WORKS APPROVAL APPLICATION

LOT 72 EVELINE ROAD, MIDDLE SWAN

Australian Precast Solutions

June 2024

[redacted]

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1 INTRODUCTION

1.1 Background

Australian Precast Solutions (APS) (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels.

1.2 Location and Layout Plans

A temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan. The property is approximately 30.5 hectares (ha) in size and is currently utilised by the Midland Brick Facility (BGC) and the proposed APS facility. BGC is located to the east of the property, with the proposed APS plant to be located in the central area. The area to be leased by APS is shown in **Appendix A** and is herein referred to as the subject site.

The subject site is located in the municipality of the City of Swan, within the City's locality of Middle Swan, approximately 18 kilometres (km) northeast of Perth. The Swan River borders the north of the Lot.

1.3 Operational Overview

The proposal involves the set up and operation of a concrete batching plant. These activities will require a works approval and subsequent licence under the *Environmental Protection Act 1986*. This document provides supporting information for a works approval application under the *Environmental Protection Act 1986*. The document includes an environmental assessment of emissions and discharges and their associated mitigation and management.

The works approval application is for the set-up and operation of a concrete batching plant at the above-mentioned site, located on Lot 72 Eveline Road, Middle Swan. The unit will be located to the north of the existing refurbished shed while operations are occurring. Concrete batching is an activity that is prescribed by the *Environmental Protection Regulations 1987* as follows:

Category 77: Concrete batching or cement products manufacturing: premises on which cement products or concrete are manufactured for use cement at places or premises other than those premises.

Importantly, the concrete batching plant is temporary only, with an approximate 18-24 month lifespan (including construction, operation and decommissioning) for the project. Construction is planned to commence in August 2024 and be completed by March 2025. Production of segments will be undertaken from April 2025 to October 2025 with delivery and demobilisation occurring from November 2025 until April 2026.

1.4 Legislative and Regulatory Compliance

Relevant State and Commonwealth legislation relating to cement batching has been consulted during the preparation of this Works Approval application and are listed below:

- *Environmental Protection Act 1986*;
- *Environmental Protection Regulations 1987*;
- *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*;
- *Environmental Protection Act 1986 – Environmental Protection (Unauthorised Discharges) Regulation 2004*;
- *Local Government Act 1995*;

- *National Environment Protection Council Act 1994*; and
- *National Environment Protection Measure for Ambient Air Quality 2003*, revised 2011.

2 EXISTING ENVIRONMENT

2.1 Regional Setting

The subject site is located within the central portion of 72 Eveline Road, Middle Swan. The property is approximately 30.5 ha in size. The BGC facility is located to the east of the property, with the proposed APS plant to be located in the central area, comprised of approximately 5.8 ha.

The subject site consists of an existing shed, offices and concrete and gravel hardstand areas. A new site office compound is also proposed.

The majority of the subject site is zoned "General Industrial" under the City of Swan's *Local Planning Scheme No. 17* with a portion in the south zoned "Private Clubs and Institutions".

Land use abutting the boundaries of the subject site is industrial based to the west and east, with the Swan River located to the north of the subject site. Areas to the west and south will be developed for future residential properties. Given that this operation is only temporary (approximately 18-24 months including construction, operation and decommissioning), the future residential development will occur after the project has been completed and decommissioned.

2.2 Topography and Soils

The current topography of the subject site can be described as gently undulating with the elevation ranging from 4 m Australian Height Datum (AHD) to 8 m AHD. Topographical elevation increases significantly to the south and west of Lot 72 and decreases to the north at the Swan River. LIDAR imaging of the site shows that the proposed activity area is located at an elevation of approximately 5 m AHD with an increase in elevation in all directions.

The subject site is located within the Pinjarra System on the Swan Coastal Plain from Perth to Capel consisting of poorly drained coastal plains with variable alluvial and aeolian soils (Tille 2006).

The subject site is located within the following soil sub-systems:

- Andrew clay loam-clay (Pinjarra) – Very shallow brown clay loam or clay over yellow-brown and grey mottled clay.
- Swan sandy loam – Shallow red-brown sandy loam over red-brown clay loam, grading to red clay.
- Pinjarra Swamp – Swamp.
- Bellvue clay loam – clay (Pinjarra) – Shallow yellow-brown clay or clay loam over variable yellow brown mottled clay. May contain gravels.
- Valley complex (Pinjarra) – Variable soils associated with drainage lines.
- Swan sand – Shallow red-brown sand over red fine sandy clay, grading to red clay.
- Herne Sand (Pinjarra) – Grey to greyish-brown sand with nil to few gravels over mottled clay.
- Bellvue loam (Pinjarra) – Shallow brown clay loam over yellow-brown mottled clay.

2.3 Climate

The subject site has a Mediterranean type climate with hot dry summers and cool wet winters. According to data from the nearest weather station with complete records, Perth Airport (Station number 009021, accessed at www.bom.gov.au) located less than 7 km to the south of the site, the average annual rainfall is approximately 757.2 mm, with approximately 90% of this rainfall occurring between the months of April to October. The average monthly maximum temperatures range from 32°C in February to 18.0°C in July.

Wind data from the site indicates that the prevailing wind direction is easterly in the morning and south westerly in the afternoon during summer, with lighter variable winds occurring during the winter months (refer to **Appendix B**).

2.4 Vegetation and Flora

Given the highly disturbed nature and historical land uses, the subject site it is devoid of native vegetation. Accordingly, the subject site does not contain any flora or fauna of conservation significance.

2.4.1 Environmentally Sensitive Areas

Section 51B of the *Environmental Protection Act 1986* (EP Act) allows the Minister to declare an Environmentally Sensitive Area (ESA). Once declared, the exemptions to clear native vegetation under the regulations do not apply in these areas. TEC's areas within 50 m of any Declared Rare flora (DRF) and defined wetland areas constitute ESAs. However, a number of other areas of environmental significance are also listed. Current declared ESAs are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

The subject site is not mapped as occurring within an ESA. An ESA is located to the north of the subject site, associated with the Swan River which slightly overlaps the proposed truck route. However, as this road is already established, no impacts on the ESA are anticipated.

2.5 Fauna

The subject site is devoid of native vegetation and therefore it does not provide habitat critical for the survival of conservation significant fauna species.

2.6 Hydrology

2.6.1 Groundwater

The subject site is located within the *Rights in Water and Irrigation* (RiWI) *Act 1914* proclaimed Perth Groundwater Area.

Mapping maintained by the Department of Water and Environmental Regulation (DWER) showing maximum depths to groundwater within the Gnangara and Jandakot areas of the Swan Coastal Plain during 2019 indicate a separation to groundwater of approximately 4 m across the subject site.

No interaction with groundwater is expected, therefore no further management actions are required.

2.6.2 Surface Water

The subject site is located in the Swan/Canning Estuary subarea of the proclaimed Swan River System surface water area. The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

There are no surface water features present within the subject site, with the closest surface water feature, the Swan River, located to the north of the property. Given proximity to the Swan River, the subject site is located within the Swan River Trust (SRT) Management Area. A tributary of the Swan River, Blackadder Creek, is located to the south of the subject site.

2.6.3 Wetlands

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system (refer to **Table 1**).

Table 1. Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands in Western Australia have been mapped and this mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the '*Geomorphic Wetlands of the Swan Coastal Plain*' dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 2**.

Table 2. DBCA wetland management categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: • Reservation in national parks, crown reserves and State owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

The subject site is not mapped as occurring within a wetland area. The closest mapped wetland is located over the Swan River to the north. No discharge to the river is expected, therefore there will be no impacts to any significant wetlands.

2.7 Aboriginal Heritage

All Aboriginal sites in Western Australia are provided protection under the *Aboriginal Cultural Heritage Act 2021* in which it is an offence for anyone to excavate, damage, destroy, conceal or in any way alter an Aboriginal site without undertaking a due diligence assessment and gaining advice and approval from the Aboriginal Heritage Council and local Aboriginal cultural heritage services (LACHS).

An online search for relevant Aboriginal heritage information was undertaken using the Department for Planning, Lands and Heritage *Aboriginal Heritage Inquiry System* that incorporates both the heritage site register and the heritage survey database (DPLH 2023). The Aboriginal Heritage Site Register is maintained pursuant to Section 38 of the superseded *Aboriginal Heritage Act 1972* and contains information on over 22,000 listed Aboriginal sites throughout Western Australia.

Results of the database search revealed that five Aboriginal heritage sites are present within or in proximity to the subject site as follows:

- Swan River (ID 3536)
- Turtle Swamp (ID 3622)
- Blackadder and Woodbridge Creek (ID 3720)
- Jane Brook (ID 3759)
- Bishop Road Camp (ID 3768)

Advice was sought from Waru Consulting, experts in indigenous heritage in which is was determined that there are no culturally significant sites overlapping the subject site and no archaeological sites have been recorded either.

Given the historical use of the subject site, it is unlikely that the proposed works will further impact any registered sites. However, if any evidence of Aboriginal artefacts are encountered during the construction, works will cease and further guidance from the relevant knowledge holders will be sought.

2.8 Site Contamination

A search of the DWER's known contaminated sites database (DWER 2024) identified that the subject site is not listed as a contaminated site. There are five properties within a 1 km radius of the subject site mapped as 'Remediated for restricted use' as follows:

- 46 Great Northern Highway (hydrocarbon impacted soil and groundwater)
- 40 Great Northern Highway (hydrocarbon impacted groundwater)
- 50 Viveash Road (hydrocarbon impacted soil at 2 m below ground surface)
- Lot 5 on diagram 48300 (hydrocarbon impacted soil at 2 m below ground surface)
- Proposed Lot 5 on deposited plan 419608 (asbestos impacted soil buried beneath geotextile warning barrier and 1 m of clean fill).

The proposed operations will not be impacted by any identified contaminated sites.

3 PROJECT DESCRIPTION

3.1 Throughput

It is anticipated that a maximum of 39,000 tonnes per annum of cement products or concrete is required to be produced. The maximum throughput of the plant is approximately 78,000 t per annum.

3.2 Plant Components

The main elements of the proposed operations will include:

- Batching Plant
  - Dual Pan Mixer (EURO Star)
  - 2 x 65 tonne cement silos with discharge point ducted to the wedge point within 1 m of ground level;
  - Four sand and aggregate 40 tonne hoppers and four storage bins with a capacity of approximately 216 m^3 each;
- Approximately 3,600 m^2 site workshop, office and amenities;
- Carousel system for manufacturing of precast tunnel segments;
- Gantry crane for handling and loading of precast tunnel segments;
- Gravel and concrete hardstand; and
- Vehicle parking facilities.

3.2.1 Raw Material Delivery and Storage

The main processing area of the plant is comprised of sealed concrete. The gravel area outside of the main processing area is fitted with reticulation to enable regular and as required watering for dust suppression.

Sand and aggregate material will be dampened during delivery, if required, to minimise dust during unloading. It will then be unloaded into sand and aggregate hoppers with a capacity of 40 tonne and storage bins with a capacity of approximately 216 m^3 each, enclosed on three sides to mitigate dust.

Delivery of the dry cement is completed via a sealed hose connection from the Cockburn Cement tanker to cement storage silos compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

3.2.2 Concrete Batching

The batch plant will consist of four aggregate storage hoppers of 40 tonne each with a reticulated water system for dust control. Incline conveyors will feed the raw material to the two dual pan mixers (EURO Star). The cement is batched and added directly to the mixer via a fully enclosed worm screw before the addition of water and mixing.

Once the mixing is complete and the concrete has reached the desired consistency, the wet mix is discharged from the mixer into the flying bucket for delivery to the mould.

3.2.3 Segment Manufacturing

The carousel system moulds are filled with the wet mix and vibration is used to settle the mix within the moulds. These moulds are then cured within the steam curing system. Once cured the segments are removed from the moulds and transported via cranes to the external storage area prior to transport to the Alkimos Desalination Plant.

3.2.4 Cleaning

Cleaning of the flying bucket, hopper and moulds will be undertaken by a combination of recycled and mains water within the washout bay and wet working stations. The pump control system is programmed to select the optimal solution, ensuring efficient and effective water use.

3.3 Water Reuse

Water from the cleaning operations along with the associated cement slurry is collected via a series of drains into the wedge slurry pit. The cement slurry is separated from the water by gravity separation. The solids settle at the bottom of the pit and the water rises to the top and is conveyed away using grated drainage. It is then directed to the sump pit and the water treatment plant for processing. The settled cement slurry is collected weekly during maintenance and will be mixed with aggregates or disposed of offsite to a suitably licenced facility.

3.3.1 Water Treatment Plant

The water treatment plant employs an oil separator, filtration systems, mixing tanks and dosing pumps to ensure the water quality is of a suitable standard for reuse (refer to **Appendix C**). Treated water will be stored in a suitably sized tank prior to reuse throughout the operations.

3.3.2 Water Reuse

Treated water will be used for the cleaning of the moulds, flying bucket and hoppers. It will also be used in the flushing of toilets, irrigation of planted vegetation and through the irrigation system designed for dust suppression. It is expected that all water will be reused in this manner and no water will be discharged to the drainage system for the wider Lot 72.

3.4 Plant Operation

3.4.1 Operating hours

Typical operating hours during construction works will be from 7:00 am to 6:00 pm Monday to Saturday. During the production phase, the plant will work 24 hours per day within operations limited outside of the 7:00 am to 7:00pm day shift to ensure compliance with noise regulations.

3.4.2 Truck Movements

Access from the property for light vehicles will be via Eveline Road. Truck access will be via Bassett Road, to Great Northern Highway (refer to **Appendix A**).

It is expected that the average daily truck movements will be approximately 25 trucks consisting of 15 semi-trailer/B double loads for segment delivery and 10 tipper trucks for materials deliveries. These numbers are estimates only, there may be periods in which these daily truck numbers are exceeded.

3.4.3 Workforce

Approximately 30 staff will be on site during the construction phase. Once operations commence, the site will be run by approximately 68 persons during the day shift and 42 persons during the night shift.

3.5 Description Overview

The key project characteristics associated with the proposal are provided below in **Table 3**.

Table 3. Project characteristics.

Characteristic	Description
Project life	18 to 24 months including construction, operation and decommissioning.
Total throughput	A maximum of approximately 39,000t of cement products.
Project footprint	Approximately 5.8 ha
Vegetation clearing	No clearing of native vegetation is required.
Operating hours	7:00 am – 6:00 pm, Monday to Saturday during construction phase, 24 hours Monday to Friday during operations with maintenance only during the day hours 7:00 am – 7:00pm Saturday and Sunday.
Water tanker	Used for dust suppression on the access roads and working floors when required.
Dust suppression	Recycled water from the treatment plant will be used through an automated water reticulation system.
Sand and Aggregate Hoppers (4 x 40 tonne)	Storage of raw materials prior to loading into the mixer
Cement silos (2 x 65 tonne)	Storage of dry cement prior to loading into the mixer.
Dual Pan Mixer (EURO Star)	Mixing of aggregate, sand and cement with water.
Toilets	Toilets will be constructed as part of the site infrastructure.
Power	Power will be sourced through the Western Power network.
Water usage	Water will be initially sourced from the Water Corporation and then a combination of Water Corporation and recycled water.
Waste	All waste products will be stored in appropriate rubbish bins (recycling, putrescible, and hydrocarbons will be separated in lidded bins) and removed from site by a contractor at regular intervals and disposed of at the licensed landfill facilities. There will be no landfill on site.

