with legislative requirements.
Septic wastewater	Unable to determine	Construction and operations	Septic wastewater will be collected in an onsite septic wastewater services subject

Waste Stream	Approximate quantity	Project Phase	Management (hierarchy step)
			to a Wastewater Works Approval under the *Public Health Act 2011* and subsidiary legislation. Wastewater will be collected in a tank with a contractor pumping it and transporting to a licenced facility.

14.6.1 Conclusion

Waste management has been designed in accordance with the waste management hierarchy and all waste streams have been identified along with appropriate management, treatment and disposal requirements. Assessment of potential impacts to soil or water as a result of inappropriate waste management have been assessed in Chapter 9 Physical Environment.

15 Hazard and Risks

This chapter addresses the Hazards and Risks identified in the EIS Assessment Requirements (Library Reference HR0, HR1, HR2, HGR3, HR4).

Renascor have conducted a formal safety study and hazard assessment to assess the safety, hazards and risks of the Project. The key parameters of the formal safety study include hazard identification (HAZID), hazard and operability analysis (HAZOP) and a quantitative risk assessment (QRA). Development of safety, hazard and risk studies is an iterative process which responds to Project development. Studies and subsequent risk analysis will continue to be developed and updated as the level of design detail and Project definition develops.

Hazard Identification workshops were held in 2022. The purpose of the workshops was to identify key hazards, examine their causes, identify preventative and mitigative measures and undertake an initial risk assessment. Formal hazard management plans will be developed for the Project and included in Project-specific construction and operational environment management plans (CEMP and OEMP).

15.1 Key Findings

Bushfire (originating offsite)

The Project site is not within a Bushfire Protection Area and is not within the Mount Lofty Ranges Fire Ban District by exclusion (see Figure 15-1 and Figure 15-3). The Project is not subject to bushfire-specific building controls or standards. Based on this spatial data, the level of risk associated with an unplanned or uncontrolled fire event occurring outside the Project site is considered to be negligible and able to be effectively controlled through standard fire hazard management procedures.

Fire (originating onsite)

The design, construction and operation of the Project will be carried out in accordance with industry best practice and international, Australian and South Australian standards and certifications. All potential sources of ignition, including explosion risk, have been identified through Hazard Identification and risk assessment processes. Measures to mitigate fire within the Project undertaken in accordance with relevant standards and legislation are appropriate to manage the risk.

Flooding

The Project site is located in a site prone to flooding after heavy rainfall events. In accordance with requirements for development within the Hazard – Flooding (General) overlay the Project will raise the ground level to 300 mm above the 1% AEP flood level. Measures to mitigate flooding on the Project Site may have a minor increase in surface water ponding on vacant land south of St Kilda Road after major rainfall events.

Site and Groundwater Contamination

All potential sources of contamination (both existing and potentially resulting from the Project) have been identified and mitigation measures proposed. A full risk assessment is included in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

Dangerous Substances

All hazardous substances have been identified and industry standard mitigation measures will be appropriate to manage the risk. Dangerous substances to be stored and used onsite have been described in Chapter 3 (Description of the proposed Project).

15.2 Setting the context

Each section provides information explaining the context within which impact assessment is undertaken. Each section includes:

- Key findings
- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- A description of the existing environment
- The impact assessment undertaken in accordance with the methodology outlined in Chapter 7 (Impact Assessment Methodology) for both Construction and Operations
- The key mitigation measures proposed to reduce or prevent environmental impacts
- A conclusion summarising the overall outcome of the impact assessment undertaken.

15.2.1 EIS Assessment Requirements

The EIS Assessment Requirements for hazards and risks are set out in Table 15-1.

Table 15-1: EIS Assessment Requirements – Hazards and Risks

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
HR0	Hazards – General	To ensure the risk of, and adverse impacts from natural and man-made hazards from the development are avoided, minimized or mitigated to protect people, property and the environment.	• Undertake a risk assessment which describes the potential risks to people and property that may be associated with the proposed project for all components of the development. • The assessment will address the specific requirements listed in HR 1, 2, 3, 4 below.	STANDARD
HR1	Bushfire / Fire	As above	• Evaluate and identify any bushfire risks on the site, in particular how risks from bushfire will be minimised with regards to the potential for uncontrolled bushfire events, high levels and exposure to ember attack, impact from burning debris, radiant heat, likelihood and direct exposure to flames from a fire front. • Evaluate the risk of fire explosion the site and any potential impacts on human health and to the environment.	STANDARD

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
			• Describe measures that would be taken to minimise the risks of these events during all stages of development.	
HR2	Flooding	As above	• Assess the vulnerability of the area to flooding. Describe the history of flooding onsite and in proximity to the development site. • Identify the potential impacts on people, property, infrastructure and the environment from potential flood risk. • Identify the wider impacts of stormwater and flooding from existing and planned upstream growth areas of the 30-Year Plan for Greater Adelaide. • Include modelling that considers future increased rain intensity scenarios as a result of climate change and future land use change scenarios in the area that may also increase runoff. • Describe measures that would be taken to minimise the risks of these events during all stages of development.	DETAILED
HR3	Site and Groundwater Contamination	As above	• Detail any known or potential sources of contaminated of groundwater that could be impacted by the development. • Identify the potential impacts on people, property, infrastructure and the environment from potential soil and groundwater contamination. • Describe measures that would be taken to minimise the risks of these events during all stages of development.	DETAILED
HR4	Dangerous Substances	As above	• Identify all dangerous and hazardous substances and any explosives to be used, transported, stored, processed or produced and the rate of usage. • Describe the use, handling and disposal of these materials during construction and operation, with reference to storage (including any associated fire protection facilities). • Describe how hazardous contaminants and waste substances produced by the development will be treated or contained until their disposal at an approved facility. • Evaluate the potential effects of any accidents involving dangerous substances on the environment and public health in the vicinity of the site. • Describe measures that would be taken to minimise the risks of these events during all stages of development.	DETAILED

15.2.2 Views of Stakeholders

No stakeholder feedback has specifically identified concerns relating to public safety, hazard and risk management, site and groundwater contamination or dangerous substance use in connection with the Project. Renascor acknowledges that the Salisbury Council, MFS, DEW and the EPA are key regulatory stakeholders with regard to Project-specific hazards and risks, as well as neighbouring landholders.

15.3 Fire Hazard

This section discusses fire hazard with relation to the Project, having regard to bushfire risks related to the site and locality, and Project-specific fire risks.

15.3.1 Requirements in legislation

This section assesses fire risk with regard to the relevant following legislation, policy, planning controls, standards and guidance documents:.

- Fire and Emergency Services Act 2005 (FES Act)
- State Bushfire Management Plan – State Bushfire Coordination Committee (SBCC)
    - Adelaide Mount Lofty Ranges Bushfire Management Area Plan – (SBCC)
- Guidelines for Fire Protection Services Pipework Systems – Wastewater Removal 2003 – EPA – addressed in Waste Management Plan/CEMP/OEMP
- Water Quality EPP – wastewater from fire protection systems
- Planning, Development and Infrastructure (General) Regulations 2017 (PDI Regulations)
- Relevant Australian Standards, including (but not limited to):
    - AS3745 Planning for Emergencies in Facilities
    - AS1670.1 & AS1670.4 Fire detection, warning, control and intercom systems – System design, installation and commissioning – (Part 1: Fire) (Part 4: Emergency warning and intercom systems)
    - AS1851 Maintenance of fire protection systems and equipment
    - AS2118.1 Automatic fire sprinkler systems, Part 1 – General systems
    - AS2441 Installation of fire hose reels

15.3.2 Description of existing bushfire risk

Renascor have conducted a desktop bushfire assessment relating to the Project site to identify and evaluate bushfire risks on the site and requirements for risk minimisation. The assessment comprises spatial analysis of the Project site having regard to bushfire mapping tools, an analysis of fire history and mapped fire hazard in the vicinity of the Project site, and development of an initial risk avoidance strategy which will inform the creation of a Fire Hazard Management Plan (FHMP), to be included in the Project specific CEMP and OEMP.

A detailed description of the landform, topography and vegetation environment is contained Chapter 9 (Physical Environment). A summary of the aspects relevant to bushfire risk is provided below.

Bushfire Management Areas

South Australia is divided into nine Bushfire Management Areas (BMA) for which Bushfire Management Area Plans (BMAP) have been developed. The Project is located within the Adelaide and Mount Lofty Ranges (AMLR) BMAP area.

Each BMAP contains a risk assessment in respect of human settlement, economic, cultural heritage and environmental assets consisting of digital mapping tools, accompanying text documents (the plan) and risk treatment registers for specific assets. BMAPs also identify Bushfire Safer Places and Last Resort Refuges within the BMA. The purpose of the BMAP is to:

- Identify assets at risk from bushfire,
- Outline bushfire prevention and mitigation strategies,
- Identify responsibilities for implementation of risk mitigation treatments, and
- Establish principles and standards to guide the success of bushfire management strategies.

The Planning and Design Code (the Code) designates bushfire protection overlays within which development is subject to bushfire-related planning and building requirements according to the level of bushfire risk determined for an area. The Hazards (Bushfire) Overlays reflect the same boundaries as Bushfire Protection Areas.

The Project site does not interact with any Hazards (Bushfire) Overlays, and therefore is not within a formal Bushfire Protection Area. The nearest extent of the closest Bushfire Protection Area is approximately 1.5 km to the north of the Project site.

The AMLR BMA encompasses both the Adelaide Metropolitan and Mt Lofty Ranges Fire Ban Districts (FBDs). Although the Project site is geographically within the Mt Lofty Ranges FBD, it is subject to exclusion from Mt Lofty Ranges FBD controls.

BMAP Asset Areas

The Project site occurs within an identified BMAP Asset Area, identified as Asset ID 2050017. This area relates to the area of market gardens between the urban interface of metropolitan Adelaide, and the southern extent of the Bushfire Protection Area to the north, and is assigned a risk rating of Medium. Each BMAP asset is assigned a risk rating of either low, medium, high, very high, or extreme. Assets may be assigned risk reduction treatments to reduce their level of risk. Where risk reduction treatments are assigned, the agency or agencies responsible for the treatment are also specified. This asset type is “economic” with a categorisation of “commercial and industrial”, subcategorised as “Industrial Area”. Risk treatment strategy for this area is described as legislative and administrative and includes Community Engagement, Education and Information Provision as well as Community Development Programs where the City of Salisbury Council is accountable for implementing.

Bushfire History

There have been no recorded major bushfire events in the vicinity of the Project site within the past 20 years. The nearest recorded bushfire event occurred approximately 4.5 km north of the Project site in Virginia in 2018, adjacent to the road reserve on Port Wakefield Road. The peri-urban location of the Project site, in addition to the nature of vegetation and adjacent land uses serves to mitigate the risk for uncontrolled bushfire events in the locality.

Bushfire Risk

The Project site is not located within a Bushfire Protection Area, or any Bushfire-specific Hazard Overlay under the Code. The Project is therefore excluded from bushfire-specific building code requirements such as Ministerial Building Standard (MBS) 008.

Key Mitigation Measures

Key mitigation measures for the management of bushfire risk include:

- emergency response protocols and equipment in place and regularly checked, and
- development of a Project specific bushfire emergency evacuation plan in consultation with MFS.



Figure 15-1: Bushfire Risk Areas (source: SAPPA)

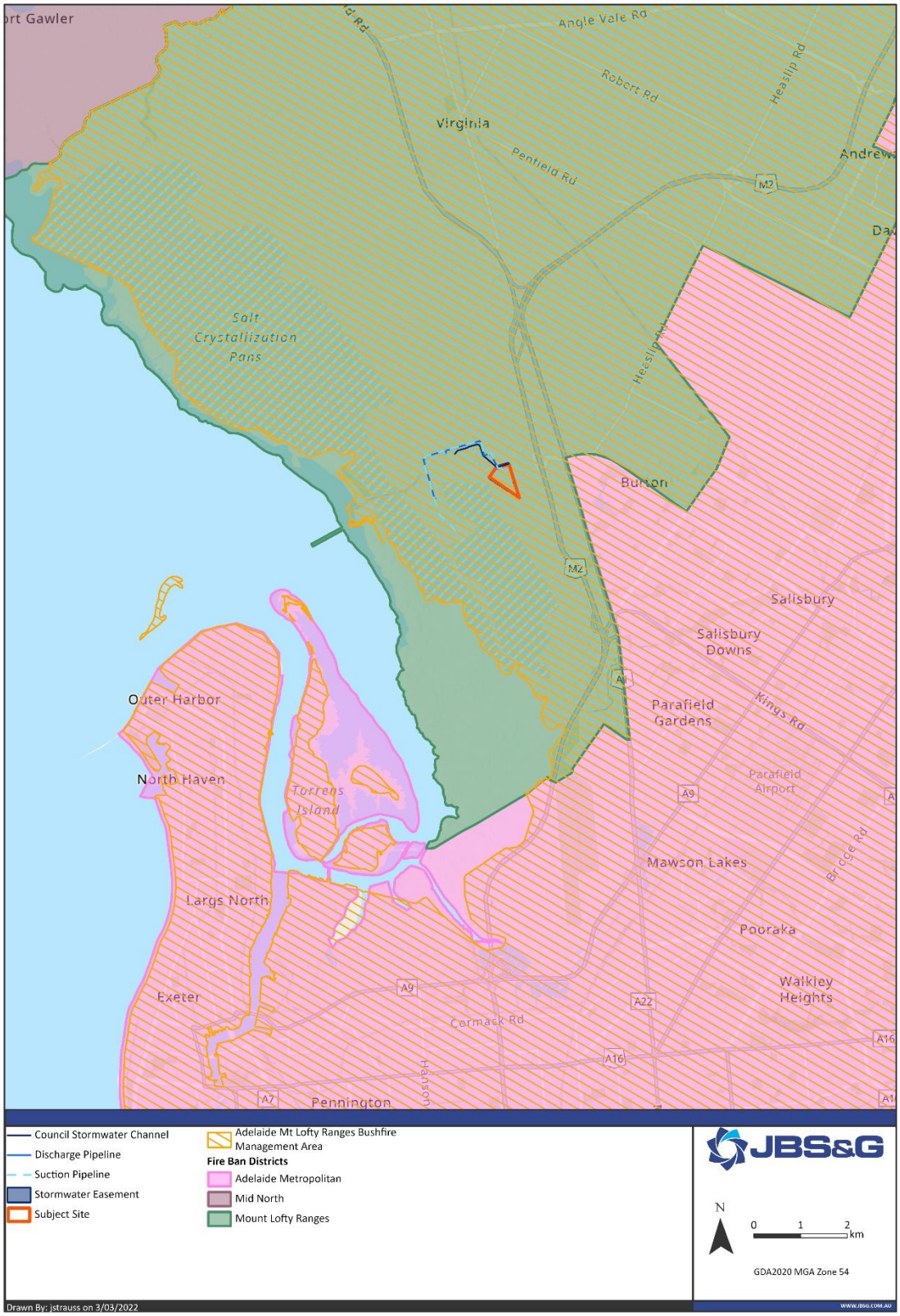


Figure 15-2: Adelaide Mt Lofty Ranges Bushfire Management Area & Fire Ban Districts

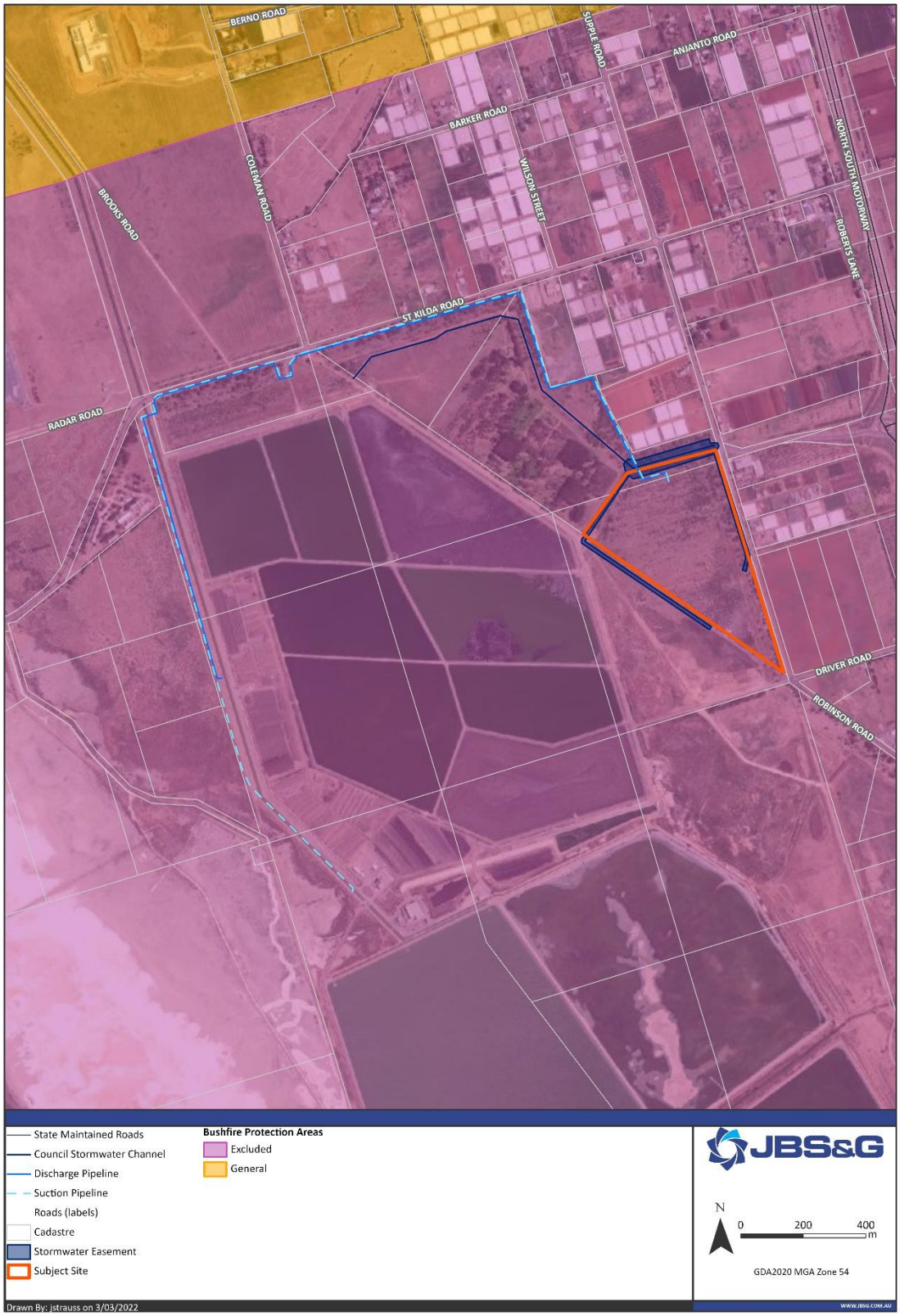


Figure 15-3: Bushfire Protection Area Exclusion

15.3.3 Impact Assessment

A risk assessment based on safety studies and hazard assessments has been conducted in order to assess the specific fire risks inherent to the Project and to ensure they are appropriately addressed in the design and management of the Project, having regard to all relevant Australian Standards and the Building Code of Australia (BCA).

The context for the risk assessment is to identify potential fire hazards for the protection of life, property and environmental assets within and adjacent to the Project, which might reasonably be expected to experience impacts in the event of a fire within the BAM Facility.

Assessment method

Assessment methodology for this chapter follows that set out in Chapter 7 (Impact Assessment Methodology). Ignition sources and chemicals onsite have been identified through engineering design and HAZIDs.

Potential ignition sources include gas fired equipment (if selected) and heating elements as well as conveyors or belt driven equipment that could cause a spark. During construction, vehicle ignition or hot metal work may result in sparks onsite. Factors which could worsen the impact of a fire include combustible fuels and hydrocarbons (notably oils, diesel and natural gas onsite) or hazardous substances where packaging or containment could be impacted by fire.

Impact Assessment

Development of the BAM Facility will not impede bushfire response nor will the Project pose additional risks from bushfire.

The site is located outside the bushfire risk overlay area (Figure 15-1) as the likelihood of a bushfire occurring here and the severity of fire (with a build up environment) is low. Design factors which limit the spread of fire onsite include clearance of a track and hard stand areas surrounding the site, placement of chemicals approximately 50 m from the nearest vegetation.

All hazardous substances will be stored in accordance with EPA guidelines including within bunds which will contain any spills should the container fail during a fire event. Gas lines will be developed by the supplier and will comply with industry standards (including Gas Infrastructure in Bushfire Prone Areas Guidelines, Energy Network Australia 2018), where applicable.

Renascor will consult with MFS regarding access during bushfires, noting the site entry will allow access for emergency vehicles. Fire fighting and suppression systems onsite include water tanks and pump sets, hydrants and hoses, fire hose reels and extinguishers, sprinkler system for high risk areas.

The worst foreseeable case of a bushfire onsite interacting with the gas main or other fuels is **Catastrophic**. The likelihood of this occurring is **Rare** noting strategies to both prevent and mitigate any impact will be installed in accordance with industry standards results in an overall risk rating of **High**. The risk is considered to be managed to ALARP and all industry standard practices have been implemented.

The Project has been designed to prevent fires onsite and extinguish any fires that do start immediately.

While the Project contains a number of ignition sources, separation of these from potential fuel sources (both hydrocarbons associated with the Project and screening vegetation) will reduce the risk of onsite fires.

During construction, hot works will not be undertaken next to native vegetation and appropriate risk assessments will be in place prior to undertaking these activities that could generate sparks. During operation, fuels will be stored in appropriate containers in cleared, bunded areas in accordance with EPA guidelines. Fire suppression systems will be installed as detailed above and equipment maintained.

An emergency response plan will form part of the management documentation for the site including staff training to respond to fire hazards.

Should an onsite fire start, the fire is likely to be small and the most likely impact would be localised contamination of soil from loss of containment of hazardous substances. This consequence is **minor** as it can be easily remediated and unlikely to occur resulting in an overall risk of **Low**.

Summary of Key Mitigation Measures

Table 15-2: Key Mitigation Measures

Mitigation Measure	Construction	Operation
Hot works to occur away from native vegetation and fuel sources	✓	✓
Appropriate land management and fire management strategies to be considered for inclusion in the CEMP and OEMP.		✓
Emergency Response Plan to be developed for fire risk		✓
Staff induction regarding fire hazards and emergency response plan		✓
Containment of hazardous substances in accordance with EPA guidelines		✓
Installation of fire fighting equipment including pumps, hoses, extinguishers and sprinkler systems in high risk areas onsite.		✓
Consultation with MFS regarding bushfire evacuation protocol and site access to emergency vehicles where appropriate		✓

15.3.4 Conclusion

The site is located within a low risk area for bushfire. Fire prevention and mitigation measures have been implemented to reduce the risks to ALARP.

15.4 Flooding

15.4.1 Requirements in legislation

Legislation covers the risk of flood under the Planning, Development and Infrastructure Act 2016. Under the PDI Act new developments need to consider risk of flooding. The requirements to address flood risk is dependent upon the risk which is summarised in the Performance Outcomes of the Hazards (Flooding) Overlay in Part 3 of the Planning and Design Code. The Project site is partially located within this overlay indicating an elevated risk of flooding onsite.