The commencement of operations is proposed in August 2024 (subject to obtaining all approvals). The estimated construction costs for the cement batching equipment is approximately [redacted] (refer to **Table 4**).

Table 4. Estimated construction costs.

Timing	Details
Category	77 – Concrete batching or cement products manufacturing
Capacity Range	More than 100 tonnes per year
Total Cost	[redacted]
Total Fee	[redacted]

4 ENVIRONMENTAL IMPACTS AND MANAGEMENT

The following factors are considered to represent the potential environmental and amenity impacts associated with the proposal:

- Noise;
- Dust; and
- Uncontrolled discharge of contaminants to land/water.

These environmental factors are discussed in more detail below, together with the proposed management actions.

4.1 Hydrology

4.1.1 Surface Water

The current water cycle within the wider Lot 72 site is addressed within the *Midland Brick Middle Swan Brickworks Site Water Management Plan (SWMP)* (Hyd2o, 2022). In this Plan, water from the subject site specifically is directed to the sediment pond 1 via the stormwater pump. The proposed operations will alter this by the construction of bunding around the external areas of high risk (i.e. the aggregate and raw material storage and the batching plant) of the subject site to collect all water runoff and direct it to the onsite treatment plant. There are currently no drainage lines within the subject site so no external drainage will be impacted through the installation of these bunds. Furthermore, no runoff from the site is expected to enter the wider drainage system. Therefore, no impacts on the Swan River or surrounding water features are expected.

Any surface water falling outside of the high risk operations will be diverted around the subject site by the perimeter bunds to the current drainage system and is managed by the existing Midland Brick SWMP (Hyd2o, 2022).

4.1.1.1 Construction

The construction of equipment associated with a Category 77 prescribed premises is not associated with any impacts to surface water, including stormwater runoff.

4.1.1.2 Operation

All water produced as waste and runoff from the operation of the batching plant will be contained within the premise and reused after treatment through the onsite treatment plant.

All stormwater drainage within the prescribed premised is internal and will be processed through the onsite treatment plant. Water management within the site is further addressed within the Surface Water Management Plan (Accendo 2024) (refer to **Appendix D**), however no surface water or wastewater from the operations will be discharged from the subject site and enter the drainage system of Lot 72 or surrounding areas.

4.1.1.3 Risk Assessment

A risk assessment relating to surface water and stormwater runoff in consideration of the proposed management measures is provided below. The residual risk associated with sedimentation and contamination from stormwater runoff during the operation of the cement batching equipment is considered low.

Table 5. Risk assessment associated with surface water and stormwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Contamination or sedimentation	Uncontrolled and contaminated stormwater runoff	Contamination and sedimentation resulting in poor surface water quality in the Swan River or tributaries.	Contain any potentially contaminated or sediment laden surface water within the premise boundary via bunding. Operations including loading areas and aggregate storage areas constructed with bunding to ensure that stormwater is contained within the premise footprint.	1	2	Low

4.2 Noise

4.2.1 Sensitive Receptors

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for concrete batching plants, a buffer distance of 300 m to 500 m is recommended from sensitive land uses.

The sensitive receptors within 300 m of the proposed operations are limited to the former Swan District Hospital (non-operational), a school and residential dwellings to the west and southeast. Future residential dwelling proposed to the south of the subject site will not be constructed prior to decommissioning of the site but have been included in the noise assessment.

The operation largely complies with the recommended separation distances specified within the Guidance Statement (EPA 2005), with the nearest sensitive receptor located approximately 300 m from the premise boundary.

4.2.2 Noise Generating Activities

The project works will involve the use of machinery and equipment that will generate noise during operation. Sources of noise from the subject site will include:

- Machinery noise from equipment use.
- Noise from safety equipment (beepers on machinery).
- Noise from trucks departing the site.

Reversing alarms can represent significant nuisance noise to sensitive receptors. There are a number of alternatives to alarms that maintain a safe work environment and also comply with occupational health and safety legislation. Reversing alarms alert pedestrians when a vehicle is moving, however, given that no

pedestrians will be onsite (private property), the applicant has committed to using flashing lights or a broadband alarm system as an alternative. The sound of a broadband alarm is much less intrusive by nature than the sound of a tonal alarm and tends to be masked by the background noise at a lesser distance. This will eliminate/reduce noise emissions associated with reversing alarms.

A summary of potential noise generating activities is presented in **Table 6** (Lloyd George 2024) (refer to **Appendix E**).

Table 6. Noise generating activities.

Activity	Equipment to be used	Sound Pressure Level (dB(A))	Comments
Batching Plant	Materials loader	104	Not used during night shift
	Pan Mixers and Silos	98	
	Steel Fibre Weighing	106	
	FEL Pouring Aggregate in Bin	96	Not used during night shift
	Truck unloading aggregate	114	Not used during night shift
Stockpile Area	Forklift	99	
	Gantry Crane	91	
	Slow moving truck	106	Not used during night shift
Inside Building	Vibrators	102	
	Rattle Gun	115	Rattle guns will be replaced with torque wrenches (or similar) during night shift.

Noise levels have been obtained from a combination of manufacturers' specifications and from data provided by the applicant (Lloyd George Acoustics 2024). Data provided by the applicant includes recorded noise levels from plant within a segment precast factory located in Sydney, run by Acciona Ferrovial Joint Venture (AFJV) with the same equipment and operation.

A Noise Assessment was undertaken by Lloyd George Acoustics (Lloyd George 2024) (refer to **Appendix E**) which demonstrated that noise levels resulting from the plant operation, are predicted to exceed the assigned level in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997* at a number of residents during night time operations. To address the noise exceedance, it is recommended to implement the following management measures as outlined within the Noise Assessment (Lloyd George 2024).

Outside of daytime hours (i.e. Monday to Saturday 7.00 am to 7.00 pm) the following is required:

- Any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining area covered with mass loaded vinyl, minimum 6mg/m^2;

- No truck movements;
- No loading associated with the batch plant;
- Torque wrenches (or similar) are to be used in place of rattle guns;
- Steel fibre weighing is to be screened/enclosed sufficient to achieve a minimum 14 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 1.0 mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east; and
- Mixer is to be screened/enclosed sufficient to achieve a minimum 0.6 mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east.
- Forklifts are to remain behind the shed so that there is no line-of-site to the future Stage 3 of Rivermark (future residential) area. Alternatively, a wall can be constructed effectively extending the length of the shed.

Provided the recommended noise mitigation measures are implemented, it is concluded that compliance with the applicable assigned noise level can be achieved at all noise sensitive receptors during the specified working hours.

4.2.3 Noise Management Measures

The proponent will ensure that noise emissions comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. In addition, the management measures prescribed within the Noise Management Plan (Accendo, 2024) (refer to **Appendix F**) and summarised in **Table 7** will be implemented to reduce noise emissions as far as practicable.

Table 7. Management actions for noise.

Item	Action	Trigger/Timing	Responsibility
Inductions			
1	As part of site inductions, employees, contractors and visitors to the site are reminded of their responsibility to undertake work activities in an environmentally sensitive manner, including minimising noise while on site, or entering and leaving the site.	Ongoing	Site Manager
2	All management and supervisors will be trained in the noise management requirements.		
Planning Controls			
3	Daily Planning • The use of significant noise generating equipment or activities simultaneously is avoided. • The noisiest activities are scheduled to the least sensitive times of the day.	Where possible	Site Manager
4	Regular review of meteorological data, specifically wind speed and direction, to guide decisions on quarrying activities.	As required, with consideration to the intensity of activities onsite and the prevailing weather conditions	Site Manager
Operational Controls			
5	Equipment and Machinery • Use machinery and equipment with minimal noise output levels. • Ensure all machinery is regularly serviced as per the equipment's maintenance schedule to minimise noise generation. • Where appropriate, all machinery and equipment will be shut off when not in use. • Use flashing lights/broadband alarms instead of tonal reversing alarms on excavators/loaders. • Apply speed restrictions (30 km/hr within site) and a ban on exhaust braking.	Continuous	All employees & contractors
Complaints Management			
6	Erect on-site signage directing public to make complaints to the relevant person.	Prior to quarrying	Site Manager

Item	Action	Trigger/Timing	Responsibility
7	Maintain a complaints register (refer to **Appendix G**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance. • Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance. If the complaint is verified as being due to a site source, remedial action will be undertaken within 2 hours. The City of Swan will be advised of all complaints as soon as they are received. If a complaint cannot be resolved within the 2 hour response period, it may be necessary to cease operations.	Upon receiving complaint	Site Manager

4.2.4 Risk Assessment

A risk assessment to determine the residual risk associated with noise emissions is provided below. The risk assessment indicates that with the application of suitable management measures the potential risk associated with noise emissions is 'Low'.

Table 8. Risk assessment associated with noise emissions.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Noise emission	Cement batching plant	Noise impacts to neighbouring properties	Refer to Actions provided in **Table 7**.	1	2	Low

4.3 Dust

4.3.1 Dust Sources

The DWER (formerly the Department of Environment and Conservation (DEC)) released *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated site remediation and other related activities* (2011) in which dust is defined as '*the generic term used to describe solid airborne particles generated and dispersed into the air by processes such as handling, crushing and grinding of organic and inorganic materials such as rock, ore, metal, coal, wood or grain and stockpiling of materials and wind blown dust*'.

Dust sources associated with the proposed operations are discussed in detail below.

4.3.1.1 Raw Material Delivery

The main processing area of the plant is comprised of sealed concrete. The gravel area outside of the main processing area will be fitted with reticulation to enable regular and as required watering for dust suppression.

Sand and aggregate material will be dampened during delivery if required (i.e. during summer months) to minimise dust during unloading. It will then be unloaded into sand and aggregate hoppers with a capacity of 40 tonne and storage bins with a capacity of approximately 216 m^3 each, enclosed on three sides to mitigate dust. An automated water reticulation system will be used as an additional dust control measure.

Delivery of the dry cement is completed via a sealed hose connection from the Cockburn Cement tanker to cement storage silos compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

4.3.1.2 Manufacturing

The plant will consist of four aggregate storage hoppers at 40 tonne each with a reticulated water system for dust control. Incline conveyors will feed the raw material to the two mixers. The cement is batched and added directly to the mixer via a fully enclosed worm screw before the addition of water and mixing.

All surfaces surrounding the plant will be constructed to a hardstand standard, with the water cart located onsite able to water down the batching plant area to minimise dust during summer. Water recycled from the operations will be available for dust suppression when required.

The *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* provides guidance on the storage and handling of materials to be used in the operation. The proposed plant and site plan is designed to be fully compliant with these Regulations as discussed in the Dust Management Plan prepared by Accendo Australia (2024) (refer to **Appendix H**).

4.3.2 Wind Direction

Wind data from the Perth Airport indicates that the prevailing wind direction is easterly in the morning and south westerly in the afternoon during the summer months when dust emissions are most problematic.

The design of the processing area along with the location between the material bins and the existing BGC shed ensures that the area is protected from both the easterly and south westerly winds. It is likely that the morning easterly winds would be abated by the BGC shed and reduce the production of dust. Furthermore, any material that is disturbed by the easterly wind will be contained by the APS shed. It is therefore unlikely to reach the residential dwellings located to the west of the subject site. Likewise, the shed is likely to shelter the processing area and restrict the south westerly winds from producing dust within the processing area. In addition, there are no sensitive receptors located within 500 m to the north-west of the subject site (i.e. upwind of the prevailing wind direction during the afternoon in summer).

4.3.3 Dust Emissions

While the above processes have been designed to reduce dust emissions during operations, the following processes have the potential to generate dust that, if not adequately controlled, can cause nuisance and safety risks.

- Cement unloading;
- Aggregate and sand movement;
- Spillage of raw materials from trucks, hoppers and storage bins;
- Truck loading; and
- Vehicle movement across gravel hardstand.

No significant dust emissions are expected from the set-up or operation of the cement batching plant as suitable management measures will be implemented. This will include the use of water carts as required, and the operation of sprayers and sprinklers, equipped on the batching equipment and to dampen material stockpiles. This is consistent with industry accepted practices.

4.3.4 Management Measures

Based on the results from the risk assessment and the separation distances to sensitive receptors, the following dust management measures are proposed.

4.4 Training

Training will be supplied to all operators and personnel onsite in dust management and housekeeping measures to ensure the accumulation and transport offsite of dust does not occur. Operators will not be allowed to undertake any aspect of the operations without first receiving training in all equipment and processes required. Training will be supported by documented and reviewed procedures.

4.5 Dust Suppression within Trafficable Areas

All surfaces surrounding the plant not sealed will be constructed to a hardstand standard. A water cart will be located onsite able to water down the batching plant area to minimise dust during summer. Reticulation for any gravel area will be utilised on a regular basis and when dust is observed.

4.6 Storage of Materials

All aggregate and sand will be stored within the covered hoppers or three-sided concrete storage bins located within the hardstand processing area. Aggregate and sand will not be stored in stockpiles on the ground nor will material stored within the bins be stored at a height greater than the walls of the bins. Sprinklers will be utilised in summer and if visible dust is observed.

Cement will be stored in sealed silos fully compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998.* Operators will be trained in the correct procedure for unloading cement to the silo and all inspections, cleaning and maintenance. Operations will cease immediately if visible dust is observed, all filters and valves will be checked and replaced as necessary.

4.7 Operation

Minimal dust will be produced during operation due to the wet nature of the plant. Visible observations will be undertaken during operation to ensure no equipment malfunctions result in dust emissions. All operators will be trained in the appropriate housekeeping and maintenance requirements, and all required parts, filters etc will be stored onsite in case of an emergency.

4.8 Summary

The potential impacts to amenity and health from dust emissions are considered low with the application of suitable management measures. A summary of these proposed management measures is provided in **Table 9**.

Table 9. Dust management measures.