15.4.2 Description of the existing environment

The site is relatively flat with less than 1 m fall over the site (falling towards the south). The site is partially located within the Hazards (Flooding) General Overlay planning layer indicating an elevated risk of flooding occurring onsite (Figure 15-4). Flood mapping of existing conditions (Appendix 10) shows up to 0.6 m of surface water ponding within and immediately south of the site during a 1% Annual Exceedance Probability (AEP) rainfall event (Figure 15-5). As shown on this figure, in addition to rainfall, the key water inflows to the site are the drainage channels under Robinson Road (immediately north east and along the eastern boundary of the site). Information from SA Water indicates inundation in the southern portion of the site has been an ongoing issue that could impact upon the Project.

As part of the development of the *Strategic Growth Framework – Waterloo Corner and Bolivar Corridor* (SGF), the City of Salisbury have expressed acknowledgement of the increased tendency of land west of the North South Motorway to experience inundation due to upstream urbanisation altering landforms and surface water path networks. This has been a focus of the Salisbury Council and various offsite works are being planned for, and implemented by, the Council around the area.



Figure 15-4: Hazard Flooding Zone Overlay

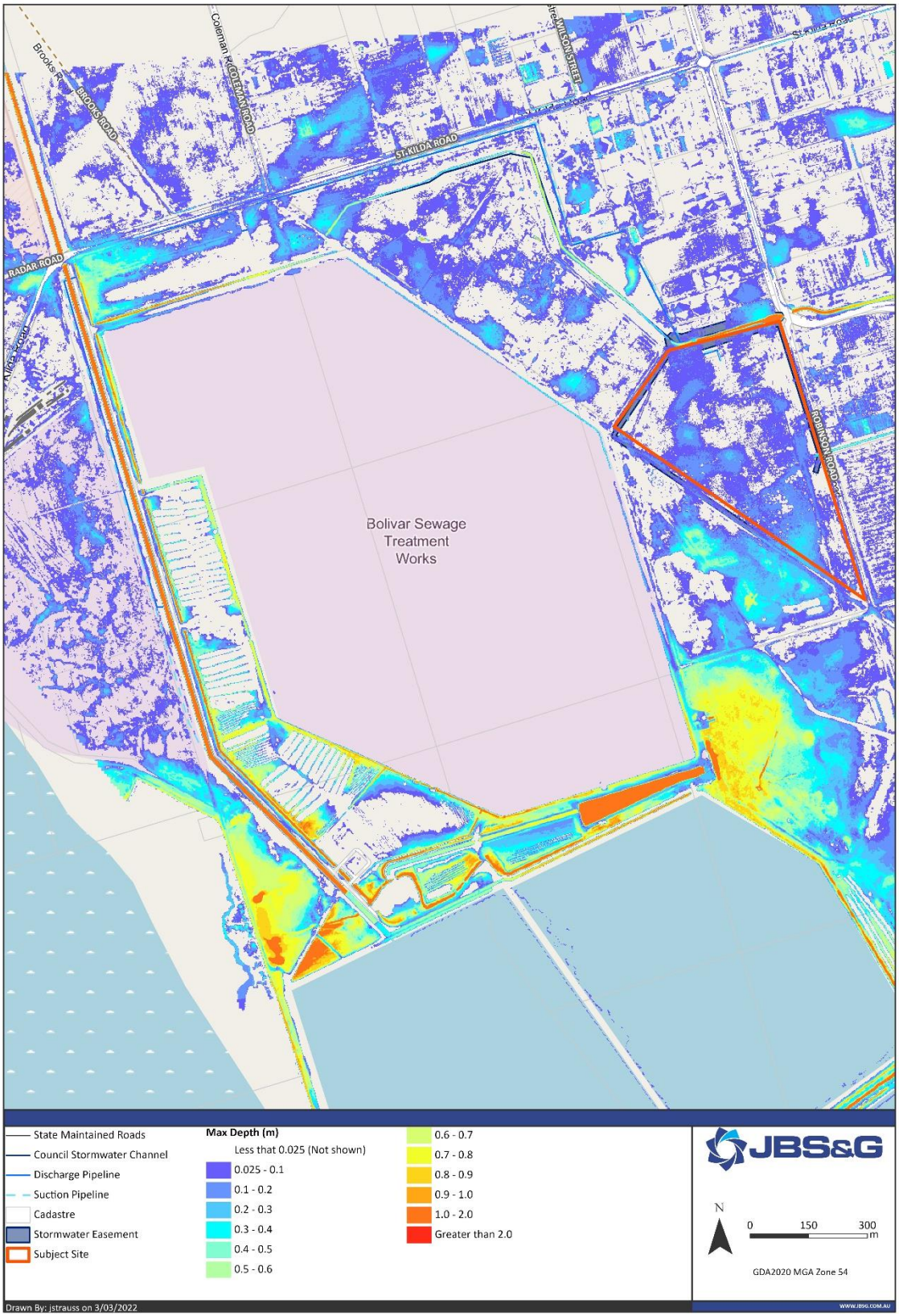


Figure 15-5: Flood modelling of existing conditions (scenario 1)

15.4.3 Assessment method

Hydraulic modelling of the site was undertaken using the Lower Little Para River TUFLOW model developed previously for the SA Flood Hazard Project (Appendix 10). A 1% AEP rainfall event was used to estimate flooding under various scenarios. The modelling assumed 90% of the developed site is impervious and thus generates additional run off. A full list of scenarios modelled is described in Appendix 10. The key scenarios relating to the impact assessment include existing conditions (scenario 1 - Figure 15-5) and fully developed site with proposed mitigation measures (scenario 16 – Figure 15-6).

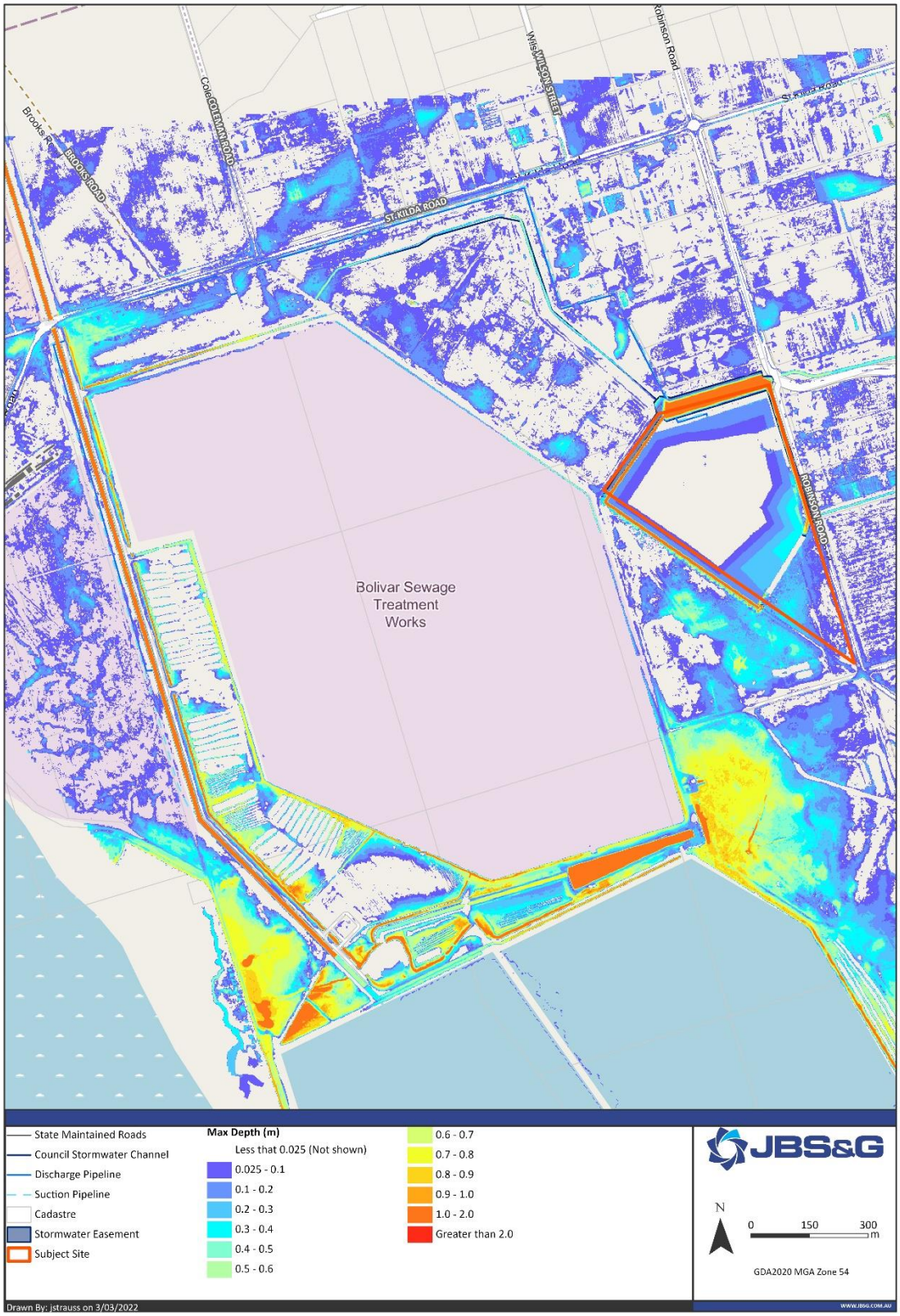


Figure 15-6: Flood modelling following development of stage 2 including mitigation measures (scenario 16)

15.4.4 Impact Assessment

Clean fill will be used to raise the site above the 1% AEP rainfall event flood model to prevent flooding of site.

Renascor have proposed to increase the ground level by importing clean fill to ensure finished floor levels are above the 1% AEP rainfall event. Discussions with Renascor and City of Salisbury are currently occurring regarding upgrading the existing stormwater management infrastructure including increasing the capacity of the northern stormwater retention channel and drainage channel along Robinson Road (eastern boundary of site). Figure 15-6 shows the 1% AEP flood model after development of the site and stormwater management strategies are in place. This figure shows post mitigation the site is not expected to flood.

The risk of site flooding causing overtopping of bunded areas and contaminating water or soils is **Minor** with a likelihood of **Unlikely** resulting in an overall risk of **Low**.

Stormwater and flood management strategies onsite may result in minor flooding of vacant land south of St Kilda Road and vacant land south of the Project site.

Renascor propose a number of stormwater mitigation measures including; increasing the ground level to ensure finished floor levels are above the 1% AEP flood event, and directing stormwater from Robinson Road drains to the stormwater channel along the northern boundary of site. These mitigation measures will increase the water reporting to the northern stormwater channel (Figure 15-6 and Figure 15-7). These figures show the channel containing the additional water levels until it passes parallel to the Adelaide Zoo feedlot where the channel dissipates and the water flows out to flood vacant land south of St Kilda Road before it enters Bolivar Stormwater Channel. There are future plans for City of Salisbury to upgrade the northern stormwater channel to increase its capacity. Renascor are engaging with the City of Salisbury and SA Water on these changes which are possible to occur coincident with site earthworks, however, as the timing is uncertain, flood modelling scenarios 1-3 and 6-7 have assumed no upgrade to this stormwater channel has occurred (Appendix 10). These scenarios show minor increased in flooding between the Bolivar WWTP and St Kilda Road compared with the proposed mitigation scenario (scenario 16).

The flood modelling (Figure 15-7) also shows an increase in the depth of flooding to the south of the Project on land owned by SA Water. The model shows an increase in depth of up to 50 mm (5 cm). Additional control strategies will be implemented to reduce this flooding including raising the height of bunding to contain additional water onsite.

The consequence of this flooding is considered **Minor** as the flooding is a maximum of 0.1 m (10 cm) over St Kilda Road which would not prevent transport and no major infrastructure is located on the vacant land south of St Kilda Road and the flooding south of the site is on vacant land. The likelihood is **Unlikely** (as this scenario is a 1% AEP event) resulting in an overall risk of **Low.**

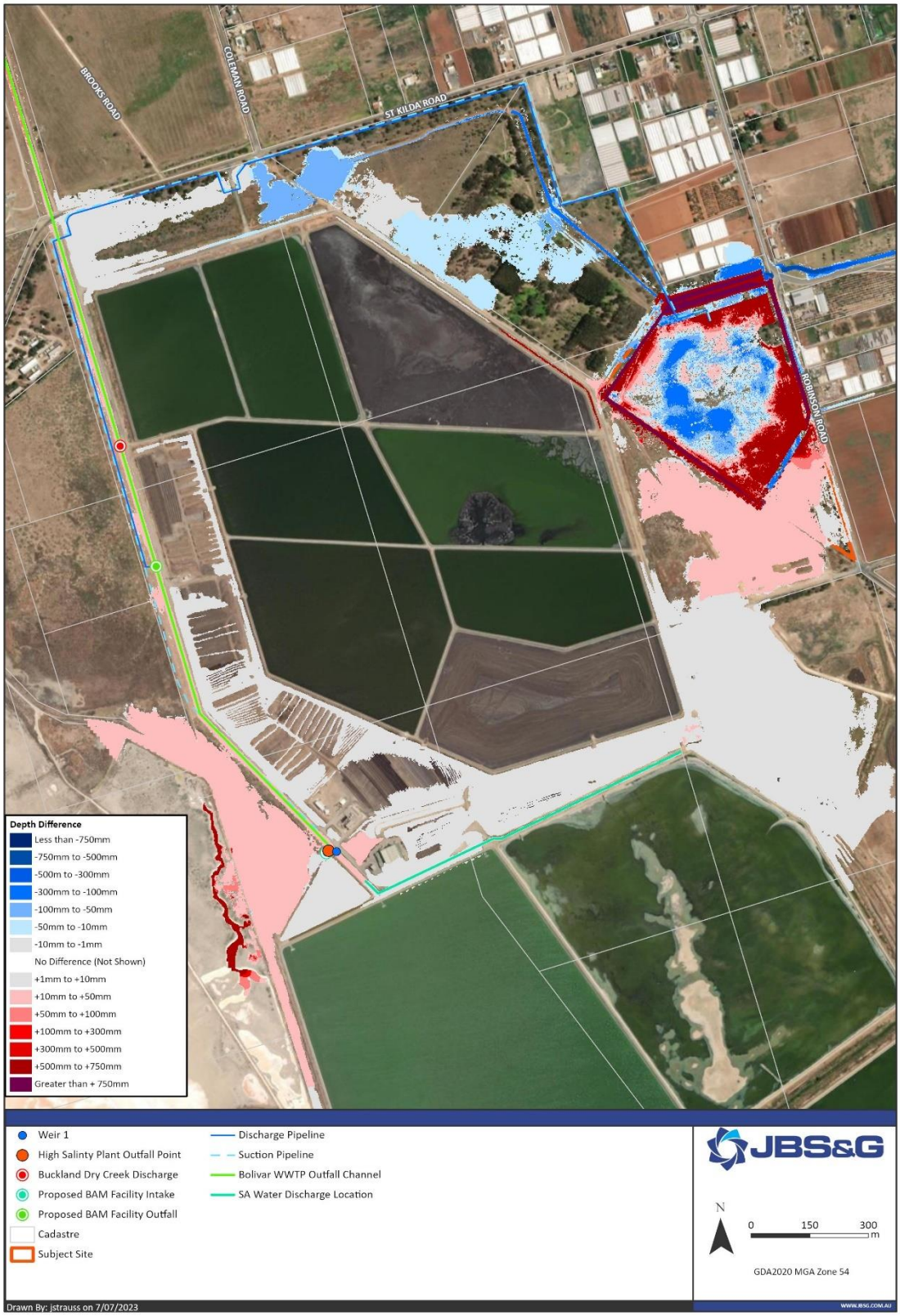


Figure 15-7: Change in water levels for proposed mitigation measures compared with existing levels

Future land use may increase the run off volumes up catchment of the site but this will be assessed at time of development application.

Future land use plans include the updated 30 year plan for Greater Adelaide (DPTI, 2017) and the Strategic Growth Framework for Waterloo Corner and Bolivar Corridor (Holmes Dyer, 2022). The key changes these plans encourage that could impact flood risk are increased urbanisation / urban infill as well as increasing transport corridors and public transport. These changes are likely to increase hard stand areas (and thus decrease infiltration). The upstream catchment for stormwater runoff is limited by the North South Connector which creates a barrier with several points where stormwater can flow. This will limit the stormwater which could increase flooding onsite due to future development. It is noted future development will also be subject to mitigation measures as well as include the assessment of surface water management and flooding, to not impact other sensitive receptors including this site.

Potential impacts from urbanisation up catchment of the Project is not expected to change the above risk ratings.

Increasing intensity of rainfall under climate projections is not expected to change the above risk ratings.

Under future climate predictions the intensity of rainfall is predicted to increase on and near the Project site. However, as shown in Figure 15-5 the flow of stormwater onto the site is governed by the capacity of the culverts under Robinson Road (north eastern corner and eastern boundary of the site). Without an increase in size to the culverts the flooding change as a result in increased ground levels at the Project Site shows no change. Modelling of the 1% AEP 2050 RCP 8.5 Climate Change Projection (Appendix 10) shows no changes to flooding in the Project site up to 2050 development. Stormwater management onsite will be sized to capture 1% AEP including potential impacts of climate change.

Increasing intensity of rainfall under climate projections is not expected to change the above risk ratings.

15.4.5 Summary of Key Mitigation Measures

Table 15-3: Key Mitigation Measures - Flooding

Mitigation Measure	Construction	Operation
Elevation of ground level 300 mm above 1% AEP flood levels		✓
Stormwater drainage channels conceptually designed along the north, east and western boundaries of the Project (subject to detailed engineering design).		✓
Separation of water catchments and containment of water which has the potential to contact process fluids onsite (designed to contain water following a 1% AEP).		✓
Stormwater system onsite to be designed to capture a 1% AEP considering potential increased rainfall intensity as a result of climate change.		✓
Run off from clean catchments to cross a 'green buffer' of vegetation to provide an initial filter before entering the perimeter drains		✓
All areas containing hazardous chemicals to be bunded in accordance with SA EPA guidelines.		✓

15.4.6 Conclusion

The proposed Project is located in a site prone to flooding after heavy rainfall events. In accordance with requirements for development within the Hazard – Flooding (General) overlay the ground level will be raised to 300 mm above the 1% AEP flood level. Measures to mitigate flooding on the Project Site will have a minor increase in surface water ponding on vacant land after major rainfall events.

15.5 Site and Groundwater Contamination

15.5.1 Description of the existing environment

A detailed description of the soil and groundwater environment is contained Chapter 9 (Physical Environment). A summary of the aspects relevant to soil and groundwater contamination is provided below.

Groundwater contamination

Groundwater occurs in five major aquifers; the shallow Quaternary aquifer and the deeper Tertiary aquifers numbered 1-4 with increasing depth. The shallow Quaternary aquifer is found onsite between 0.6 and 1.8 m Below Ground Level (BGL) and is highly saline in this location. There are no nearby users of this groundwater due to the high salinity. Most groundwater users in the area consume the T1 and T2 Tertiary aquifers as they have a fresher water quality and higher yield making them better for supplying agriculture and horticultural uses. Use of PFAS at the Edinburgh Air Base has resulted in PFAS contamination which has permeated into the Quaternary aquifer. The groundwater prohibition zone linked to this aquifer was extended in February 2023, refer to Figure 9-2 for the extent of this prohibition area. The site is located outside of the prohibition area.

The foundations for the infrastructure will involve importation and raising of the ground surface to ensure finished floor levels are 300 mm above the 1% AEP flood event. There is potential for minor excavations to intersect groundwater during construction, however, this is expected to be managed in accordance with SA EPA Water Quality Guideline *Environmental management of dewatering during construction activities*. The potential for groundwater management to mobilise PFAS contamination has been assessed in Chapter 9 (Physical Environment) and concluded the risk of this occurring is **Low**.

Site / Soil Contamination

A Preliminary Site Investigation (PSI) was conducted over the Project Site to identify any potential for contamination which was then verified by site investigations (Appendix 7 and full assessment Chapter 9 Physical Environment). The PSI concluded:

- The risk of actual or potential acid sulfate soils on site was negligible.
- Material containing asbestos fibres has been identified onsite, likely as a result of illegal dumping activities.
- Elevated levels of coliforms have been detected adjacent to the Bolivar Sludge Ponds.
- No other sources of contamination were identified onsite.

Any identified asbestos will be removed by a licenced professional prior to construction and the CEMP will contain strategies to manage any asbestos unexpectedly uncovered during construction work. The

elevated coliform levels may be due to aerolised material from the Bolivar lagoons or from previous site activities such as sheep grazing. No material will be removed from site which could mobilise this contamination. Management will be dealt with as a worker safety issue as the only receptor that could be impacted.

15.5.2 Impact assessment

The following impact assessment conclusions relate to soil and groundwater contamination. The full assessment of these impacts is included in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

- The risk of actual or potential acid sulfate soils occurring on site and being exposed during construction is negligible.
- The potential for groundwater management to mobilise PFAS contamination has been assessed in Chapter 9 (Physical Environment) and the risk of this occurring is Low.

Accidental spills or loss of containment will be remediated immediately to prevent impacts to soils, surface and groundwater resulting in a **Low** risk.

15.5.3 Summary of Key Mitigation Measures

A summary of mitigation measures for soil and groundwater contamination can be found in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

15.5.4 Conclusion

All potential sources of contamination (both existing and potentially resulting from the project) have been identified and mitigation measures proposed. A full risk assessment is included in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

15.6 Dangerous Substances

Renascor have identified and will appropriately manage all hazardous chemicals relating to the BAM facility to ensure protection of people and the environment. Management plans will be developed to ensure all requirements, standards and guidelines are followed for both transport and storage onsite. All disposal offsite will be in accordance with the appropriate legislation.

15.6.1 Legislative Background

Transport of dangerous substances is regulated under the *Dangerous Substances Act 1979 (SA)* and associated regulations. The operational and technical requirements are set in the national Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) to ensure appropriate standards are maintained across all states and territories.

Storage of large volumes of hazardous chemicals is regulated under the *Work Health and Safety Act 2012* and associated regulations with volumes above certain thresholds requiring notification and licencing. The proposed storage volumes of chemicals onsite will not trigger this legislation.

The *Environment Protection Act 1993* (EP Act) sets out a general environmental duty to protect the environment as well as setting out requirements and responsibility for remediation of contamination and disposal of hazardous chemicals.

15.6.2 Hazardous Substances

Engineering design has identified a number of hazardous substances that will be required for the process, listed in Table 15-4.