Legislation and Key Standards		
Environmental Protection Act 1986 (EP Act) *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC 2011) *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*		
Objectives		
• Minimise dust lift during all activities. • No adverse dust impacts to sensitive receptors from the processing operations.		
Targets		
• No visible dust beyond the property boundary. • Address all complaints regarding dust emissions.		
Management Actions		
Description	**Responsibility**	**Timing**
Notice to be erected at the site, providing contact details of the person to be contacted regarding the works. This person will also be available outside of operational hours to address any complaints.	Site Manager	Ongoing
Induction for all employees will include information on: • Potential sources of dust • Dust Management Plan • Speed limits onsite and staying on designated roads • Reporting procedure for dust issues	Site Manager	Prior to commencement of employment

All surfaces surrounding the plant are to be constructed to at least a hardstand standard. A water cart will be located onsite able to water down the batching plant area to minimise dust during summer. Reticulation of any gravel area will be utilised when dust is observed.	Site Manager	As required
All aggregate and sand will be stored within the three-sided concrete storage bins located within the hardstand processing area. Aggregate and sand will not be stored in stockpiles on the ground, nor will material stored within the bins be stored at a height greater than the walls of the bins.	Site Manager	At all times
All aggregate and sand will be covered to prevent moisture changes and reduce dust liftoff. Sprinklers will be utilised if visible dust is observed.	Site Manager	As required
Cement will be stored in sealed silos fully compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998.*	Site Manager	At all times
Operators will be trained in the correct procedure for unloading cement to the silo. Operations will cease immediately if visible dust is observed, all filters and valves will be checked and replaced as necessary.	Site operators	As required
Vehicle speeds will be restricted to no more than 30km/hr on the site to minimize dust lift off.	Drivers	At all times
Visible observations will be undertaken at all times to ensure no malfunction of the processing equipment is resulting in the production of dust. Works will cease immediately in the event dust is produced by the processing plant.	Site operators	At all times
Spare filters, air cartridges and essential maintenance items will be available and stored on site at all times in case of an emergency.	Site Manager	As required
Maintain a complaints register (refer to **Appendix G**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance. • Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance.	Site Manager	As required

Monitoring			
Description	**Parameter**	**Responsibility**	**Frequency**
Visual monitoring of dust will be ongoing throughout the day during operations. All monitoring is to be maintained on a logging sheet for reference and proof of compliance.	Dust lift and signs of dust deposition near property boundary. Evidence of no visible dust crossing the site boundary will be used as the monitoring criteria for compliance.	Site Manager	Continuous

Contingency and Corrective Actions		
Incident or Consequence	**Corrective Action**	**Responsibility**
Observation of excessive dust lift onsite	Report and investigate as incident.	Site Manager
	Halt work within proximity of the area until cause of dust is addressed.	Site Manager
	Increase dust mitigation measures (e.g. additional watering of exposed areas).	Site Manager
Complaint received	Report and investigate as incident. To determine the validity of the complaint, the wind direction, wind speed and activities being undertaken on site at the time of the complaint will be established.	Site Manager
	If required, halt work until cause of dust is addressed.	Site Manager
	If the complaint is verified as being due to a site source, consultation between the site manager and the City of Swan will be undertaken to identify the need for any supplementary dust measures (depending on the nature of any complaint) such as (but not limited to) the following: • Additional use of the water truck to regularly water down the concrete batching site;	Site Manager

	• The use of a streetsweeper on the process water catchment area and site crossover; • (re)sealing of the ingress/egress (crossover) for the site; and/or • Wind shielding measures for the storage bins.	
	Review dust management procedures and adjust if deemed necessary.	Site Manager

4.9 Domestic and Industrial Waste Products

No domestic or industrial waste will be stored onsite. Any waste material generated during the operational activities will be taken offsite for disposal at an approved landfill facility on a daily basis. Hydrocarbon wastes such as accidental oil spills will be mopped up with absorbent material and segregated for removal and disposal offsite by a licensed contractor.

4.10 Hydrocarbons and Dangerous Goods Management

Hydrocarbons are the only dangerous goods that will be utilised within the proposed subject site for the operation of machinery. However, storage of hydrocarbons on the subject site will not occur.

4.10.1 Construction

The mobilisation and positioning of equipment associated with a Category 77 prescribed premises is not associated with any uncontrolled discharges of contaminants to land or water.

4.10.2 Operation

There is the minor possibility for soil and water contamination as a result of incidental hydrocarbon leakages or spills during the maintenance and operation of machinery. In such instances the management measures specified below will be implemented.

Table 10. Hydrocarbon and dangerous goods management measures.

Timing	Management Measure
At all times	Spill kits containing appropriate equipment for control, containment and cleanup of hydrocarbon and chemical spills will be available in appropriate locations onsite and maintained.
	All water will be directed through the water treatment plant prior to reuse.
	Oil separator will remove any hydrocarbon contamination from water.

4.10.3 Risk Assessment

A risk assessment to determine the residual risk associated with the uncontrolled discharge of contaminants is provided below. The risk assessment indicates that with the application of suitable management measures the potential risk associated with uncontrolled discharges is 'Low'.

Table 11. Risk assessment associated with the uncontrolled discharge of contaminants.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Uncontrolled discharge of contaminants to land/ water	Machinery	Contamination of soils and/or water	Refer to Management Measures provided in **Table 10**.	1	2	Low

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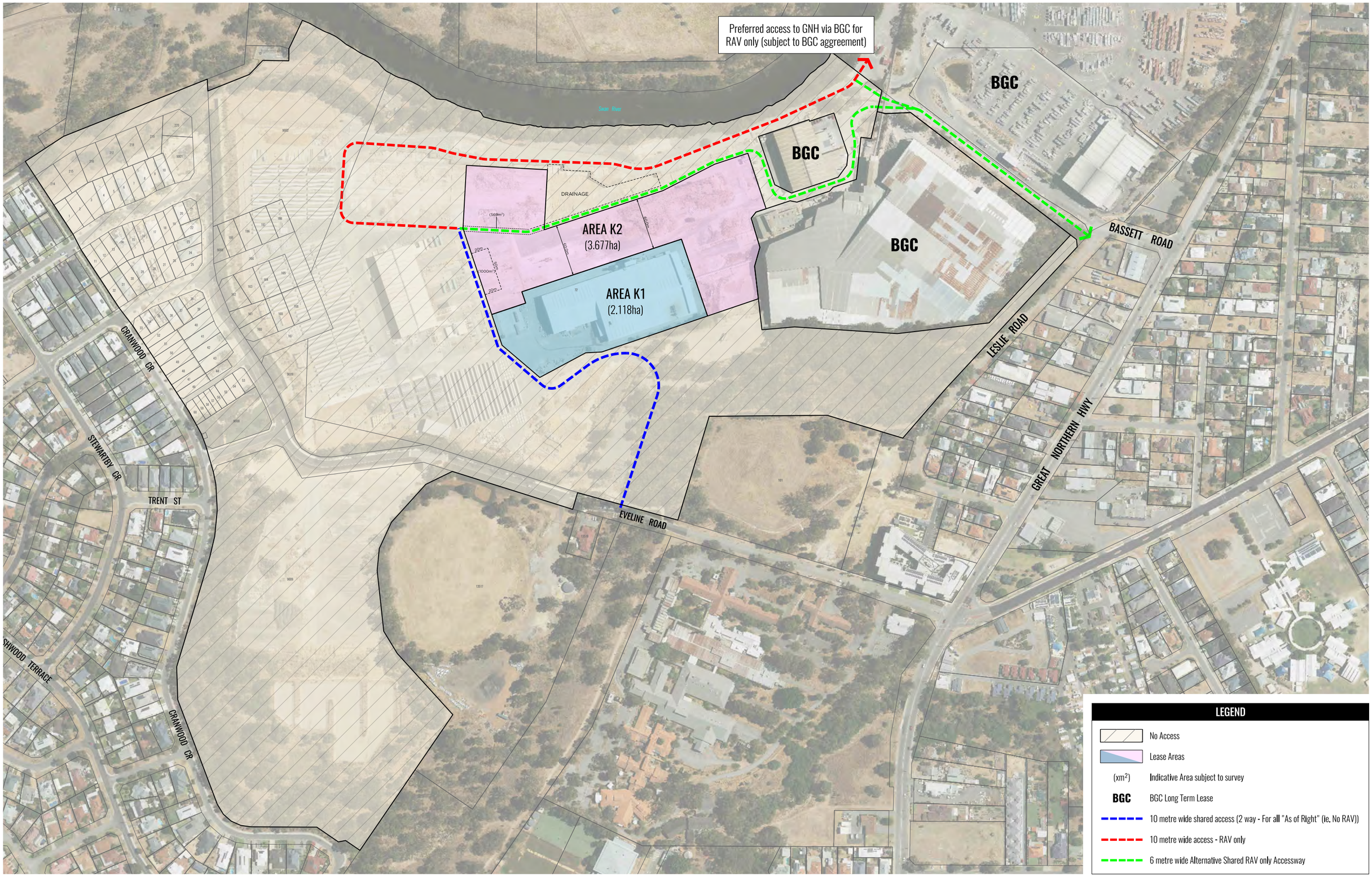
APPENDIX A – SITE PLAN



LEGEND

- No Access
- Lease Areas
- (xm^2) Indicative Area subject to survey
- **BGC** BGC Long Term Lease
- 10 metre wide shared access (2 way - For all "As of Right" (ie. No RAV))
- 10 metre wide access - RAV only
- 6 metre wide Alternative Shared RAV only Accessway

LEASE PLAN

Midland Brick

HESPERIA

0 30 60 90m

Date: 19/04/2024 Plan: HESMS-1-066A Scale 1:4000@A3

Note: All areas subject to detailed survey.

studio CFM TOWN PLANNING URBAN DESIGN

APPENDIX B – WIND ROSES

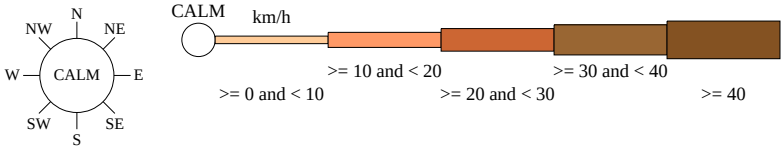
Rose of Wind direction versus Wind speed in km/h (01 May 1944 to 10 Aug 2023)

Custom times selected, refer to attached note for details

PERTH AIRPORT

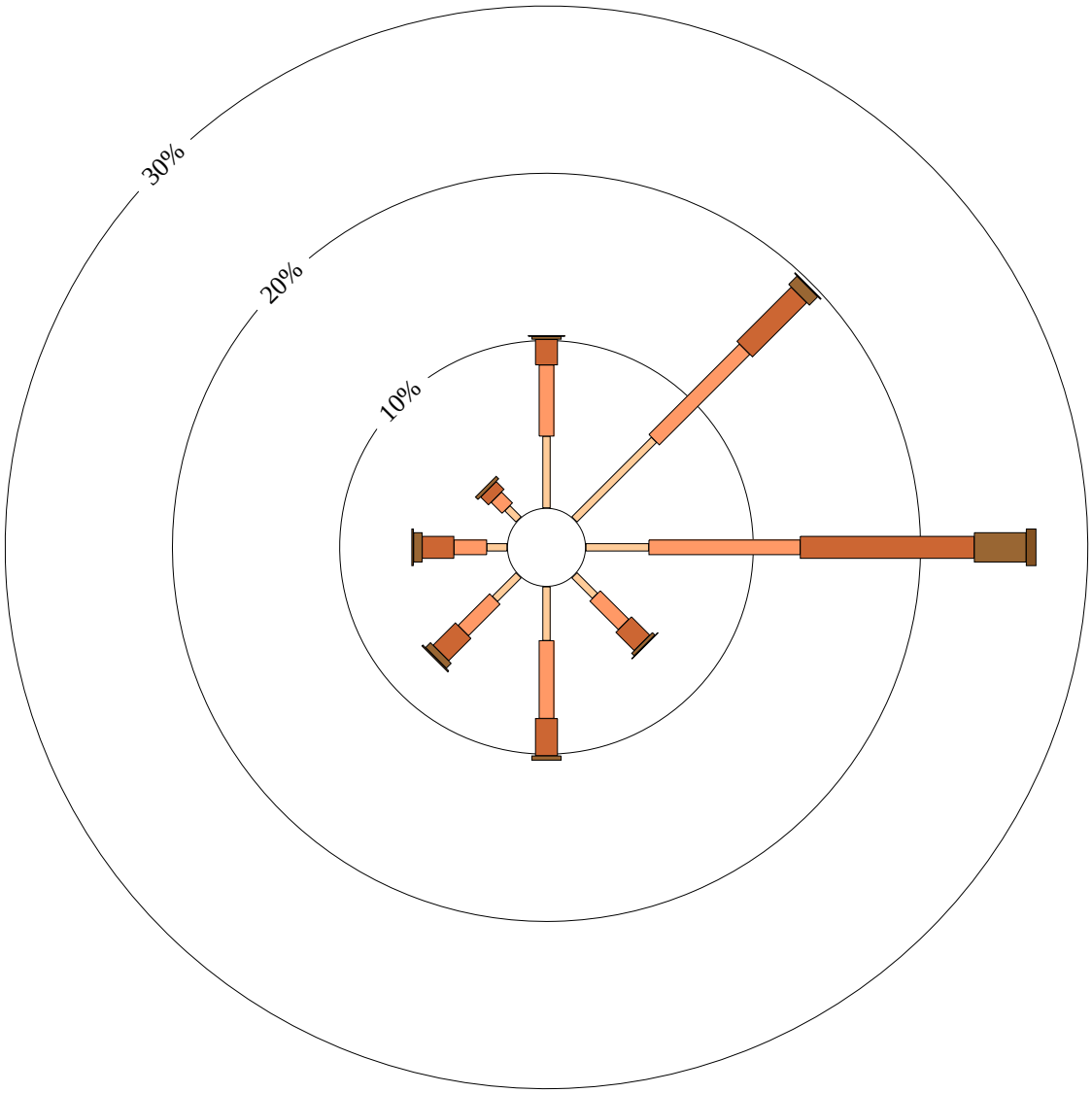
Site No: 009021 • Opened Jan 1944 • Still Open • Latitude: -31.9275° • Longitude: 115.9764° • Elevation 15.m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
28945 Total Observations

Calm 12%



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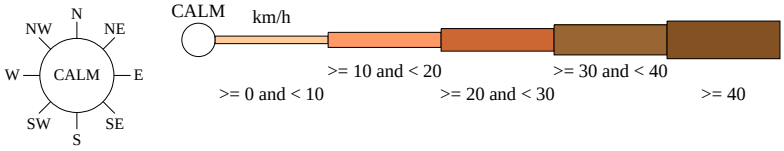
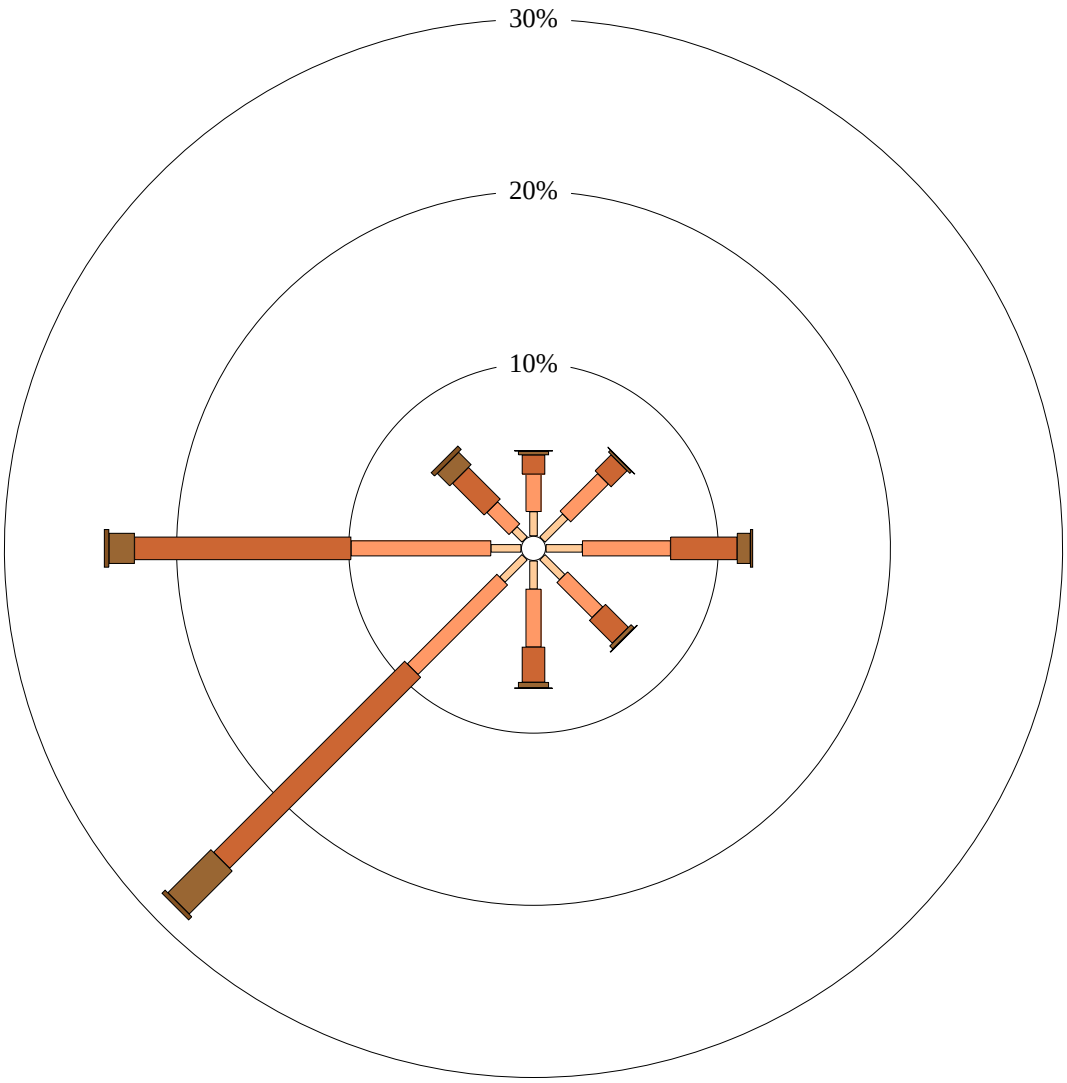
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
28930 Total Observations

Calm 4%



APPENDIX C – WATER TREATMENT PLANT

NORTH

WEDGE PIT

GRATED DRAIN

AGGREGATE STORAGE BIN

BOOT BIN LOADING RAMP

WASH OUT BAY
FLYING HOPPER

TRANSFORMER COMPOUND
(BY OTHERS)

PUMP FOR MOULD
SPRAY WASHER

W

W

SMSB

1664,03

1674,3

GRATED DRAIN

WET AREA

GRATED DRAIN

SUMP PIT

PUMP

WATER TREATMENT PLANT

OIL WATER
SEPARAOR

TANK

FILTER
SYSTEM

MIXING TANK

MIXING TANK

STORAGE TANK

BOOSTER PUMP

W

W

W

GB5

PE5

AGGREGATE STOCKPILE

ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

Contractor No: Rev:

AUSTRALIAN precast solutions

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA
DRAWN F. MENDOZA
CHECKED
APPROVED
DATE

WATER TREATMENT PLAN

ALKIMOS DESALINATION PLANT
BATCH PLANT SLURRY PIT
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0014 Rev: A

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NORTH

OIL WATER SEPARAOR

TANK

FILTER SYSTEM

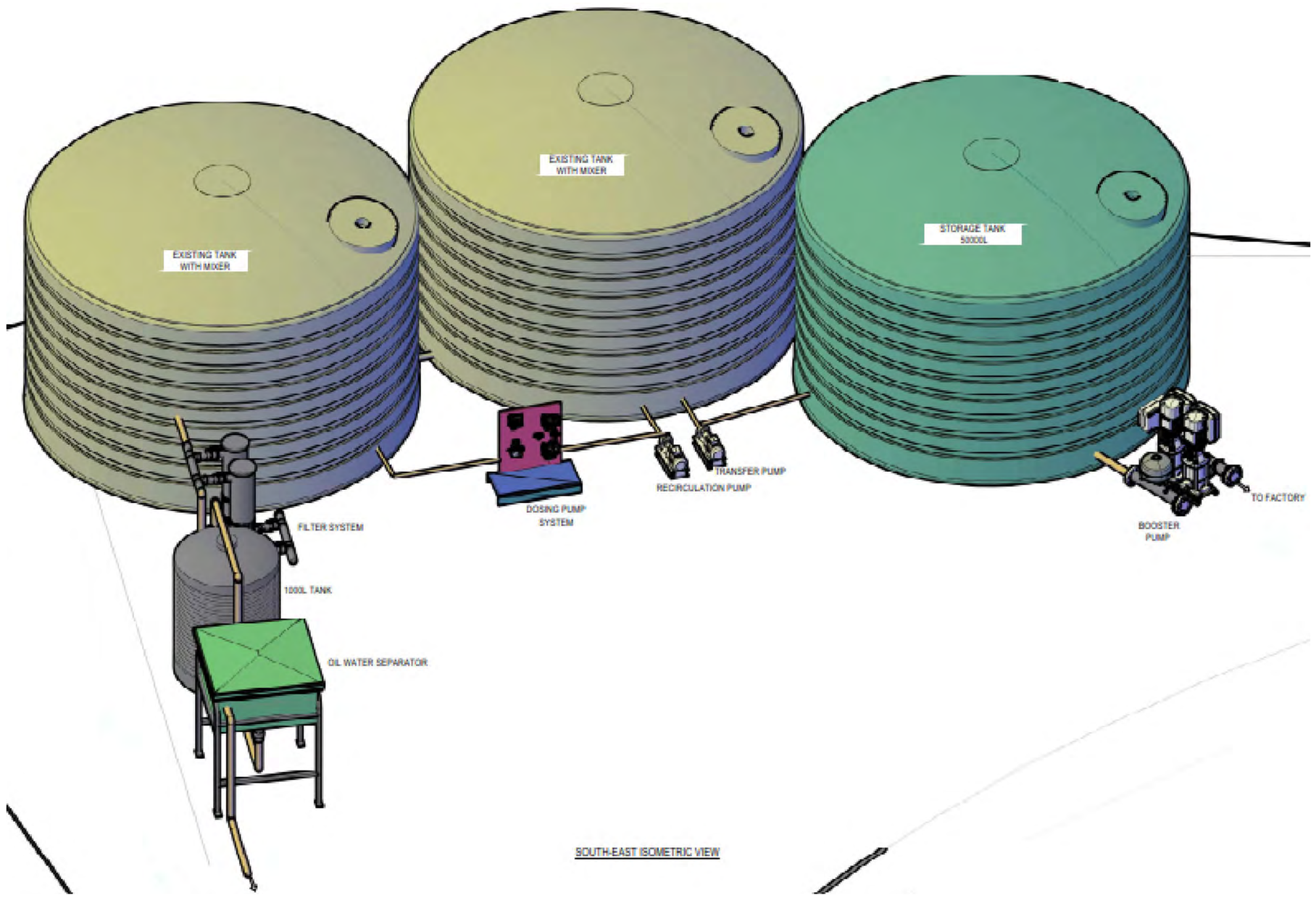
TANK

MIXING TANK

STORAGE TANK

BOOSTER PUMP

W



SOUTH-EAST ISOMETRIC VIEW

ISSUED FOR APPROVAL

REV	DATE					
A	07.05.24	DRAFT	FM	FM		
REV	DATE	AMENDMENT	DSN	DRN	CHK	APP

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

Contractor No: Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA
DRAWN F. MENDOZA
CHECKED
APPROVED
DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER TREATMENT PLANT SETUP
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0015 Rev: A

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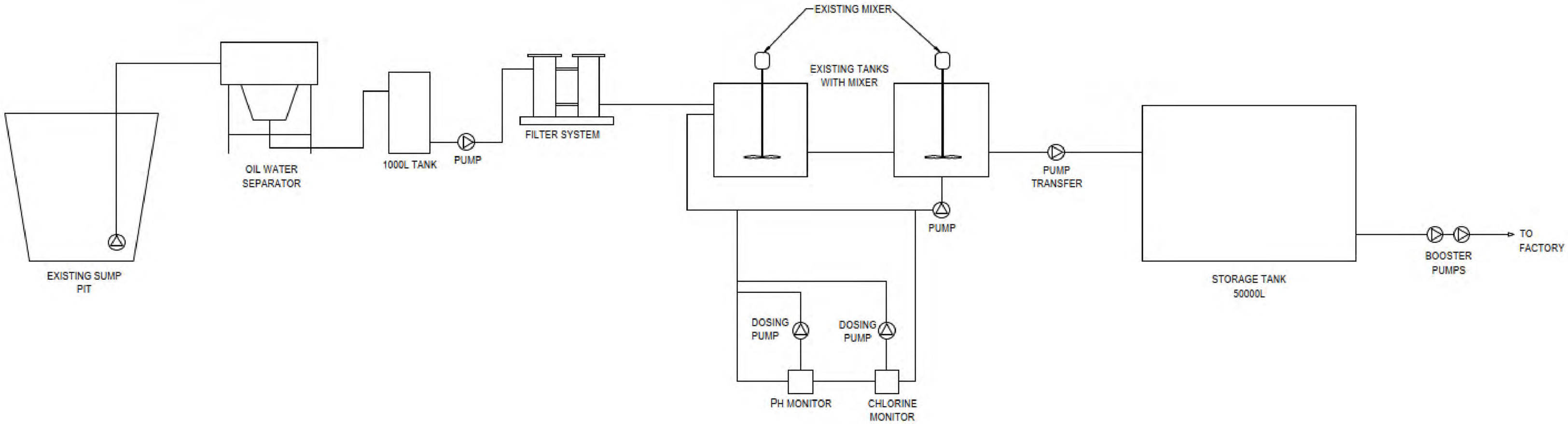
NORTH



ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
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ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

Contractor No: Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
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DESIGNED F.MENDOZA
DRAWN F. MENDOZA
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APPROVED
DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER TREATMENT PLANT SCHEMATIC
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0016 Rev: A

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NORTH

MAIN WATER

WEDGE PIT

WASH OUT BAY
FLYING HOPPER

GRATED DRAIN

TRANSFORMER COMPOUND
(BY OTHERS)

PUMP FOR MOULD
SPRAY WASHER

AGGREGATE STORAGE BIN

BOOT BIN LOADING RAMP

SUMP PIT

1664.03

1674.3

GRATED DRAIN

WET AREA

GRATED DRAIN

PUMP

WATER TREATMENT PLANT

OIL WATER
SEPARAOR

TANK

FILTER
SYSTEM

MIXING TANK

MIXING TANK

STORAGE TANK

BOOSTER PUMP

AGGREGATE STOCKPILE

FIRE HYDRANT
WALL PANEL

GB5

GB6

EL -600 T.O.GB6

GB7

EL -425 T.O.GB7

550

750

272299.886 N

FIRE HYDRANT
WALL PANEL

LOCATION OF
SEWAGE PUMP STATION

80Ø MDPE
RISING MAIN

ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

Contractor No:

Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA

DRAWN F. MENDOZA

CHECKED

APPROVED

DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER RETICULATAION / DRAINAGE
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0017 Rev: A

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APPENDIX D – SURFACE WATER MANAGEMENT PLAN

SURFACE WATER MANAGEMENT PLAN

LOT 72 EVELINE ROAD, MIDDLE SWAN

Australian Precast Solutions

JUNE 2024

Document Control

Version	Date	Author	Reviewer
V1	30/5/2024	PN	KMT
Filename	2438_Lot 72 Eveline Rd SWMP_V1		

Limitations

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This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

This report has been prepared based upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report, which Accendo has not independently verified or checked beyond the agreed scope of work. Accendo does not accept liability in connection with such unverified information.

The conclusions and recommendations in this report are based on assumptions made by Accendo described in this report where and as they are required. Accendo disclaims liability arising from any of the assumptions being incorrect.

The report is based on site specific conditions encountered and information received at the time of preparation of this report or the time that site investigations were undertaken. Accendo disclaims responsibility for any changes that may have occurred after this time.

The preparation of this report has been undertaken and performed in a professional manner, in consideration of the scope of services and in accordance with environmental consulting practices. No other warranty is made.

CONTENTS

TABLES

1 INTRODUCTION

1.1 Background

Australian Precast Solutions (APS) (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. A temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan. The property is approximately 30.5 hectares (ha) in size and is currently utilised by the Midland Brick facility (BGC) and the proposed APS facility. BGC is located to the east of the property, with the proposed APS plant to be located in the central area. The area to be leased by APS is shown in **Appendix A** and is herein referred to as the subject site.

The subject site is located in the municipality of the City of Swan, within the City's locality of Middle Swan, approximately 18 kilometres (km) northeast of Perth. The Swan River borders the north of the subject site.

1.2 Purpose and Scope

The purpose of this Surface Water Management Plan (SWMP) is to review the risks and control measures to appropriately manage and minimise the environmental impacts of the proposed operations on surface water in proximity to the subject site.

The scope of the SWMP is to cover the following:

- Legislative and regulatory compliance;
- Existing environment;
- Risk assessment of surface water quality impacts;
- Mitigation and measurement measures; and
- Roles and responsibilities in relation to surface water management.

2 EXISTING ENVIRONMENT

2.1 Location

The subject site is located within Lot 72 Eveline Road, Middle Swan. The subject site is located in the municipality of the City of Swan, within the City's locality of Middle Swan, approximately 18 kilometres (km) north east of Perth. The Swan River borders the north of the subject site.

2.2 Land Use

The majority of the subject site is zoned "General Industrial" under the City of Swan's *Local Planning Scheme No. 17* with a portion in the south zoned "Private Clubs and Institutions".

Land use abutting the boundaries of the subject site is industrial based to the west and east, with the Swan River located to the north of the subject site. Areas to the west and south will be developed for future residential properties. However, given the short-term and temporary nature of this project, future residential development will only occur after the project has been completed.

2.3 Topography and Soils

The current topography of the subject site can be described as generally undulating with the elevation ranging from 4 m Australian Height Datum (AHD) to 8 m AHD. Topographical elevation increases significantly to the south and west of Lot 72 and decrease to the north at the Swan River.

LIDAR imaging of the site shows that the proposed activity area is located at an elevation of approximately 5 m AHD with an increase in elevation in all directions.

The subject site is located within the Pinjarra System on the Swan Coastal Plain from Perth to Capel consisting of poorly drained coastal plains with variable alluvial and aeolian soils (Tille 2006).

The subject site is located within the following soil sub-systems:

- Andrew clay loam-clay (Pinjarra) – Very shallow brown clay loam or clay over yellow-brown and grey mottled clay.
- Swan sandy loam – Shallow red-brown sandy loam over red-brown clay loam, grading to red clay.
- Pinjarra Swamp – Swamp.
- Bellvue clay loam – clay (Pinjarra) – Shallow yellow-brown clay or clay loam over variable yellow brown mottled clay. May contain gravels.
- Valley complex (Pinjarra) – Variable soils associated with drainage lines.
- Swan sand – Shallow red-brown sand over red fine sandy clay, grading to red clay.
- Herne Sand (Pinjarra) – Grey to greyish-brown sand with nil to few gravels over mottled clay.
- Bellvue loam (Pinjarra) – Shallow brown clay loam over yellow-brown mottled clay.

2.4 Climate

The climate of the locality is classified as Mediterranean with warm to hot summers and cool wet winters.

The closest weather recording station with complete records is Perth Airport (Station 9021). Temperatures are highest on average in February, at approximately 32.0°C. July and August have the lowest average temperature of the year of 8.1°C.

Rainfall for the area is approximately 757 mm per annum with approximately 90% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

During the summer months the dominant wind in the mornings is from the south-east at 10-14 knots, swinging to the south-west at 20-25 knots in the afternoon. During winter, the winds are most commonly 10-14 knots with no dominant prevailing direction. During storms winds from the west and north-west can reach 40 knots (BoM 2024).

Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system which yields the two hour 10 year average return interval storm event for the subject site as 33 mm/hr.

2.5 Hydrology

2.5.1 Groundwater

The subject site is located within the *Rights in Water and Irrigation* (RiWI) *Act 1914* proclaimed Perth Groundwater Area.

Mapping maintained by the Department of Water and Environmental Regulation (DWER) showing maximum depths to groundwater within the Gnangara and Jandakot areas of the Swan Coastal Plain during 2019 indicate a separation to groundwater of approximately 4 m is present across the subject site.

2.5.2 Surface Water

The subject site is located in the Swan/Canning Estuary subarea of the proclaimed Swan River System surface water area. The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

There are no surface water features present within the subject site, with the closest surface water feature, the Swan River, located to the north of the property. Given the proximity of the Swan River, the subject site therefore is located within the Swan River Trust (SRT) Management Area. A tributary of the Swan River, Blackadder Creek, is located to the south of the subject site.

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system (refer to **Table 1**).

Table 1. Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands in Western Australia have been mapped and this mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the '*Geomorphic Wetlands of the Swan Coastal Plaint*' dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the

recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 2**.

Table 2. DBCA wetland management categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: • Reservation in national parks, crown reserves and State owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

The subject site is not mapped as occurring within a wetland area. The closest mapped wetland is located over the Swan River to the north. No discharge to the river is expected therefore there will be no impacts to any significant wetlands.

3 FACILITY OPERATIONS

Australian Precast Solutions (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. A temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan.

The concrete batching plant will be located to the north of the existing shed and the carousel system for manufacturing of the precast tunnel segments located within the refurbished shed. Storage and loading of aggregates and raw materials will take place to the east of the refurbished shed.

3.1 Truck Movements

Access from the property for light vehicles will be via Eveline Road. Truck access will be via Bassett Road, to Great Northern Highway.

It is expected that the average daily truck movements will be approximately 25 trucks consisting of 15 semi-trailer/B double loads for segment delivery and 10 tipper trucks for materials deliveries. These numbers are estimates only, there may be periods in which these daily truck numbers are exceeded.

3.2 Site Commission

Site commissioning will entail the refurbishment of the shed, the construction and installation of the batching plant and raw materials storage and the construction of the office compound will be undertaken. Operating hours during construction will be 7 am to 6 pm with approximately 30 staff on site.

3.3 Operations

3.3.1 Raw Material Delivery and Storage

The main processing area of the plant is comprised of sealed concrete. The gravel area outside of the main processing area will be fitted with reticulation to enable regular and as required watering for dust suppression.

Sand and aggregate material will be dampened during delivery if required to minimise dust during unloading. It will then be unloaded into sand and aggregate hoppers with a capacity of 40 tonne and storage bins with a capacity of approximately 216 m^3 each, enclosed on three sides to mitigate dust.

Delivery of the dry cement is completed via a sealed hose connection from the Cockburn Cement tanker to cement storage silos compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

3.3.2 Concrete Batching

The batch plant will consist of four aggregate storge hoppers of 40 tonne each with a reticulated water system for dust control. Incline conveyors will feed the raw material to the two mixers. The cement is batched and added directly to the mixer via a fully enclosed worm screw before the addition of water and mixing. All water used in the production of cement will be sourced from Watercorp mains supply.

Once the mixing is complete and the concrete has reached the desired consistency, the wet mix is discharged from the mixer into the flying bucket for delivery to the mould.

3.3.3 Segment Manufacturing

The carousel system moulds are filled with the wet mix and vibration is used to settle the mix within the moulds. These moulds are then cured within the steam curing system. Once cured the segments are removed from the moulds and transported via cranes to the external storage area prior to transport to the final site.

3.3.4 Cleaning

Cleaning of the flying bucket, hopper and moulds will be undertaken by a combination of recycled and mains water within the wash out bay and wet working stations. The pump control system is programmed to select the optimal solution, ensuring efficient and effective water use.

3.4 Water Reuse

Water from the cleaning operations along with the associated cement slurry is collected via a series of drains into the wedge slurry pit. The cement slurry is separated from the water by gravity separation. The solids settle at the bottom of the pit and the water rises to the top and is conveyed away using grated drainage. It is then directed to the sump pit and the water treatment plant for processing. The settled cement slurry is collected weekly during maintenance and will be mixed with aggregates or disposed of offsite to a suitably licenced facility.

3.4.1 Water Treatment Plant

The water treatment plant employs an oil separator, filtration systems, mixing tanks and dosing pumps to ensure the water quality meets discharge standards (refer to **Appendix B**). Treated water will be stored in a suitably sized tank prior to reuse throughout the operations.

3.4.2 Water Reuse

Treated water will be used for the cleaning of the moulds, flying bucket and hoppers. It will also be used in the flushing of toilets, irrigation of vegetation and through the irrigation system designed for dust suppression. It is expected that all water will be reused in this manner and no water will be discharged to the drainage system for the wider Lot 72.

3.5 Proposed Operating Times

Operating hours will involve 24 hour shifts Monday to Friday with only maintenance occurring during the day shift (7 am to 7 pm) on the weekends. The operations will be worked by approximately 68 persons during the day shift and 42 persons during the night shift.

4 POTENTIAL IMPACTS AND MANAGEMENT

The Section provides and overview of the potential impacts to surface water resources associated with the proposed land use, and the proposed management measures to address the identified impacts.

4.1 Surface Water

The current water cycle within the wider Lot 72 site is addressed within the *Midland Brick Middle Swan Brickworks Site Water Management Plan (SWMP)* (Hyd2o, 2022). In this Plan, water from the subject site specifically is directed to the sediment pond 1 via the stormwater pump. The proposed operations will alter this by the construction of bunding around the external areas of high risk (i.e. the aggregate and raw material storage and the batching plant) of the subject site to collect all water runoff and direct it to the onsite treatment plant. There are currently no drainage lines within the subject site so no external drainage will be impacted through the installation of these bunds. Furthermore, no runoff from the site is expected to enter the wider drainage system. Therefore, no impacts on the Swan River or surrounding water features are expected.

Any surface water falling outside of the high risk operations will be diverted around the subject site by the perimeter bunds to the current drainage system which is managed by the existing Midland Brick SWMP (Hyd2o, 2022).

A risk assessment relating to surface water and stormwater runoff in consideration of the proposed management measures is provided below. The residual risk associated with sedimentation and contamination from stormwater runoff during the operation of the proposed operations is considered low.

Table 3. Risk assessment associated with surface water and stormwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Contamination or sedimentation	Uncontrolled and contaminated stormwater runoff	Contamination and sedimentation resulting in poor surface water quality in the Swan River or tributaries.	Contain any potentially contaminated or sediment laden surface water within the premise boundary via bunding. Operations including loading areas and aggregate storage areas constructed with bunding to ensure that stormwater is contained within the premise footprint.	1	2	Low

4.2 Hydrocarbons and Dangerous Goods Management

Hydrocarbons are the only dangerous goods that will be utilised within the proposed subject site for the operation of machinery. However, storage of hydrocarbons on the subject site will not occur.

There is the minor possibility for soil and water contamination as a result of incidental hydrocarbon leakages or spills during the maintenance and operation of machinery. In such instances the management measures specified below will be implemented.

Table 4. Hydrocarbon and dangerous goods management measures.

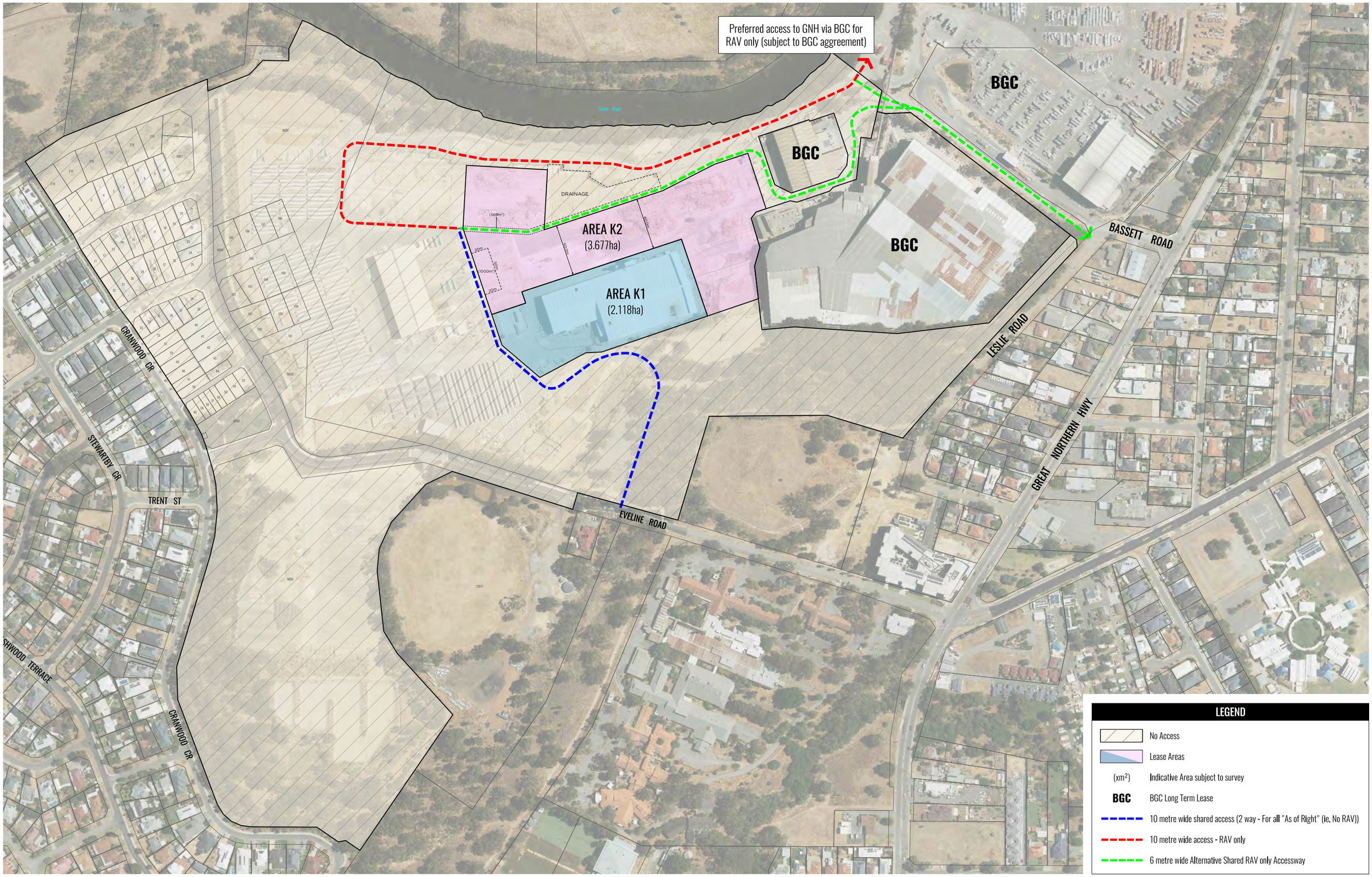
Timing	Management Measure
At all times	Spill kits containing appropriate equipment for control, containment and cleanup of hydrocarbon and chemical spills will be available in appropriate locations onsite and maintained.
	All water will be directed through the water treatment plant prior to reuse.
	Oil separator will remove any hydrocarbon contamination from water.

A risk assessment to determine the residual risk associated with the uncontrolled discharge of contaminants is provided below. The risk assessment indicates that with the application of suitable management measures the potential risk associated with uncontrolled discharges is 'Low'.

Table 5. Risk assessment associated with the uncontrolled discharge of contaminants.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Uncontrolled discharge of contaminants to land/ water	Machinery	Contamination of soils and/or water	Refer to Management Measures provided in **Table 4**.	1	2	Low

APPENDIX A – SITE PLAN



LEGEND

- No Access
- Lease Areas
- (xm^2) Indicative Area subject to survey
- **BGC** BGC Long Term Lease
- 10 metre wide shared access (2 way - For all "As of Right" (ie. No RAV))
- 10 metre wide access - RAV only
- 6 metre wide Alternative Shared RAV only Accessway

LEASE PLAN

Midland Brick

HESPERIA

0 30 60 90m

Date: 19/04/2024 Plan: HESMS-1-066A Scale 1:4000@A3

Note: All areas subject to detailed survey.

studio CFM TOWN PLANNING URBAN DESIGN

APPENDIX B – WATER TREATMENT PLANT PLANS

NORTH

WEDGE PIT

GRATED DRAIN

AGGREGATE STORAGE BIN

BOOT BIN LOADING RAMP

WASH OUT BAY
FLYING HOPPER

TRANSFORMER COMPOUND
(BY OTHERS)

PUMP FOR MOULD
SPRAY WASHER

W

W

SMSB

1664,03

1674,3

GRATED DRAIN

WET AREA

GRATED DRAIN

SUMP PIT

PUMP

WATER TREATMENT PLANT

OIL WATER
SEPARAOR

TANK

FILTER
SYSTEM

MIXING TANK

MIXING TANK

STORAGE TANK

BOOSTER PUMP

W

W

W

GB5

PE5

AGGREGATE STOCKPILE

ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

Contractor No: Rev:

AUSTRALIAN precast solutions

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

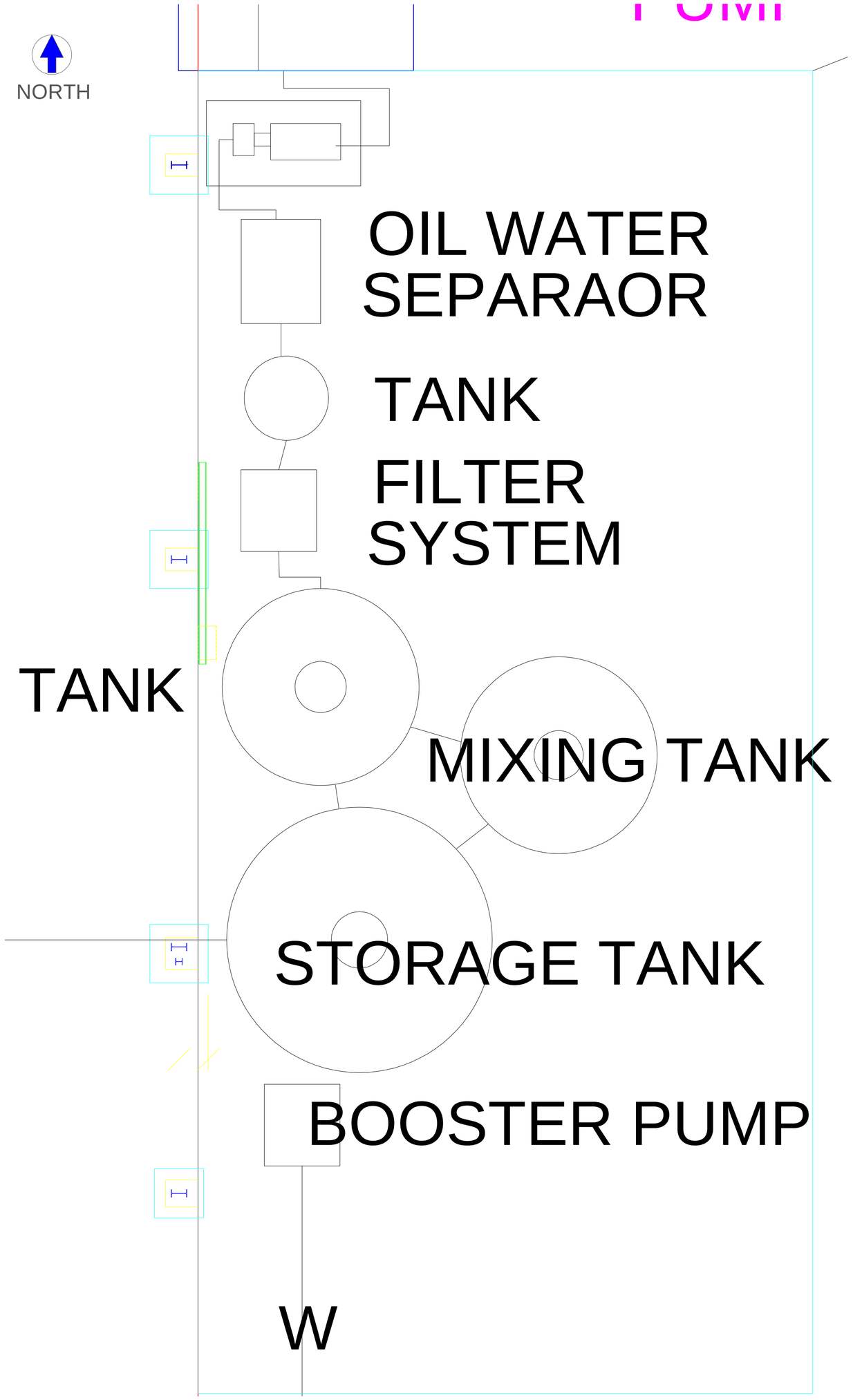
DESIGNED F.MENDOZA
DRAWN F. MENDOZA
CHECKED
APPROVED
DATE

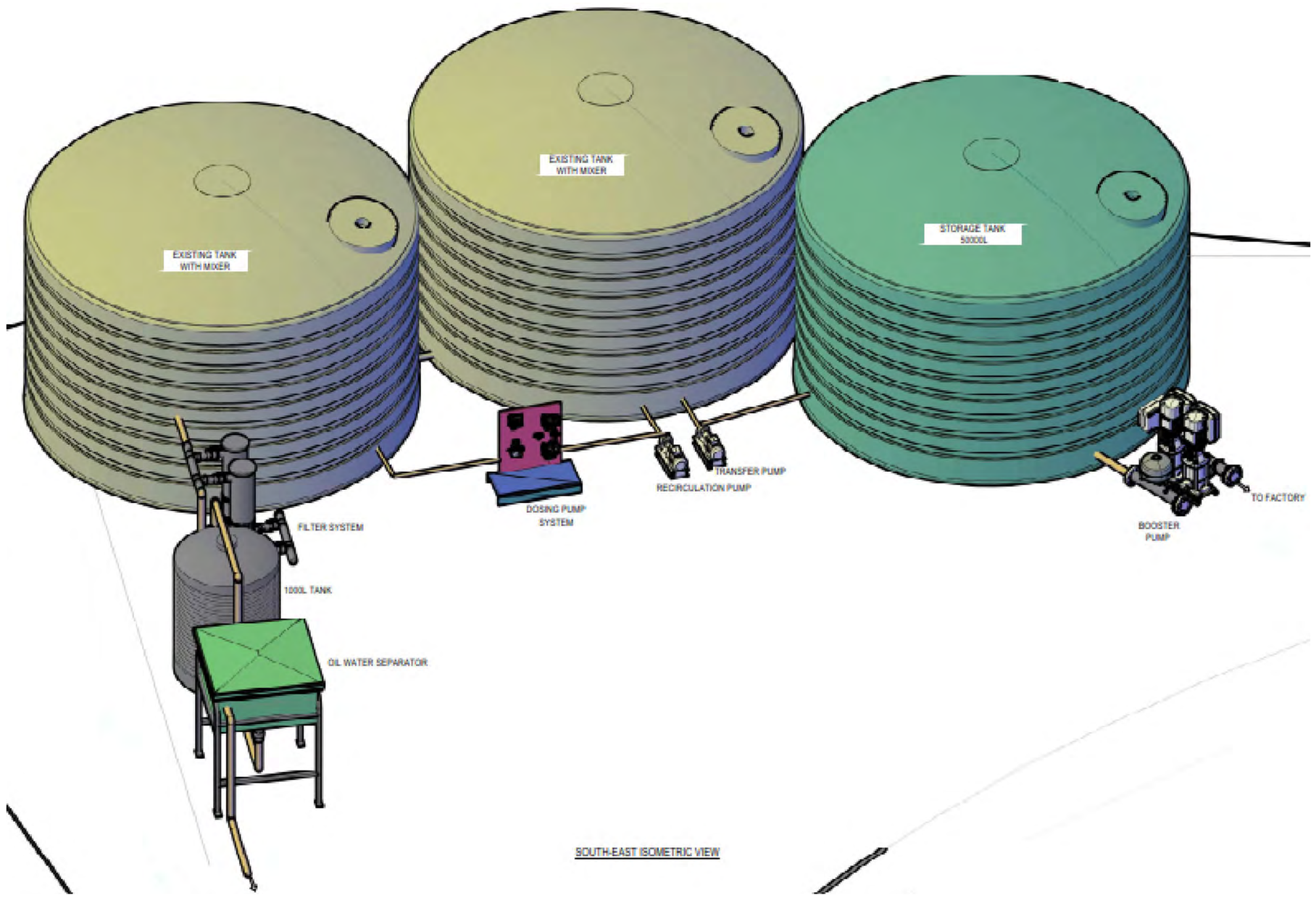
WATER TREATMENT PLAN

ALKIMOS DESALINATION PLANT
BATCH PLANT SLURRY PIT
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0014 Rev: A

CAD DRAWING PATHNAME C:\Users\francisco.mendoza\ACCIONA S.A\Australian Precast Solutions - X2012 - Alkimos Desalination Plant\80 Design & Engineering\00 Middle Swan Facility Drawings\APS Facility Drawings\01 FOR APPROVAL\1.0 Architectural\ACAD\X2012-AR-APS-MID-0014.dwg





ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

Contractor No: Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA
DRAWN F. MENDOZA
CHECKED
APPROVED
DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER TREATMENT PLANT SETUP
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0015 Rev: A

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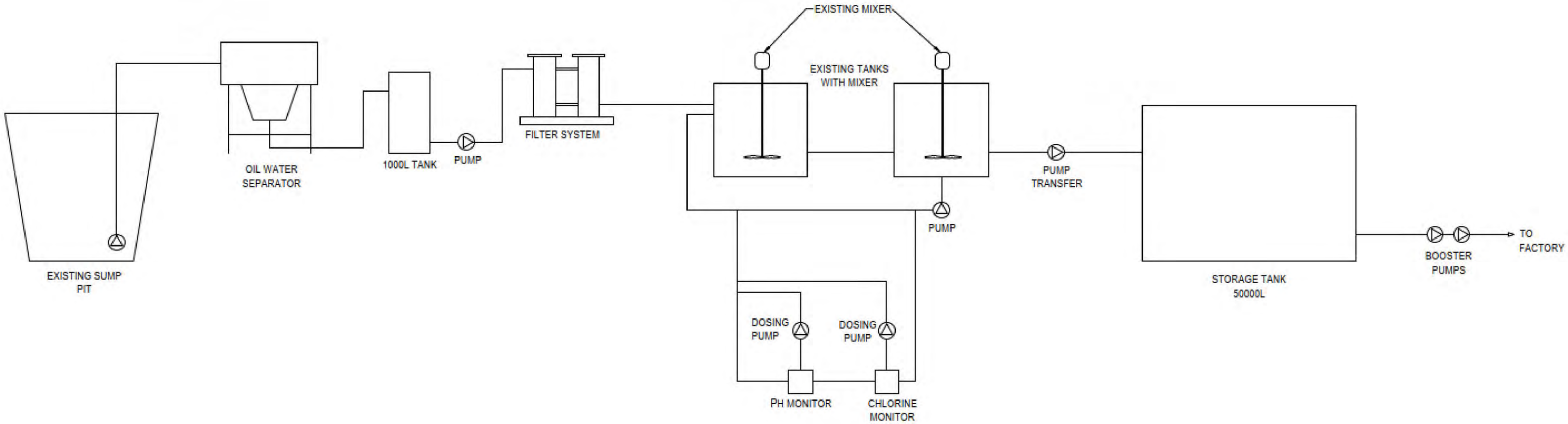
NORTH



ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

Contractor No: Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA
DRAWN F. MENDOZA
CHECKED
APPROVED
DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER TREATMENT PLANT SCHEMATIC
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0016 Rev: A

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NORTH

MAIN WATER

WEDGE PIT

WASH OUT BAY
FLYING HOPPER

GRATED DRAIN

TRANSFORMER COMPOUND
(BY OTHERS)

PUMP FOR MOULD
SPRAY WASHER

AGGREGATE STORAGE BIN

BOOT BIN LOADING RAMP

SUMP PIT

1664.03

1674.3

GRATED DRAIN

WET AREA

GRATED DRAIN

PUMP

WATER TREATMENT PLANT

OIL WATER
SEPARAOR

TANK

FILTER
SYSTEM

MIXING TANK

MIXING TANK

STORAGE TANK

BOOSTER PUMP

AGGREGATE STOCKPILE

FIRE HYDRANT
WALL PANEL

GB5

GB6

EL -600 T.O.GB6

GB7

EL -425 T.O.GB7

550

750

272299.886 N

FIRE HYDRANT
WALL PANEL

LOCATION OF
SEWAGE PUMP STATION

80Ø MDPE
RISING MAIN

ISSUED FOR APPROVAL

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	07.05.24	DRAFT	FM	FM		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

Contractor No:

Rev:

REFERENCES

SCALE NTS

DATUM
HORIZONTAL:
VERTICAL:

DESIGNED F.MENDOZA

DRAWN F. MENDOZA

CHECKED

APPROVED

DATE

ALKIMOS DESALINATION PLANT

ALKIMOS DESALINATION PLANT
WATER RETICULATAION / DRAINAGE
72 EVELINE ROAD VIVEASH MID SWAN PCAST FACILITY

APS DRG NO. X2012-APS-GA-0017 Rev: A

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APPENDIX E – NOISE ASSESSMENT

[redacted]

Environmental Noise Assessment - Concrete Batching Plant

Lot 72 Eveline Road, Middle Swan

Reference: 24038850-01A

Prepared for:
Accendo Australia

[redacted]

This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

Date	Rev	Description	Author	Verified
23-Apr-24	0	Issued to Client as Draft	[redacted]	[redacted]
21-May-24	1	Draft 2 following client review and new data provided.	[redacted]	-
14-Jun-24	A	Finalised with no further changes	[redacted]	-
21-Jun-24	B	Rivermark Stage 3 now assessed with assigned levels assuming this is residential	[redacted]	-

CONTENTS

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Appendices

1. INTRODUCTION

Lloyd George Acoustics was engaged by Accendo Australia to undertake an environmental noise assessment for a proposed short-term (12-18 months) concrete batching plant to be located at Lot 72 Eveline Road, Middle Swan and specifically within and adjacent the shed marked in *Figure 1-1*. The shed previously formed part of the Midland Brick operations, which is slowly being decommissioned over time, ultimately making way for residential development. The first stage of residential ("Recent Subdivision") can be seen to the west of the temporary shipping container noise wall. Further residential development ("Future Subdivision" referred to as Rivermark Stage 3) is proposed to the south and although the subject facility will no longer be operating when these homes are occupied, it is assumed this land has been rezoned residential and requires assessment.

Figure 1-1: Subject Site Location

The proposed facility is required to construct the marine tunnels associated with the Alkimos Desalination Plant and as such, will be a relatively short term project of 12-18 months. A site plan is provided in *Figure 1-2* with the following link (https://www.youtube.com/watch?v=BklgZfvitG8) providing an indication of the operations, albeit this project will be at a smaller scale.

With regard to noise emissions, consideration is given to noise from the concrete batching plant and mobile equipment outside the shed and the vibrators inside the shed at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Appendix A contains a description of some of the terminology used throughout this report.

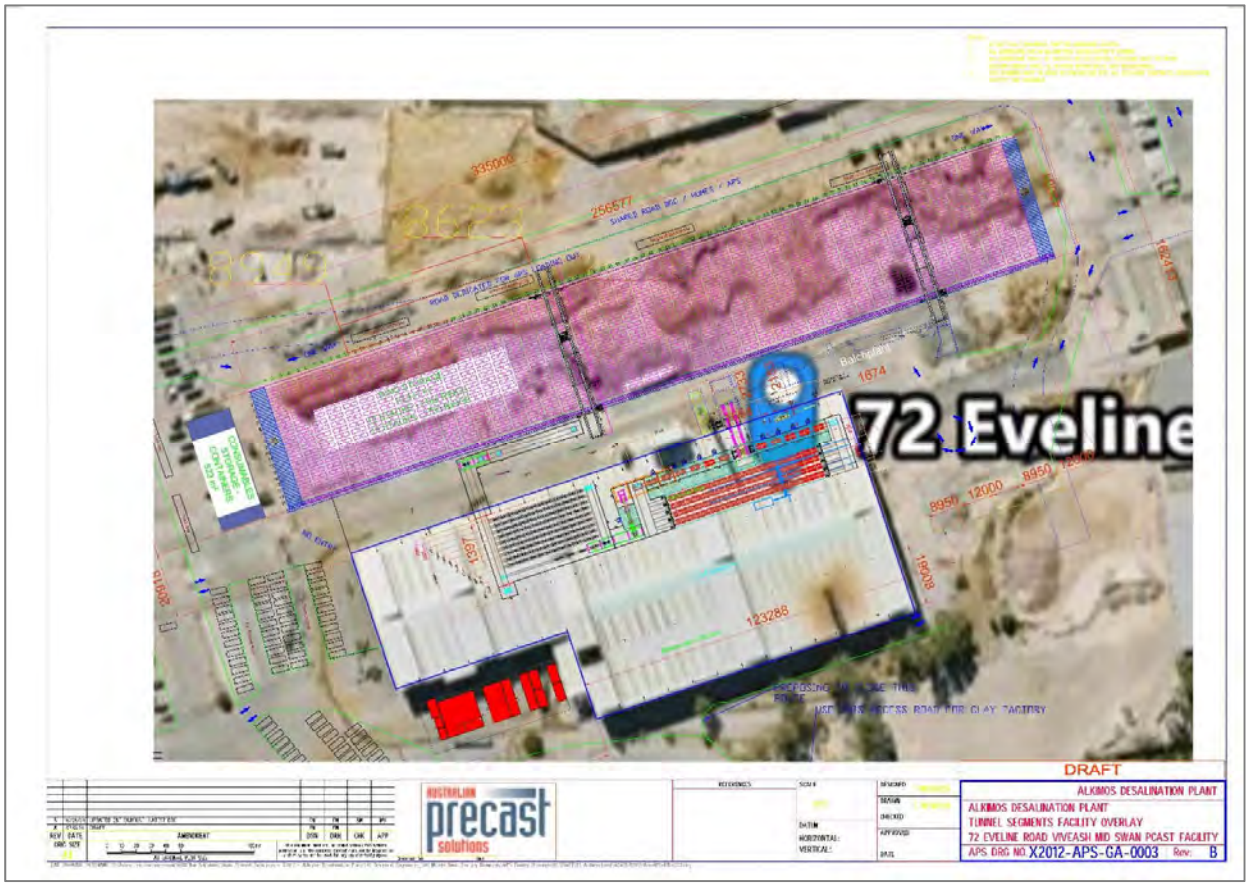

Figure 1-2: Site Plan

2. CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations) as follows:

"7. Prescribed standard for noise emissions

(1) Noise emitted from any premises or public place when received at other premises –

(a) must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) must be free of –

(i) tonality; and

(ii) impulsiveness; and

(iii) modulation,

when assessed under regulation 9.