Table 15-4: Hazardous substances required for BAM facility

Chemical	Use	Storage location & Volume	Hazard Class	Rate of usage
Sulfuric Acid (H_2S0_4)	Acid leach process	Reagents storage area (~22 m^3)	H 314 & H 290	~100 tonne per day
Sodium Hydroxide (NaOH)	Caustic roast and leach process	Reagents storage area (~100 bulka bags)	H 314, H 290	~20 tonne per day
Natural Gas - predominantly methane (CH_4, C_2H_6, CO, N_2)	Power roaster, dryer and boiler	N/A – piped onto site	H220, H280, H 380	1.6 TJ/day
Lime ($Ca(OH)_2$) and/or Limestone ($CaCO_3$)	Water treatment	Reagents storage area (~90 tonnes)	H 315, J 318, H 335, H 350i, H 373	~120 tonne per day

15.6.3 Management of Hazardous Substances / Mitigation of risks

Renascor will include management of hazardous substances in the CEMP and OEMP to ensure all appropriate legislative requirements are met for their transport, storage, use and disposal.

Transportation

A copy of the Safety Data Sheet (SDS) for all chemicals used on site will be available in an appropriate location, and chemicals will be transported by appropriately licenced persons and vehicles.

Handling and storage

Hazardous chemicals will be stored in the appropriately contained areas. Handling and storage will comply with *AS1940 The storage and handling of flammable and combustible liquids* and EPA Bunding and Spill Management Guidelines. Appropriate ventilation will be provided in areas where hazardous substances are stored with potential to form gases.

Spill kits and fire fighting equipment will be located at chemical storage areas.

Use

All staff will complete an induction which will include hazardous chemical safety. Appropriate training will be provided to staff who will have direct responsibility for the use and management of hazardous chemicals.

Disposal

No hazardous substances will be produced onsite which require specific disposal. Outputs from processing and water treatment do not meet the triggers for definition as a Hazardous Substance. Should a hazardous substance be produced that requires specific disposal, options for reuse at a separate facility would be considered or disposal at a licenced EPA facility.

15.6.4 Risks associated with Hazardous Substances

The following impact assessment conclusions relate to hazardous substances. The full assessment of these impacts is included in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

- Accidental spills or loss of containment will be remediated immediately to prevent impacts to soils, surface and groundwater resulting in a Low risk.

15.6.5 Summary of Key Mitigation Measures

A summary of mitigation measures for the soil and groundwater contamination can be found in Chapter 9 (Physical Environment) and Chapter 8 (Land Use and Site Conditions).

15.6.6 Conclusion

All hazardous substances have been identified and industry standard mitigation measures will be appropriate to manage the risk to ALARP.

16 Design Quality

This chapter addresses the Urban Design and Placemaking (Library Reference DQ1) Assessment Requirements. It is based on alignment with relevant design standards, policies and guidelines, and includes potential impacts and risks to the social values of amenity and landscape through a design lens, where those impacts are not addressed in other chapters of the EIS.

The nature of Renascor's BAM Facility as an industrial development is a key driver of the Project's design process. The appearance, scale, mass and orientation of constructed elements within the landscape are determined according to functional necessity. Renascor have had 3D visualisations, schematics, elevations, shadow diagrams and site plans prepared by the engineering partner which detail the physical appearance of the Project in its local context. 3D visualisations have informed the assessment presented in this chapter in addition to the Visual Impact Assessment in Chapter 11 and are included in Appendix 15. An outline of how the Project is designed to respond to the site, built form considerations, design guidelines and the local context is provided in this chapter, having regard to related sections of the EIS where appropriate.

16.1 Key findings

- Following the relevant Performance Outcomes and Desired Outcomes of General Development Policies, Zones and Overlays under the Planning and Design Code (Chapter 5 Planning Assessment) results in general alignment with the principles of Good Design, Crime Prevention through Environmental Design, Environmentally Sustainable Design and the mitigation of adverse impacts of the Project on the design quality of the public realm.
- The Project is likely to result in a net-positive outcome for the perceived and / or actual safety of the adjacent public realm, with the addition of upgrades to Robinson Road. The Project represents an increase in passive surveillance over the public realm, which may assist to discourage criminal behaviour. The Project will include constructed elements which will contribute to public safety, including exterior lighting, continuous monitoring of the site and increased personnel onsite.

16.2 Setting the context

Each section provides information explaining the context within which impact assessment is undertaken. Each section includes:

- Key findings
- The relevant EIS assessment requirements
- Relevant requirements in legislation and other standards
- Views of stakeholders and the environmental and social outcomes they would like the project to meet
- A description of the existing environment
- The impact assessment undertaken in accordance with the methodology outlined in Chapter 7 (Impact Assessment Methodology) for both Construction and Operations
- The key mitigation measures proposed to reduce or prevent environmental impacts

- A conclusion summarising the overall outcome of the impact assessment undertaken.

16.2.1 EIS Assessment Requirements

The EIS Assessment Requirements for Project design are set out in Table 16-1.

Table 16-1: EIS Assessment Requirements –Design Quality

Library Ref	Environmental Attribute	Objective	Assessment Requirements	Assessment level
DQ1	Urban Design and Place-Making	To ensure development promotes the value and quality of good design across South Australia's built environments, and that contributes to healthy neighbourhoods, supports innovation and the integration of smart and sustainable technologies.	• Demonstrate the proposal's servicing strategy including the location of any required services infrastructure and the proposed material/screening treatment of any visible services. • Describe the proposal's Environmentally Sustainable Design (ESD) strategy and targets. • Describe how the proposal considers Crime Prevention Through Environmental Design (CPTED) principles. • Provide visualisations (including long view perspectives) to demonstrate the proposal in context. • Provide a full set of documentation including site plan, plans, elevations (including streetscape elevations where relevant), sections/site sections and shadow diagrams.	Standard

Table 16-2: Aspects of assessment requirements addressed in other chapters

Assessment requirements	Chapter
Description of the Project's servicing strategy, including location of required services infrastructure	Chapter 3 – Description of the proposed Project
Provide visualisations (including long view perspectives) to demonstrate the project in context.	Section 11.5 – Visual Amenity
Provide a full set of documentation including site plan, plans, elevations (including streetscape elevations where relevant), sections/site sections and shadow diagrams.	See Appendices 2 & 15

16.2.2 Requirements in Legislation

As there is no specific South Australian legislation which regulates the assessment of impacts to urban design and placemaking, general guidance for assessment and management of visual impacts of infrastructure is provided through the State's statutory planning framework and associated policy and guidance documents.

The Planning and Design Code provides for the design and siting of structures to reduce aesthetic impacts to rural vistas, minimise impacts on the natural environment, avoid obscuring existing public views to landscape and minimise impacts from key public vantage points and scenic routes. The planning assessment (including design and appearance of the Project) against the Code is provided in Chapter 5 Planning Assessment. The statutory planning framework also captures policy and guidelines relating to urban design, placemaking and management of public safety through built environment

assets. These guidelines and policies are contained within the State Planning Policies (SPPs) and expressed as targets through strategic planning frameworks such as the 30YPGA and the City of Salisbury's Strategic Growth Framework (SGF).

The Project's alignment with the SPPs and 30YPGA is provided in Chapter 5 Planning Assessment. Impacts of the Project on the visual character, landscape and amenity of the locality are addressed in Section 11.5 Visual Amenity.

16.2.3 Views of Stakeholders

No community stakeholder feedback has been received specifically related to the design and urban interface of the Project.

16.2.4 Assessment Method

The potential impacts of the Project on its locality from an urban design and placemaking perspective are assessed in this chapter. The impacts of the design of the Project are closely related to other impact assessment parameters, including Visual Amenity (see Section 11.5), stormwater and flood management (see Chapter 9 Physical Environment and Chapter 15 Hazard and Risks) and Social, Community and Economy (see Chapter 12).

The method of impact assessment has followed the socio-economic impact assessment methodology set out in Chapter 7 Impact Assessment Methodology, having regard to quantitative data where it is applicable and available. Site plans, floorplans, elevations, cross sectional diagrams and a site survey plan of a prescribed scale are presented in Appendix 2.

Visualisations in the form of 3D renders of the Project have been created pursuant to the Visual Impact Assessment in Chapter 11 Amenity and Environmental Quality, including long view perspectives indicating the Project's visibility from receptors in the broader locality including the St Kilda township and boat ramp, the North South Motorway and recreational land uses to the south of the Project site. Visualisations are presented in Appendix 15.

Design Quality assessment was conducted to align with best practice guidelines and standards by utilising the following resources and documents:

- State Planning Policy 2, Design Quality,
- 30-Year Plan for Greater Adelaide – 2017 Update,
- The Planning and Design Code – General Development Policies (Design),
- Strategic Growth Framework, Waterloo Corner and Bolivar Corridor – City of Salisbury / Holmes Dyer 2022,
- Water Sensitive Urban Design – Department of Environment and Water,
- Environmentally Sustainable Design Specifications – Department of Infrastructure and Transport, and
- Crime Prevention Through Environmental Design (CPTED).

Design Quality is necessarily a localised and experiential parameter. Assessment has been constrained to elements of the Project's interface with the public realm immediately adjacent to the Project site, including materials and screening. The Project's interface with its broader locality is further assessed through Chapter 11 (Amenity and Environmental Quality) and Chapter 8 (Land Use and Site Conditions).

16.2.5 Description of the Existing Environment

Existing development in the locality of the Project site is of a low density and dominated by market gardens (including both greenhouses and open-air gardens), utilities and infrastructure, and recreational commercial operations. The Project has conservatively assumed properties immediately adjacent to the site on Robinson Road to be residential.

The condition of the immediate receiving environment, including the Robinson Road reserve and adjacent environments, is discussed in detail in Chapter 11 (Amenity and Environmental Quality). The public realm around Robinson Road is in a generally poor condition from a design quality and accessibility perspective, with limited stormwater drainage, no kerbing, pedestrian or cycling infrastructure, no street lighting and a degraded road surface. Cycle infrastructure is present on nearby roads including Waterloo Corner Interchange Connector, and dedicated cycle paths traverse the Waterloo Corner Interchange with the North-South Motorway, connecting the locality to urban development east of the Motorway. Upgrades to Robinson Road are scheduled to occur prior to or during construction of the Project.

There is limited opportunity for passive surveillance of the public realm in the immediate vicinity of the Project site. The nature of land use (infrastructure, horticulture, light industry and low-usership recreational facilities) means that there is little incidental public presence in the public realm. Residents, visitors and staff of adjacent horticultural, commercial and recreational land uses, in addition to heavy vehicle and staff access to the Bolivar WWTP, are the predominant sources noted during passive surveillance to date.

To facilitate the construction of the North-South Motorway, modifications to the local street network in the locality were necessary. Establishment of the Motorway reserve necessitated the severance of several local roads in the locality which traditionally connected the locality to suburbs to the east and south. This has resulted in the creation of several cul-de-sac streets (including Robinson Road and Undo Road) in the vicinity of the Project site. There is evidence of criminal activity in these cul-de-sac areas and nearby street junctions. In particular, evidence of illegal dumping and antisocial driving features in the landscape (See Figure 11-7). The impermeable nature of Robinson Road, Undo Road and other local roads in the locality in addition to the limited number of public spaces and destinations mean there is little requirement for dedicated pedestrian or cycle infrastructure at present.

16.2.6 Sensitive Receptors

The key receptors for impacts of the Project on the environmental values of Design Quality for the purpose of this impact assessment are based on the Sensitive Receptors identified in section 11.5 (Visual Amenity). As noted previously, since Design Quality is necessarily a localised and experiential parameter, impact assessment has been constrained to elements of the Project's interface with the public realm immediately adjacent to the Project site. The Project's interface with its broader locality is addressed above through the Design Summary and further assessed through section 11.5 (Visual Amenity).

Receptors in the locality to which the design of the Project is relevant are predominantly those most proximate to the Project site (within a 100 m buffer of the site boundary) in addition to those which are only accessible via Robinson Road as shown in Figure 16-1, including R12 – R22 inclusive. These receptors will have direct interaction with the Project's public realm interface.