(2) For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level at the point of reception."

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix A*). Under regulation 9(3), *"Noise is taken to be free of the characteristics of tonality, impulsiveness and modulation if -*

(a) the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] … are made to the noise emission as measured at the point of reception."

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music*			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

* These adjustments are cumulative to a maximum of 15 dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to "steady-state" noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2 Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises, varies depending on the proximity to industrial land. These have been based on those presented in the Herring Storer Acoustics[1] (HSA) report for the Existing LSP-17 (refer *Figure 2-1* taken from the HSA Report), reduced to allow for the rezoning of Rivermark Stage 3.

[1] *Acoustic Assessment, Midland Brick Site Redevelopment for Capitary No. 2;* June 2021, Reference: 27982-2-20355-02

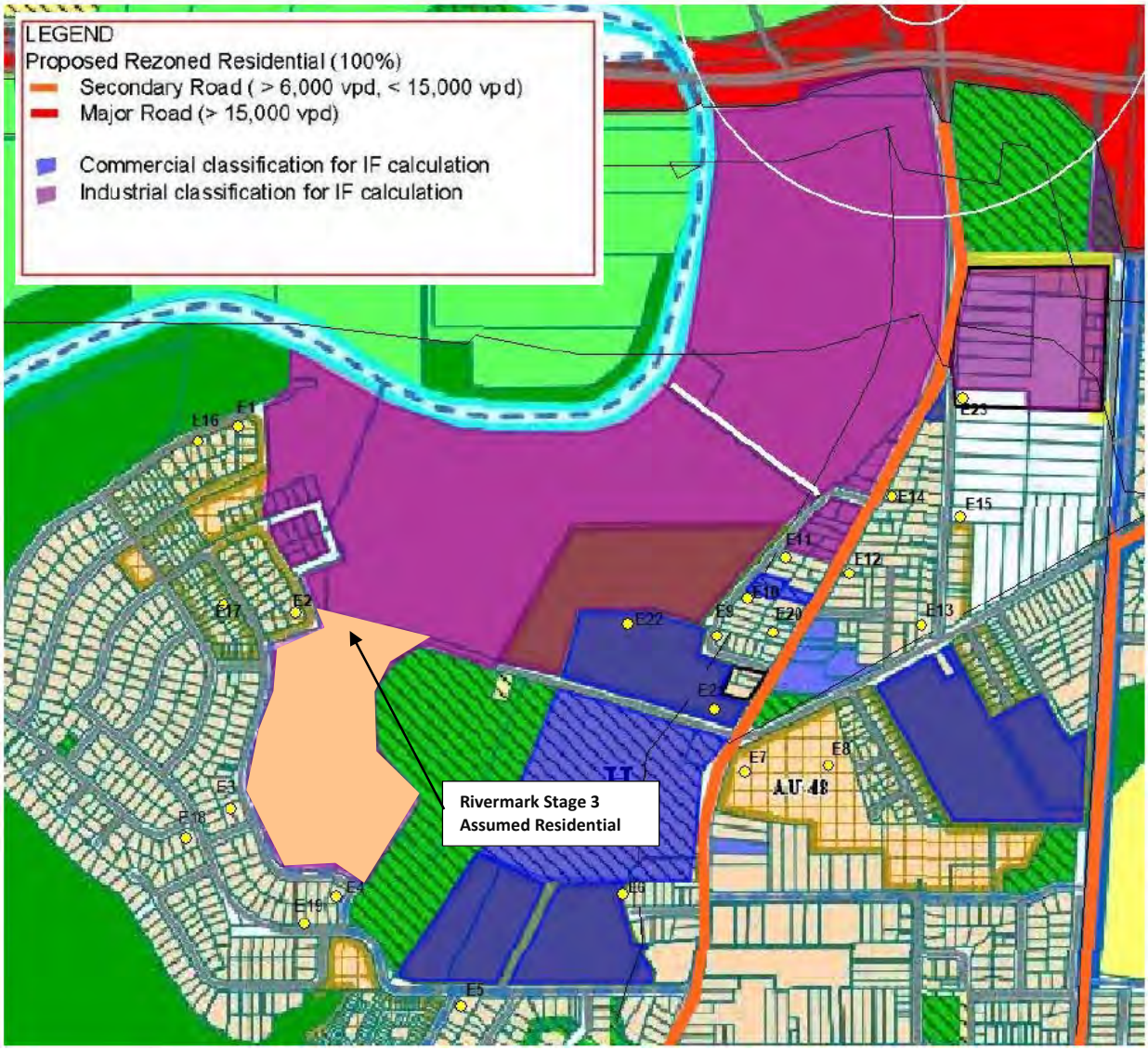

Figure 2-1: Receiver Locations from HSA Report and Rivermark Stage 3

The critical receivers in this assessment are considered to be E1 to E4, E9 to E11 and E22 and Rivermark Stage 3.

3. METHODOLOGY

Computer modelling has been used to predict the noise emissions from the development to all nearby receivers. The software used was *SoundPLAN 8.1* with the ISO 9613 algorithms selected, as they include the influence of meteorological conditions. Input data required in the model are listed below and discussed in *Section 3.1* to *Section 3.4*:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1. Meteorological Conditions

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1: Modelling Meteorological Conditions

Parameter	Day (7.00am to 7.00pm)	Night (7.00pm to 7.00am)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5	Up to 5
Wind Direction*	All	All

* The modelling package allows for all wind directions to be modelled simultaneously.

Alternatives to the above default conditions can be used where one year of weather data is available and the analysis considers the worst 2% of the day and night for the month of the year in which the worst-case weather conditions prevail (source: *Draft Guideline on Environmental Noise for Prescribed Premises*, May 2016). In most cases, the default conditions occur for more than 2% of the time and therefore must be satisfied.

3.2. Topographical Data

Topographical data was obtained from previous LG Acoustics work on the Midland Brick project and include topography as well as the bund and shipping container wall. This was also combined with Lidar information provided by Acciona.

3.3. Ground Absorption

The Midland Brick site has been modelled as acoustically hard (0.0), public open space and scrub as acoustically soft (1.0) and residential land as a combination of the two, albeit mostly hard (0.3).

3.4. Source Sound Levels

The source sound power levels used in the modelling are provided in *Table 3-2*. Whilst these may not represent all noise sources, they are considered to represent those that are most dominant.

Table 3-2: Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Batching Plant									
Materials Loader	89	91	101	96	101	98	93	89	**104**
Pan Mixers and Silos	97	98	104	98	99	104	98	96	**98**
Steel Fibre Weighing	98	107	103	103	101	98	93	85	**106**
FEL Pouring Aggregate in Bin	89	90	96	90	91	96	90	88	**96**
Truck Unloading Aggregate	103	104	110	104	105	110	104	102	**114**
Stockpile Area									
Forklift x 2	72	86	87	91	93	95	85	78	**99**
Gantry Crane x 2	67	76	77	84	86	87	78	-	**91**
Slow Moving Truck	110	106	105	101	102	99	92	-	**106**
Inside Building (Typical Enclosed R_w 25)									
Vibrators (Inside Building)	113	106	101	99	96	91	92	81	**102**
Rattle Gun	90	93	98	101	102	109	110	109	**115**

The following is noted in relation to *Table 3-2*:

- Batching plant sound level data provided from CTP via Acciona (email 16 May 2024);
- Advice from Acciona is that vibrators were measured to be 88 dB(A) at 1.5 metres;
- Other sources have utilised file data.
- The building is assumed to be of typical construction, achieving R_w 25 acoustic performance. This means that any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining open area covered with mass loaded vinyl, minimum 6kg/m^2.

4. RESULTS & ASSESSMENT

Three scenarios are considered as follows:

- Scenario 1: Daytime L_{A10} Noise - All Plant
- Scenario 2: Night-time L_{A10} Noise – Reduced Plant (refer *Section 4.2*)
- Scenario 3: Daytime Truck Movements

4.1. Scenario 1: Daytime Noise All Plant

The results for the All Plant during the day are provided in *Table 4-1*. A noise contour plot is also provided in *Figure 4-1* showing noise levels at ground floor. Being during the day, no adjustments are applied for intrusive characteristics.

Table 4-1: Scenario 1 Predicted Levels, dB L_{A10}

Receiver	Predicted Level	Assigned Level	Assessment
E1 – 67 Winston Crescent, Viveash	44	49	*Complies*
E2 – 16 York Lane, Viveash	42	53	*Complies*
E3 – 22 Cranwood Crescent, Viveash	38	45	*Complies*
E4 – 2 Cranwood Crescent, Viveash	39	45	*Complies*
E22 – 6 Eveline Road, Middle Swan	39	57	*Complies*
E9 – 8 Richardson Road, Middle Swan	36	53	*Complies*
E10 – 10 Leslie Road, Middle Swan	35	55	*Complies*
E11 - 20 Leslie Road, Middle Swan	30	57	*Complies*
Stage 3 Rivermark	43	51	*Complies*

Figure 4-1

Noise levels
L_{A10}, dB

=	45
=	50
=	55
=	60
=	65

Signs and symbols

- Receiver
- Point Source

N

Length Scale 1:7000

0 35 70 140 210 280 m

Proposed Concrete Batching Plant for Alkimos Desalination Plant -
Scenario 1 - Daytime Noise Levels

L_{A10} Noise Level Contours Based Ground Floor Level

SoundPLAN v8.1
ISO 9613 Algorithms

21 June 2024

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
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4.2. Night-time Noise – Reduced Plant

During the night, the only plant that would be operational are:

- the vibrators inside the shed;
- the forklifts and gantry cranes in the stockpile area; and
- the mixers and steel weighing as part of the batch plant.

Note, rather than rattle guns, torque wrenches would be used during the night. The results for the Reduced Plant during the night are provided in *Table 4-2*. A noise contour plot is also provided in *Figure 4-2* showing noise levels at ground floor. Being during the night, a + 5 dB adjustment is applied for possible tonality.

Table 4-2: Scenario 2 Predicted Levels, dB L_{A10}

Receiver	Predicted Level	Adjusted*	Assigned Level	Assessment
E1 – 67 Winston Crescent, Viveash	37	42	39	+ 3 dB
E2 – 16 York Lane, Viveash	36	41	43	*Complies*
E3 – 22 Cranwood Crescent, Viveash	33	38	35	+ 3 dB
E4 – 2 Cranwood Crescent, Viveash	32	37	35	+ 2 dB
E22 – 6 Eveline Road, Middle Swan	35	40	47	*Complies*
E9 – 8 Richardson Road, Middle Swan	34	39	43	*Complies*
E10 – 10 Leslie Road, Middle Swan	32	37	45	*Complies*
E11 - 20 Leslie Road, Middle Swan	24	29	47	*Complies*
Stage 3 Rivermark	40	45	41	+ 4 dB

* Noise is adjusted for tonality.

With the inclusion of tonality, there are some relatively minor exceedances of 2-4 dB. To achieve compliance at residences E1, E3 and E4, it is recommended that both the Steel Fibre Weighing and the Mixers are enclosed, which is offered by the supplier. The Steel Fibre Weighing is to achieve a noise reduction of 14 dB in the direction of E1 and the Mixers a 10 dB reduction. Any openings required for this equipment are to be to the east. To Stage 3 Rivermark, the highest noise source is one of the forklifts, which in the model is located towards the western end of the shed and therefore has line-of-sight. This can managed by ensuring the forklift is located behind the shed so that it does not have line-of-sight at night. Alternatively, a wall could be constructed, effectively extending the western end of the shed.

It is noted the calculations assume both gantry cranes and forklifts are moving simultaneously which may not be the case. Also, it is assumed the stockpile of the marine tunnels is non-existent and therefore is not providing any barrier attenuation. When stockpiling does occur, if this can be done from west to east, this may assist in further reducing noise emissions to the west.

Figure 4-2

Noise levels
L_{A10}, dB

	=	35
	=	40
	=	45
	=	50
	=	55

Signs and symbols

- Receiver
- Point Source

N

Length Scale 1:7000

0 35 70 140 210 280 m

Proposed Concrete Batching Plant for Alkimos Desalination Plant -
Scenario 2 - Night-time Noise Levels

L_{A10} Noise Level Contours Based Ground Floor Level

SoundPLAN v8.1
ISO 9613 Algorithms

21 June 2024

LLOYD GEORGE Acoustics

[redacted]

4.3. Daytime Truck Movements

The truck movement paths across the site are shown on *Figure 4-3* in red and green. The blue path to the south is for light vehicles only. As trucks move over a large area, these are modelled differently to the other scenarios. In this case, the truck speed is assumed to be 8m/s (approximately 30 km/hr) and the noise from the trucks are calculated over time. The noise from a truck entering and exiting for E1 is shown in *Figure 4-4*, whereby 1 truck takes approximately 260 seconds to travel the route.