Figure 16-1: Sensitive Receptors

16.3 Urban Design and Placemaking

16.3.1 Summary of Design Process

Renascor is working with GR Engineering Services (GRES) to iteratively develop the design of the BAM Facility. As an industrial development, the design and site layout of the Project is driven by practical necessity, commercial and access requirements. Within the constraints of site layout and responses to specialist studies undertaken to inform the development of this EIS, consideration is given to the relationship between the BAM Facility and its local context, having regard to the minimisation of adverse impacts to the receiving environment.

This process considers comparable development within the broader locality and has regard to such development to inform the ongoing design process of the BAM Facility, in addition to applicable design guidelines, policies, standards and objectives.

Final detailed design of the Project is expected to retain flexibility with regard to the final schedule of materials, design and configuration of exterior elements of the BAM Facility. This approach allows Renascor to iteratively consider best practice design outcomes. An indicative Project schedule is provided in Section 1.6 Staging and Timing.

As the Project is not a publicly accessible development, the role of the design of the Project is predominantly focused on its interface with the public realm and adjacent land uses.

16.3.2 Location of Services

As described in Section 3.8 (Supporting Services).

16.3.3 Servicing Strategy

The BAM Facility will be serviced by connection to electricity, gas and water infrastructure, as described in Section 3.9 (Utility requirements).

16.3.4 Appearance and Screening

This subsection discusses the design-focused approaches applied to addressing the visual scale and bulk of the BAM Facility, including surface treatments, colours, materials and screening. The visual impact of the BAM Facility is discussed in detail in Section 11.5 (Visual Amenity). The Visual Impact Assessment includes visualisations (including long-view visualisations) demonstrating the Project in context.

Materials and Finishes

The buildings housing the milling trains, kiln equipment, acid and caustic leach processes, flash dryers and product bagging (see Section 3.6 (Nature of the Proposal)) will be constructed from steel and clad in colour-treated sheet metal, consistent with existing development of a comparable scale and nature in the locality of the Project site. Examples include buildings associated with the SA Water Bolivar WWTP, the Iberdrola electricity generation facility, and other large industrial or agricultural buildings. Final cladding, roofing and screening materials chosen for the BAM Facility will be similar to comparable development in the locality, having regard to surface treatments and colour choices which

blend with the landscape and exhibit a low reflectivity to mitigate solar reflectivity and glare. Materials and colours will be selected to align with standard best practice. Fencing of the facility will consist of approximately 2.4 m high chain linking fencing. External signage is assumed to be a single signboard at the front entry gate with a dimension of approximately 3m x 3m (subject to detailed design). The sign will be static without LED flashing and have local lighting focused on the sign.

Screening

Existing vegetation within the Project site will be retained to the greatest practicable extent (See Chapter 10 Biological Environment). Soft landscaping and planted screening vegetation will be employed to mitigate the visual impact of the Project. A Project-specific Landscape Management Plan will be developed prior to the commencement of operations.

Where services or infrastructure are unable to be screened through the use of vegetation, constructed screening is able to be incorporated into Project design having regard to mitigation of the potential for overlooking into adjacent private open space. Services and infrastructure constructed in proximity to the eastern boundary of the Project site will be screened to the greatest practicable extent, having regard to access and safety constraints.

Access and Public Safety

The Project will be constructed incorporating appropriate safety, monitoring and surveillance equipment commensurate with the nature of the Project as an industrial facility. The Project will not be a publicly accessible development and will incorporate controlled access, closed-circuit television security systems where appropriate and exterior lighting designed to comply with relevant standards and guidelines (see Section 5.6).

16.3.5 City of Salisbury Strategic Growth Framework

The City of Salisbury City Plan 2035 includes a critical action to develop a comprehensive 25-year Growth Framework for the land west of Port Wakefield Road (Holmes Dyer 2022). The *City of Salisbury Strategic Growth Framework: Waterloo Corner and Bolivar Corridor* (SGF) aims to articulate a pathway toward supporting the orderly and sustainable redevelopment of the areas identified.

During community consultation undertaken to inform the development of the SGF, respondents indicated safety and public realm infrastructure (such as roads, connective infrastructure and stormwater management) as issues of concern. The Project indirectly supports the SGF's stated objective to work towards the progressive improvement of public safety through design, through the activation of a site which is currently not substantially developed. Integrated safety, surveillance and access control equipment in association with the Project will complement third-party public realm upgrades.

Renascor's BAM Facility is further discussed with regard to the SGF in Section 8.3.3 (Known future land uses changes).

16.3.6 Crime Prevention Through Environmental Design

Crime Prevention Through Environmental Design (CPTED) is a strategy that focuses on utilising the planned and designed structure of cities and neighbourhoods to discourage criminal behaviour. CPTED aims to foster conditions, whether real or perceived, in which the potential costs of committing criminal activity are greater than the likely benefits. This is achieved through encouraging and creating environmental and social conditions that:

- Maximise the risk of detection, challenge and apprehension to offenders,
- Maximise the effort (time, energy and resources) required to commit crime,
- Minimise the actual or perceived benefits of criminal activity (removing, concealing or minimising crime attractors and rewards), and
- Minimise excuse making opportunities by removing conditions that facilitate rationalisation of criminal or antisocial behaviour.

There are two 'generations' of CPTED Principles, each employing four key strategies which may be applicable to a project. First generation CPTED strategies are:

- territorial re-enforcement,
- natural or passive surveillance,
- space and activity management, and
- access control.

Second generation CPTED strategies are:

- social cohesion,
- community culture,
- connectivity, and
- threshold capacity.

The locality of the Project site is noted to contain evidence of criminal behaviour, including illegal dumping and antisocial driving (See Figure 11-7, Section 11.5 Visual Amenity). This is further discussed in Chapter 11 (Amenity and Environmental Quality). The layout of the street network in the locality enhances opportunity for such activities to occur due to the relative absence of passive surveillance, the low density of development and the absence of street lighting and connective infrastructure.

At all stages of construction and operation of Renascor's BAM Facility, the Project site will be controlled and monitored. The Project will result in an increase in the presence of people and activity in and around the site, including the adjacent public realm of Robinson Road. This represents an increase in the potential for passive surveillance of the public realm and is considered likely to have a mitigating effect on the likelihood of criminality to occur in the immediate vicinity of the site. Security devices including key-card access to a securitised access point, closed-circuit television cameras and exterior lighting will be incorporated into Project design where appropriate for site security and access control.

The CPTED principles discussed above are, to the extent possible, captured within the General Development Policies of the Planning and Design Code (see Section 5.6). Alignment with the relevant provisions of the Code is indicative of the Project's alignment with CPTED principles.

Table 16-3 and Table 16-4 provide further comment on the alignment of the BAM Facility with first and second generation CPTED principles.

First Generation CPTED

Table 16-3: Alignment with First Generation CPTED Principles

CPTED Principle	BAM Facility Alignment
Territoriality & Territorial Control Relates to a sense of ownership of public space. Architectural principles and semi-public space design assists residents and the community broadly to assume informal ownership of public spaces.	At present, the locality has low natural surveillance and relatively poor territorial control. Territorial control is inherently linked to the quality of the public realm. Criminality in both public and semi-public spaces in the vicinity is evident through the existence of illegal dumping sites and evidence of antisocial behaviour concerning the misuse of motor vehicles. The Project is likely to assist in mitigating the criminogeneity of the locality through an increase in territorial control and natural surveillance. Additional works conducted by Renascor such as the removal of illegal dumping within the Project site, and the activation of the Project site through the establishment of the BAM Facility will have positive outcomes for the locality. The existing alignment of local roads limits access to the area; however in the present condition, this is a contributor to criminality, not a deterrent. Access control in the locality is managed through standard fencing and gating of properties, which also has a tendency to create visual barriers that further isolate the public realm of Robinson Rd. There is limited traffic on Robinson Road other than that associated with existing activities in the locality, for which Robinson Road is the primary access point. Project design incorporates gated access; it is not a publicly accessible facility, but the thoughtful treatment of the interface between the BAM Facility and the public realm will serve to align with the principles of CPTED through introducing a higher level of natural surveillance. Maintenance of the Project site will elevate the image of the locality, which at present is characterised by vacant land and very low territoriality.
Natural Surveillance Relates to the presence of people in public, semi-public and public-facing private spaces, which precipitates natural or passive surveillance of the public realm. The ability of residents and occupants of a space to casually observe semi-public spaces reduces fear of crime and opportunities for criminality to occur within a space.	
Image and Milieu The urban safety of an area is linked to the physical condition of properties and public spaces. Relates to the physical condition of a locality and the incidence (or perceived incidence) of criminality. The existence of graffiti, littering or dumping, neglected public spaces and the absence of beautification are identified as factors which detract from the image of a space.	
Access Control Relates to limiting or controlling access to private property, public and semi-public spaces to those people who have a legitimate purpose for being there, and discouraging access by others.	

Second Generation CPTED

Table 16-4: Alignment with Second Generation CPTED Principles

CPTED Principle	BAM Facility Alignment
Social Cohesion Aims to enhance positive social relationships between residents with a focus on solving local problems. Community action (special interest groups, etc.) to tackle local problems. Relies on CPTED1 principles around territoriality, surveillance and image to reinforce social programming.	The activation of the Project site contributes meaningfully to the elevation of the locality. This aligns strongly with City of Salisbury's SGF as discussed in Section 8.3.3 (Strategic Growth Framework). Increased passive surveillance as a result of the Project may discourage criminal behaviour. Renascor's stakeholder engagement program has respect for existing community cohesion and interest groups in the locality. More detail on stakeholder management is included in Chapter 6 (Stakeholder and Community Engagement). At present, connective infrastructure is limited in the locality of the Project site. The City of Salisbury's SGF indicates Council's objective to create a high degree of linkage within the Waterloo Corner and Bolivar area, incorporating greenways and cycle paths in addition to green infrastructure and an increase in the diversity of land use in the area. The BAM Facility aligns with this objective through the diversification and intensification of land use in the locality. The SGF strongly emphasises the diversity of future land use in the locality, including the development of green/future industry or industrial parks, commercial development and public realm/green infrastructure commensurate with the infrastructure landscape of the locality. The presence of existing heavy infrastructure limits the potential of the locality to support future/new residential development, so this kind of development is anticipated to be limited in the vicinity of the Project. Crime prevention through environmental design, however, has informed the policy that is underpinned by this strategic document.
Community Culture Relates to the establishment of regular cultural or community events at a neighbourhood level, with a more general focus than the single-issue context of Social Cohesion. The intention is to assist communities to develop a strong sense of cohesion across a broader diversity of the community than single-issue interest groups will generally facilitate. This is a driver of weak social ties, the form of social capital attributed to social mobility, community-based wellbeing and inclusion.	
Connectivity Seeks to mitigate the exclusionary elements of territoriality and access control, by encouraging active and passive movement and linkages across neighbourhoods. Enhanced connectivity contributes to passive surveillance.	
Threshold Capacity Relates to the diversity of land use within a precinct, neighbourhood or locality. Refers to a policy-guided level of land use diversity tailored for a specific locality or precinct. Provision of access to a variety of development types, allowing users of a neighbourhood to meet the majority of their everyday needs within a particular radius of their place of residence. Mixed-use development, land use diversity and colocation of services to infrastructure are key outcomes of this philosophy in policy.	

16.3.7 Environmentally Sustainable Design Strategy

To the greatest extent practicable, Renascor will utilise construction and fit-out materials, and operating practices during both construction and operation which meet or exceed relevant environmental sustainability standards. This may include:

- Use of construction and fit-out materials which have third-party green certification or an Environmental Product Declaration,
- Construction steel sourced from ISO 14001-accredited manufacturers,
- Insulation materials with a zero Ozone Depleting Potential (ODP),
- Low-VOC paints, sealants and adhesives,
- AS 1680 compliant lighting systems and fixtures,

- AS/NZS6400:2005 compliant water fixtures, and
- Waste management practices (including general waste and office waste) incorporating facilities for the separation, recycling and safe disposal of waste.

16.4 Impact Assessment

The impact assessment has assumed that upgrades to Robinson Road are complete prior to or during construction of the Project.

Residents and users of Robinson Road will experience minor positive impacts to public realm amenity during operation of the BAM Facility.

Existing public realm amenity along Robinson Road adjacent to the Project site is limited, and dominated by the interface between the rural-style road reserve and fenced or gated horticultural properties. Grass verges are well maintained elsewhere in the locality, but are in poorer condition adjacent the Project site. Road surface quality of Robinson Road is poor, as discussed in Section 11.4 (Transport and traffic). The presence of the BAM Facility is likely to elevate the overall built quality of the locality, in combination with planned upgrades to the Robinson Road reserve, which are assumed to have been undertaken prior to construction of the Project commencing.

Mitigation measures undertaken to address other impact parameters are likely to result in a net-positive impact from the Project on the adjacent public realm. These include:

- The retention of existing native vegetation along the eastern boundary of the Project site and soft landscaping and engineered stormwater management within the Project site will elevate the site's interface with the public realm. Where vegetation clearance cannot be avoided, juvenile plantings of appropriate species will be planted to provide screening amenity in this area.
- In combination with upgrades to Robinson Road, integrated stormwater management within the Project site will mitigate the tendency for the Robinson Road reserve to become inundated during heavy rainfall events.
- The visual impact of the Project will be mitigated through the use of building materials and colours which blend with the locality and have regard to existing development in the area, and direction of exterior lighting away from receptors.
- Lighting will be designed and positioned to minimise light spill to sensitive receivers. Control strategies will include directing lighting towards where required and away from sensitive receptors, visual screening in place between manufacturing facility and sensitive receivers, and distance of approximately 250 m from main manufacturing facility and nearest sensitive receptor. Final lighting design is the subject of further engineering design and will be provided in subsequent approvals (e.g. building rules consent) which will assess the lighting design against Australian Standards.

When including the proposed mitigation measures discussed in relevant sections of the EIS, the Project will represent a **Minor** impact to the amenity of the public realm. The likelihood of this change is **Possible,** resulting in an overall risk of **Low,** noting the likelihood of a net-positive impact.

The BAM Facility presents the potential for overlooking into adjacent private and semi-public spaces on Robinson Road, mitigated by vegetation screening, site layout and constructed visual privacy barriers where applicable.

The tallest component of the Project are the kiln buildings at approximately 25 m above ground level. These buildings incorporate external platforms and stairwells to a height of approximately 21.5 m above ground level (floor level). Some variance in elevation relative to sensitive receptors is possible, depending on the finished floor level of the Project and the depth of fill required to elevate the site above the 1% AEP flood level. The Stage 2 kiln building is approximately 120 m from the nearest sensitive receptors on Robinson Road (identified as R14, R15, R16). At a platform height of approximately 21.5 m above ground level, the highest observation point from the Project stands at approximately 23.3 m above ground level.

From this vantage point it may be possible for personnel on the external stairway to overlook into private open space within adjacent horticulture.

Existing screening vegetation on the eastern boundary of the Project site rises to a maximum height of approximately 11 m above ground level, but is sparse and inconsistent. Thus, screening vegetation presently existing is not of a sufficient height to fully mitigate the possibility of overlooking from the elevated platform on the Stage 2 kiln building.

The possibility of overlooking is able to be mitigated through placement of design elements such as visual screening and locating platforms and stairwells away from receptors, where possible.

With appropriate mitigations in place such as visual screening, the potential for the Project to overlook sensitive receptors amounts to a **Minor** impact, **Unlikely** to occur, resulting in a **Low** risk.

16.5 Summary of Mitigation Measures

Incorporation of exterior lighting, surveillance equipment and access control into the design of the Project will increase the visual presence of activity within the locality. An increase in passive surveillance is considered to be a mitigating factor in the criminogeneity of a locality.

Mitigation measures have been incorporated into design in consultation with relevant stakeholders where appropriate. Ongoing interface issues will be managed under the Mitigation measures listed in the other impact assessment chapters, of relevance are:

- Chapter 12 Social and Economic Impact
- Chapter 9 Physical Environment
- Chapter 10 Biological Environment
- Chapter 11 Amenity and Environmental Quality

16.6 Conclusion

The Project is likely to result in an increase in the passive surveillance of the locality due to an increase in people and movements associated with the Project. This is considered to align with the principles of CPTED, in addition to designed and constructed crime prevention assets inherent to Project design. The Project is compatible with the desired future development pattern of the locality expressed through the City of Salisbury's SGF, and will be constructed utilising materials, colours, screening

treatments and finishes which align with industry best practice. Landscaping and vegetation screening will be incorporated into Project design. The Project is considered to present the potential for an overall positive impact to the design quality of the receiving environment, incorporating appropriate impact mitigation controls.

17 Environmental Management Framework

This chapter describes the environmental management framework that will be applied during construction and operation for the Project. It describes Renascor's Environment and Social Management System (ESMS) and sets out the framework for the development and implementation for a range of environmental management plans, including those required by the EIS guidelines. The EIS guidelines specifically require the following environmental management plans and strategies to be developed:

- Cultural Heritage Management Plan
- Discharge Criteria Management Plan (Appendix 18)
- Waste Management and Minimisation Strategy (Appendix 17)

The general requirements in the EIS Assessment Requirements outline the proposed environmental management measures which will be adopted and specifically addressed in the relevant environmental impact assessment chapter along with an assessment of the likely effectiveness of said measures.

This chapter sets out the framework which will be used to develop Construction Environmental Management Plans (CEMP) and Operating Environmental Management Plans (OEMP). All management plans will be reviewed on a regular basis to ensure they are fit for purpose with regular compliance inspections (formal and informal), conducted by the Company to monitor, audit and assess compliance with environmental approvals. As discussed in Chapter 14 (Climate Change and Resource Efficiency), Renascor is proposing to align its Environmental and Social Management Systems and standards with the Equator Principles (EP4). This includes principle 7 which involves the independent audit of projects with potential for adverse environmental and social risks.

17.1 Environmental and Social Management System (ESMS)

An ESMS provides the framework by which environmental risks associated with an organisation's activities, product and services can be identified, managed, and monitored. These systems focus on continuous improvement of environmental performance, prevention of environmental damage and resource management. An ESMS can also assist by providing the means of demonstrating ongoing environmental regulatory compliance.

17.1.1 Environmental Policy

Renascor have an Environmental Policy (Appendix 5) which commits to:

- Minimising the environmental impacts from Renascor's activities.
- Implementing best practice environmental planning, management and monitoring.
- Continuous improvement of environmental performance.
- Ensuring environmental systems and procedures are appropriate and fully integrated into the business.

17.1.2 Environmental and Social Management System (ESMS)

Renascor will develop an ESMS to support their Environmental Policy. The ESMS will define the structure for management of environmental and social impacts and the elements and expectations by which the environment and the public are protected during conduct of Renascor's operations. The ESMS will consider the following standards:

- ISO 14001 Environmental Management Systems
- ISO 9000 Quality Management Systems
- ISO 31000 Risk Management
- ISO 19600 Compliance Management Systems
- Equator Principles (EP4)
- International Finance Corporation – Environment Health and Safety Guidelines

The ESMS will be subject to ongoing review using the plan-do-check-act approach for continuous improvement.

17.1.3 Legal and other requirements

Renascor must also comply with a range of legislation, policies and requirements as set out in Chapter 4 (Statutory Framework). The CEMP and OEMP will provide the framework for achieving compliance with regulatory requirements (including the general environmental duty), environment protection policies, standards, guidelines and codes of practice.

17.2 Environmental Management Framework for the Project

17.2.1 Preparation of CEMP and OEMP

Project specific plans for environmental management of construction, operations and maintenance are required by the EIS guidelines. These will be developed and implemented in compliance with relevant legislation and regulatory requirements. Where work is undertaken by a contractor, Renascor will require the contractor to have developed a site specific EMP that meets regulatory requirements and the below framework.

As a general guide it is expected that the structure of the CEMP and OEMP will include the following:

- An introductory overview of the key issues requiring management,
- Key legislation, policies, standards and other requirements that apply to the environmental aspect,
- Relevant environmental values that require protection,
- Identification and analysis of potential environmental impacts, including environmental hazards and risks,
- Performance goals the EMP is seeking to achieve in order to avoid or mitigate impacts,

- An overview of the management measures that will be utilised to meet the objectives and their timing. Where required, specific plans will be developed for aspects requiring further detail,
- Specification of the required level of performance to meet environmental/legislative or Project-specific standards,
- Procedures to monitor, measure and record performance (e.g. inspections and auditing)
- Reporting requirements to regulators, the community and other stakeholders for the environmental aspect and the responsible parties,
- Procedures to be undertaken in performance indicators are not met.

The CEMP and OEMP will address management of environmental aspects identified and discussed in the EIS including, at a minimum, all mitigation measures committed to in the EIS. The CEMP will also include information as advised in the Construction Environment Management Plan Guideline (EPA 1095/21) (EPA SA, 2021b). Some specific issues will be addressed through more detailed sub-plans within the CEMP and OEMP to provide appropriate guidance to contractors and other personnel onsite. Other environmental management plans are specifically required to be prepared by the EIS guidelines and will be additional to the CEMP and OEMP.

Table 17-1: Management measures to be addressed in the CEMP and OEMP

Issue	CEMP	OEMP	Chapter
Sedimentation, soil erosion and drainage	Yes	Yes	Chapter 9 Physical Environment
Dangerous substance management, including spills, incidents and emergency response	Yes	Yes	Chapter 9 Physical Environment Chapter 15 Hazard and Risks
Acid sulphate soils	Yes		Chapter 9 Physical Environment
Soil or groundwater contamination	Yes	Yes	Chapter 9 Physical Environment Chapter 15 Hazard and Risks
Wastewater management and discharge	Yes	Yes	Chapter 9 Physical Environment
Stormwater management and flooding	Yes	Yes	Chapter 9 Physical Environment Chapter 15 Hazard and Risks
Vegetation management	Yes		Chapter 10 Biological Environment
Pests, diseases, and weeds	Yes	Yes	Chapter 10 Biological Environment
Cultural Heritage	Yes	Yes	Chapter 13 Cultural Heritage
Dust and air emissions	Yes	Yes	Chapter 11 Amenity and Environmental Quality
Noise	Yes	Yes	Chapter 11 Amenity and Environmental Quality
Traffic	Yes	Yes	Chapter 11 Amenity and Environmental Quality
Visual amenity	Yes	Yes	Chapter 11 Amenity and Environmental Quality
Stakeholder engagement, notifications and complaints management	Yes	Yes	Chapter 6 Stakeholder and Community Engagement

Table 17-2: Environmental management plans required by the EIS

Plan	Appendix	Chapter
Cultural Heritage Management Plan	Management Plan in development	Chapter 13 Cultural Heritage
Discharge Criteria Management Plan	Appendix 18	Chapter 9 Physical Environment
Waste Management and Minimisation Strategy	Appendix 17	Chapter 14 Climate Change and Resource Efficiency

17.2.2 Environmental monitoring

Monitoring of construction, operations and maintenance activities will be undertaken to determine whether environmental risks are being managed, minimised or where reasonably possible, eliminated. Monitoring requirements in the CEMP and OEMP will address compliance with regulatory requirements.

17.2.3 Emergency response

Renascor will develop an emergency response system as part of the overarching ESMS, with processes and plans for responding to potential or actual emergency situations documented in an Emergency Response Procedure which is regularly reviewed and updated.

17.2.4 Community engagement and complaint management

Communications between Renascor and identified stakeholders will be ongoing during project development, construction and operations. Land access protocols will be established with SA Water as the land holder for the Project site and land over which the water pipelines will traverse.

All Renascor employees, contractors and visitors who interact with members of the local community are expected to adhere to Renascor Policies requiring respect for the cultural environments of the communities in which Renascor operates.

A community feedback and complaints process will be set out in the CEMP and OEMP to ensure all feedback and complaints are appropriately recorded and addressed. The draft process is outlined below.

Community Feedback and Complaints Process

The Company has set up a community phone number and email address advertised on their website. A Stakeholder Engagement Register (SE Register) has been developed for the Project. The CE Register is a live document that is used to record details of all stakeholder consultation and engagement activities, feedback received and follow up actions required.

Renascor will continue to ensure the community is informed of the feedback process when engaging with potentially impacted stakeholders.

All complaints are targeted to be responded by within two business days and resolved as soon as practicable.

Table 17-3 outlines the framework Renascor will adopt when contacted by a stakeholder and the associated priority assessment and action. Additionally, the following steps will be undertaken on the occurrence of a complaint:

1. Record the complaint
2. Acknowledge the complaint, and respond based on the level of the concern.
3. Advise complainant of the outcome.
4. Report as required.

Table 17-3: Internal Complaints Framework Procedure

Nature of Complaint	Priority Assessment	Delegate and Action
Serious Serious incident that requires immediate attention.	High	Immediately, or as soon as reasonably practicable.
Medium Non-serious incident but requires attention within 24 hours.	Medium	Within 24 hours, or as soon as reasonably practicable.
Low Trivial or misconceived/misunderstood issues.	Low	If it cannot be resolved at the time of the call/email, follow up is required within 48 hours

The Company will also ensure that it provides appropriate notifications to stakeholder and community members about matters relating to the construction/development of the Project that may impact on their usual activities prior to such events occurring (e.g., temporary road closures). The information will be communicated by a variety of different platforms which may include:

- Project website,
- Email/post mail notifications to relevant stakeholders,
- Advertisement in local newspapers.

17.2.5 Training and induction

All Project personnel involved in construction and operation activities will be required to undergo training in site policies and procedures including environmental management and safety requirements prior to commencement of construction or operational activities. Job-specific training relevant to roles will also be undertaken and records maintained of induction and attendees.

At the completion of a site induction, personnel will be required to demonstrate that they have understood the content of the induction.

A simplified induction will be developed for visitors to site. Specific training and induction requirements will be set out in the CEMP and OEMP.

17.2.6 Reporting and compliance

Renascor will establish a compliance system to monitor, audit and assess compliance against approval conditions. A compliance register will be established which will be regularly reviewed and updated. Non-compliances and proposed corrective actions will be reported to regulators as required.

Reporting procedures will be developed and implemented to ensure that relevant issues are recorded and external reporting requirements are met. Internal reporting protocols will be developed to record Contractors' compliance, progress and incidents. External reporting will be carried out in accordance with regulatory requirements.

Contractors will be responsible for reporting all environmental incident and events (including any notice received from a government agency) to Renascor as soon as practicably possible.

The ESMS will include an audit protocol and schedule that details the audits and inspections to be conducted and their timing. This will be followed up with specific procedure for non-conformance and corrective actions, which sets out the process, rules and responsibilities that apply to raising non-conformances or opportunities for improvement.

17.2.7 Roles and responsibilities

All personnel involved in the Project, including Renascor employees, advisors, contractors and subcontractors are currently being identified and detailed responsibilities will be developed as specific roles are confirmed and the Project moves forward.

18 Conclusion

The Australian Government released the Critical Minerals Strategy in 2022 highlighting the importance of stable supply chains for minerals that support the functioning of modern technologies including renewable energy technologies. Graphite has been identified as a key critical mineral due to its use in lithium ion batteries, with 60% of the world's graphite supply produced in China who are also responsible for all downstream processing of lithium ion batteries (CSIRO, 2021).

Renascor's BAM Facility Project proposes a downstream graphite processing facility for battery anodes. This project increases SA's capability to process critical minerals for production of renewable energy technologies and provides a more stable supply chain of this valuable mineral.

If approved, the BAM Facility Project would deliver a range of benefits to SA, including:

- Creation of over 1,200 FTE jobs (direct, indirect and flow on) including ~840 jobs in the Northern Adelaide Region
- Contribution to the Gross State Product is estimated at $2.6 B over the life of the project
- Project is expected to have a net social and community benefit via increased employment, support of local goods and service providers and sponsorship opportunities for community, social and sporting clubs.

The Project has been designed, where practicable, to avoid and minimise environmental and social impacts. Baseline studies, monitoring, modelling and assessment have been undertaken to identify all potential environmental, social and economic impacts and mitigation measures proposed to reduce potential impacts and risks to as low as reasonably practicable while maximising positive benefits.

Assessments have been based on the current engineering designs for the Project. A conservative approach to the assessment has been adopted which indicates that no unacceptable impacts are anticipated.

Details of Renascor's capability, corporate governance and management systems has been provided to demonstrate commitment and ability to deliver this Project.

Renascor is committed to open and transparent engagement with stakeholders and communities members throughout the EIS process and beyond and will continue to engage with landholders, traditional owners, government and the wider community as the Project progresses.

Overall, the Project represents an important step towards achieving the Australian Government objectives regarding in-country critical minerals capacity and transitioning to a lower carbon emissions future.

19 Glossary

Acronym / Name	Definition / Explanation
30YPGA	30 – Year Plan for Greater Adelaide
AAR-AGD	Aboriginal Affairs and Reconciliation within the Attorney-General's Department
ABS	Australian Bureau of Statistics
ACWQIP	Adelaide Coastal Water Quality Improvement Plan
ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AHA Act	*Aboriginal Heritage Act 1988*
AHD	Australian Height Datum
Air Quality EPP	*Environment Protection (Air Quality) Policy 2016*
ALA	Atlas of Living Australia
ALARP	As low as reasonably practicable
AMLR BMA	Adelaide Mount Lofty Ranges Bushfire Management Area
ASS	Acid Sulphate Soils
AWS	Automated Weather Stations
BAM	Battery Anode Material
BATEA	Best Available Technology Economically Achievable
BDBSA	Biological Databased of South Australia
BGL	Below Ground Level
BoM	Bureau of Meteorology
C	Carbon
CALPUFF	Air quality dispersion model
CASA	Civil Aviation Safety Authority
CASS	Coastal Acid Sulfate Soils
CCIA	Climate Change in Australia
CCRA	Climate Change Risk Assessment
CE Register	Community Engagement Register
CEMP	Construction Environment Management Plan
CHMP	Cultural Heritage Management Plan
CO	Carbon Monoxide
CONCAWE	Conservation of Clean Air and Water in Europe (noise model)
CPTED	Crime Prevention Through Environmental Design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwth	Commonwealth
DA	Development Application
dB(A)	A weighted decibels (standard noise measurement)
DCCEEW	Department for Climate Change, Energy, the Environment and Water (Cwth)
DD	Deposited Dust
DEM	Department for Energy and Mining
DEW	Department for Environment and Water
DGV	Default Guideline Value

DIT	Department of Infrastructure and Transport
DoE	Department of the Environment (Cwth)
DTI – PLUS	Department for Trade and Investment, Planning and Land Use Services
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMPs	Environment Management Plans
EP Act	*Environment Protection Act 1993*
EP4	Equator Principles
EPA SA	South Australian Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cwth)*
EPPs	Environment Protection Policies
ERMA	European Raw Materials Alliance
ESD	Ecologically sustainable development
ESG	Environmental, Social and Governance
ESMS	Environmental and Social Management System
FES Act	*Fire and Emergency Services Act 2005*
FFDI	Forest Fire Danger Index
FID	Financial Investment Decision
FTE	Full time equivalent
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse Gas
GISA	Green Industries South Australia
GJ	Gigajoules
GPA	Groundwater Prohibition Area
GRP	Gross Regional Product
GSP	Gross State Product
H_2S	Hydrogen sulfide
HDPE	High Density Polyethylene
HF	Hydrofluoric acid
HSP	High Salinity Plant
HVAC	Heating, Ventilation, Air Conditioning
HVNL	*Heavy Vehicle National Law (SA) Act 2013*
IAIA	International Association for Impact Assessment
IAP2	International Association for Public Participation
IAQM	Institute of Air Quality Management
IFD	Intensity Frequency Duration
ISO	International Standards Organisation
kg CO_2 eq per kg PSG	Kilograms of carbon dioxide equivalent produced for every kilogram of purified spherical graphite
Km/h	Kilometers per hour
Ktpa	Kilotonnes per annum
kV	Kilovolt
KYAC	Kaurna Yerta Aboriginal Corporation (Traditional Owners of the land)
L/s	Liters per second

LCA	Life Cycle Analysis
LGA	Local Government Area
LSA Act	*Landscape South Australia Act 2019*
MAR	Managed Aquifer Recharge
MNES	Matters of National Environmental Significance
MPN/g	Most Probable Number per gram (measure of coliforms)
MW	Mega Watt
NAIS	Northern Adelaide Irrigation Scheme
NAP PWA	Northern Adelaide Plains Prescribed Wells Area
NARCLiM	New South Wales and Australian Regional Climate Modelling Project
NEPM	National Environmental Protection Measure
NGER Act	*National Greenhouse and Energy Reporting Act 2007*
NO_2	Nitrogen dioxide
Noise EPP	*Environment Protection (Commercial and Industrial Noise) Policy 2023*
NOx	Nitrogen oxides
NPW Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
OEMP	Operational Environment Management Plan
PASS	Potential Acid Sulfate Soils
PDI Act	*Planning, Development and Infrastructure Act 2016*
PFAS	Per – and Poly-fluoroalkyl Substance
$PM_{2.5}$	Particulate matter smaller than 2.5 microns
PM_{10}	Particulate matter smaller than 10 microns
PMST	Protected Matters Search Tool
Project	The Siviour BAM Project (subject of this EIS)
PSG	Purified Spherical Graphite
PSI	Preliminary Site Investigation
RAAF	Royal Australian Air Force
RARB	Recognised Aboriginal Representative Body
RCP4.5 pathway	Representative Concentration Pathway 4.5 (medium effort made to curb GHG emissions)
RCP8.5 pathway	Representative Concentration Pathway 8.5 (low effort made to curb GHG emissions)
RDA	Regional Development Australia Adelaide (Cwth)
RNU	Renascor Resources
RO	Reverse Osmosis
SA	South Australia
Salisbury	The area within the City of Salisbury Local Government Area as defined by ABS dataset: LGA47140.
SAPN	South Australia Power Networks
SD	Standard deviation
SDS	Safety Data Sheet
SEB	Significant Environmental Benefit
SEIFA	Socio Economic Index for Aras

SGF	City of Salisbury Strategic Growth Framework: Waterloo Corner and Bolivar Corridor
SIA	Social impact assessment
SPC	State Planning Commission
SPP	State Planning Policies
'State average' or 'average'	Average values calculated provided in the whole state of South Australia dataset as defined by ABS (2021 Census)
TCFD	Task Force on Climate-Related Financial Disclosures
TDS	Total Dissolved Solids
The Code	The Planning and Design Code
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
UD	Universal Design
V	volt
WAP	Water Allocation Plan
Waterloo Corner, or WC	The suburb of Waterloo Corner as defined by ABS dataset: SAL41547.
Water Quality EPP	*Environment Protection (Water Quality) Policy 2015*
WQG	Australian and New Zealand Water Quality Guidelines
WSUD	Water Sensitive Urban Design
WWTP	Waste Water Treatment Plant

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