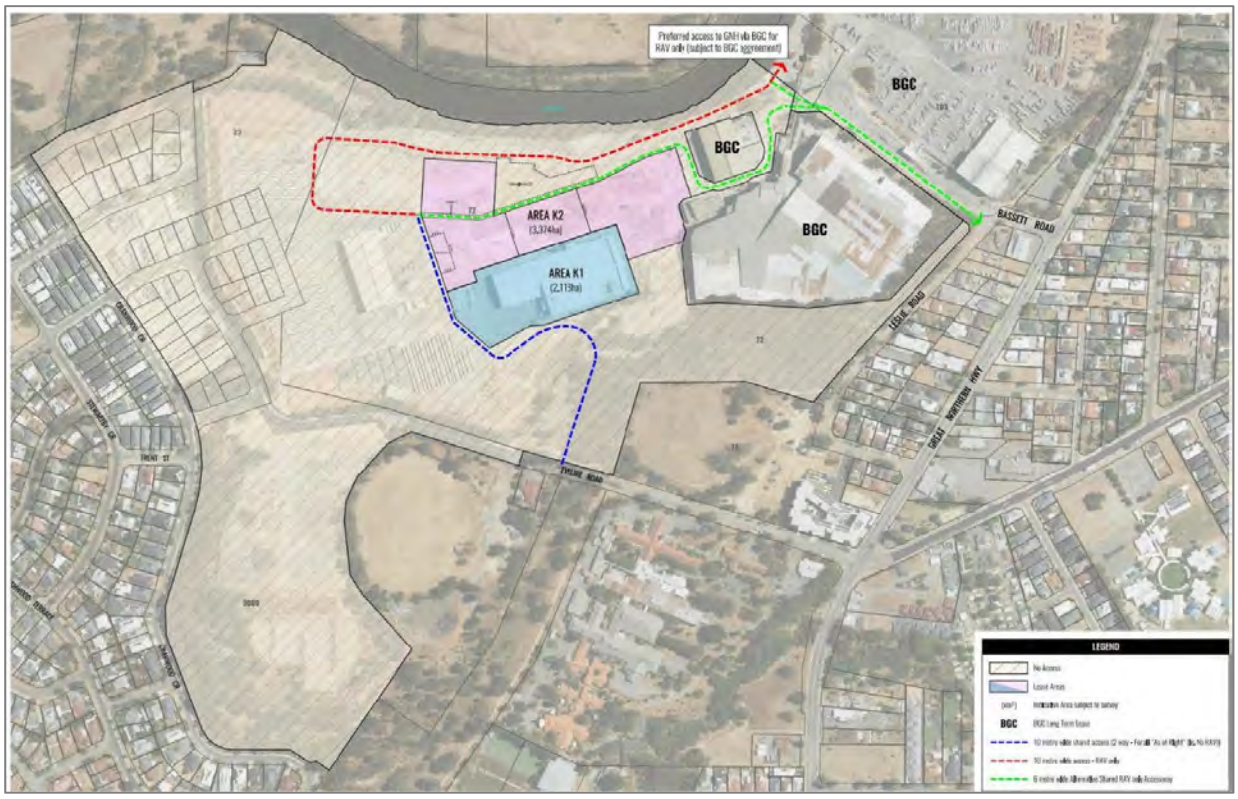


Figure 4-3: Proposed Truck Route

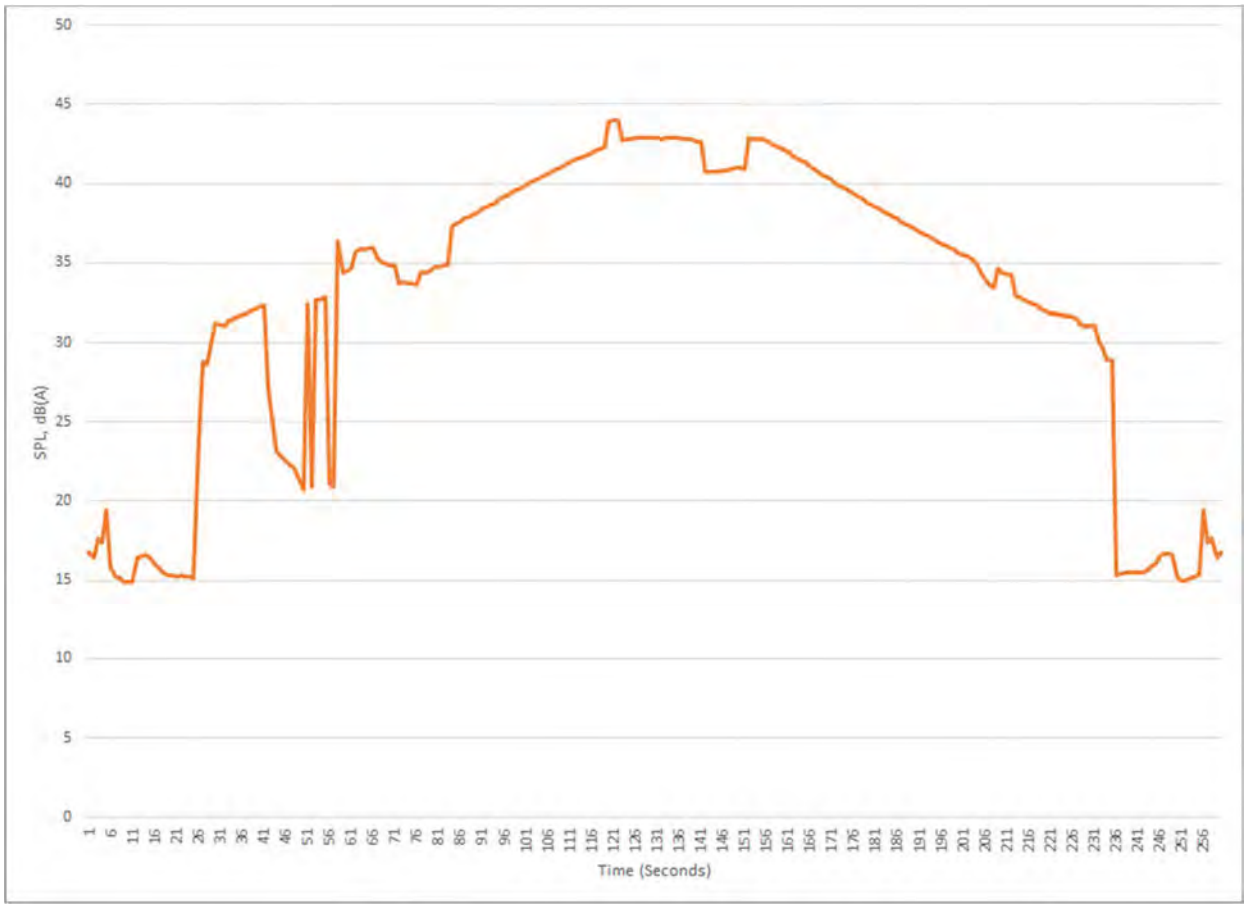


Figure 4-4: Time History at E1 for Truck Entering and Exiting

Table 4-3 to *Table 4-10* provides the different percentile predicted noise levels at each assessment location, depending on the number of truck movements per hour, noting these will be daytime only.

Table 4-3: Scenario 3 Predicted Levels to E1

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	44	43	N/A	69	59	49	*Complies*	*Complies*	*Complies*
2	44	43	32						
3	44	44	36						
4	44	44	39						
5	44	44	40						
6	44	44	41						

Table 4-4: Scenario 3 Predicted Levels to E2

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	42	41	N/A	73	63	53	*Complies*	*Complies*	*Complies*
2	42	42	28						
3	42	42	34						
4	42	42	35						
5	42	42	36						
6	42	42	36						

Table 4-5: Scenario 3 Predicted Levels to E3

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	37	35	N/A	65	55	45	*Complies*	*Complies*	*Complies*
2	37	35	22						
3	37	35	29						
4	37	36	32						
5	37	36	33						
6	37	36	34						

Table 4-6: Scenario 3 Predicted Levels to E4

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	39	36	N/A	65	55	45	*Complies*	*Complies*	*Complies*
2	39	37	27						
3	39	37	33						
4	39	37	34						
5	39	38	35						
6	39	38	35						

Table 4-7: Scenario 3 Predicted Levels to E9

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	44	36	N/A	73	63	53	*Complies*	*Complies*	*Complies*
2	44	38	22						
3	44	42	26						
4	44	43	33						
5	44	43	35						
6	44	43	35						

Table 4-8: Scenario 3 Predicted Levels to E10

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	47	34	N/A	75	65	55	*Complies*	*Complies*	*Complies*
2	47	36	23						
3	47	45	24						
4	47	46	26						
5	47	47	27						
6	47	47	31						

Table 4-9: Scenario 3 Predicted Levels to E11

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	41	39	N/A	77	67	57	*Complies*	*Complies*	*Complies*
2	41	40	27						
3	41	40	33						
4	41	40	34						
5	41	40	34						
6	41	40	35						

Table 4-10: Scenario 3 Predicted Levels to E22

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	40	35	N/A	77	67	57	*Complies*	*Complies*	*Complies*
2	40	36	21						
3	40	39	31						
4	40	39	32						
5	40	39	33						
6	40	39	33						

Table 4-11: Scenario 3 Predicted Levels to Rivermark Stage 3

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	49	46	N/A	71	61	51	*Complies*	*Complies*	*Complies*
2	49	47	31						
3	49	48	38						
4	49	48	39						
5	49	48	44						
6	49	48	45						

Where a result is shown as "N/A", this is because a single truck per hour is calculated to be present for less than 10% of the time and therefore there is no L_{A10} value.

5. DISCUSSION

The analysis within this report shows that compliance during the daytime (Mondays to Saturdays, 7am to 7pm) can be achieved from the proposed operations, including proposed plant and truck movements.

Outside of daytime hours (Monday to Saturday 7.00am to 7.00pm) the following is required:

- Any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining open area covered with mass loaded vinyl, minimum 6kg/m^2.
- No truck movements;
- No loading associated with the batch plant;
- Torque wrenches are to be used in place of rattle guns;

- Steel Fibre Weighing is to be screened/enclosed sufficient to achieve a minimum 14 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 1.0mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east;
- Mixer is to be screened/enclosed sufficient to achieve a minimum 10 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 0.6mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east; and
- Forklifts are to remain behind the shed so that there is no line-of-sight to the future Stage 3 of Rivermark. Alternatively, a wall can be constructed effectively extending the length of the shed.

General good practice requirements are:

- Equipment is to be maintained in good working order to minimise noise emissions;
- Trucks and staff are to be advised of the requirement to minimise noise emissions as far as practicable;
- Mobile equipment is to either operate with no reversing alarms where deemed safe to do so by others or shall be fitted with broadband alarms rather than tonal type alarms.

Appendix A – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A, dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{A1}**

The L_{A1} level is the A-weighted noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{A10}**

The L_{A10} level is the A-weighted noise level exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

- **L_{A90}**

The L_{A90} level is the A-weighted noise level exceeded for 90 percent of the measurement period and is considered to represent the "background" noise level.

- **L_{Aeq}**

The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

– the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

– a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band; and

(b) is present for at least 10% of the representative assessment period; and

(c) is regular, cyclic and audible.

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

– a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

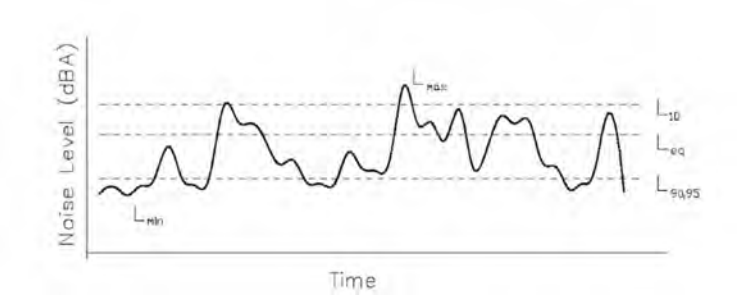
- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

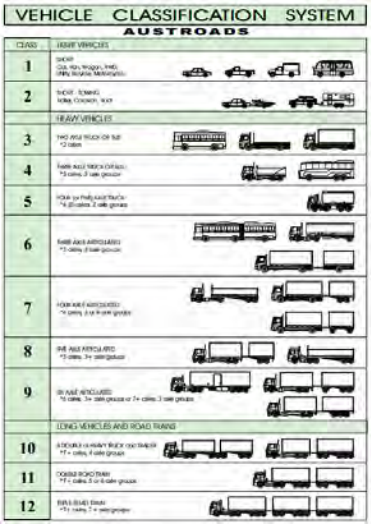
- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

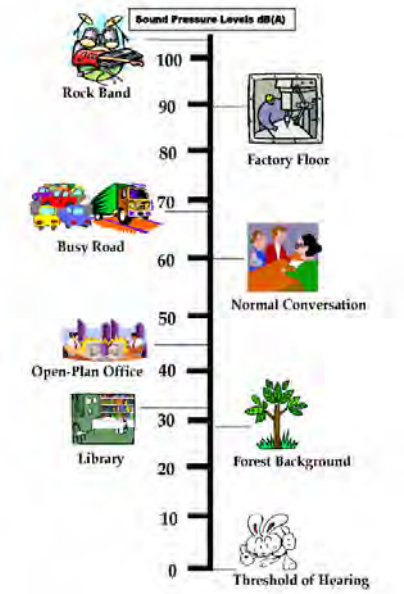
- **Chart of Noise Level Descriptors**



- **Austroads Vehicle Class**



- **Typical Noise Levels**



APPENDIX F – NOISE MANAGEMENT PLAN

NOISE MANAGEMENT PLAN

LOT 72 EVELINE ROAD, MIDDLE SWAN

Australian Precast Solutions

JUNE 2024

[redacted]

Document Control

Version	Date	Author	Reviewer
V1	11/06/24	PN	KMT/Client
V2	25/06/2024	PN	KMT
Filename	2438_Lot 72 Eveline Rd NMP_v2		

Limitations

This report has been prepared by Accendo Australia Pty Ltd in accordance with the scope limitations provided in this report, or as otherwise agreed, between the Client and Accendo.

This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

This report has been prepared based upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report, which Accendo has not independently verified or checked beyond the agreed scope of work. Accendo does not accept liability in connection with such unverified information.

The conclusions and recommendations in this report are based on assumptions made by Accendo described in this report where and as they are required. Accendo disclaims liability arising from any of the assumptions being incorrect.

The report is based on site specific conditions encountered and information received at the time of preparation of this report or the time that site investigations were undertaken. Accendo disclaims responsibility for any changes that may have occurred after this time.

The preparation of this report has been undertaken and performed in a professional manner, in consideration of the scope of services and in accordance with environmental consulting practices. No other warranty is made.

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

1.1 Background

Australian Precast Solutions (APS) (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. A temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan. The property is approximately 30.5 hectares (ha) in size and is currently utilised by the Midland Brick facility (BGC) and the proposed APS facility. BGC is located to the east of the property, with the proposed APS plant to be located in the central area. The area to be leased by APS is herein referred to as the subject site.

The subject site is located in the municipality of the City of Swan, within the City's locality of Middle Swan, approximately 18 kilometres (km) north east of Perth. The Swan River borders the north of the subject site.

1.2 Purpose and Scope

This Noise Management Plan (NMP) has been prepared to fulfil the relevant requirements provided within the City of Swan's *Local Planning Scheme No. 17.* It is intended to provide the City of Swan, the public and relevant government agencies with an understanding of the proposal and the environmental strategies and commitments proposed to address noise emissions associated with the proposed land use.

The Plan will describe the proposed management measures necessary to ensure noise impacts on surrounding receptors will be managed in accordance with best practice and the *Environmental Protection (Noise) Regulations 1997*.

2 EXISTING ENVIRONMENT

2.1 Land Use

The majority of the subject site is zoned "General Industrial" under the City of Swan's *Local Planning Scheme No. 17* with a portion in the south zoned "Private Clubs and Institutions".

Land use abutting the boundaries of the subject site is industrial based to the west and east, with the Swan River located to the north of the subject site. Areas to the west and south will be developed for future residential properties. Given that this operation is only temporary (approximately 18-24 months including construction, operation and decommissioning), the future residential development will occur after the project has been completed and decommissioned.

2.2 Topography

The current topography of the subject site can be described as gently undulating with the elevation ranging from 4 m Australian Height Datum (AHD) to 8 m AHD. Topographical elevation increases significantly to the south and west of Lot 72 and decrease to the north at the Swan River.

LIDAR imaging of the site shows that the proposed activity area is located at an elevation of approximately 5 m AHD with an increase in elevation in all directions.

2.3 Climate

The climate of the locality is classified as Mediterranean with warm to hot summers and cool wet winters.

The closest weather recording station with complete records is Perth Airport (Station 9021). Temperatures are highest on average in February, at approximately 32.0°C. July and August have the lowest average temperature of the year of 8.1°C.

Rainfall for the area is approximately 757 mm per annum with approximately 90% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

During the summer months the dominant wind in the mornings is from the south-east at 10-14 knots, swinging to the south-west at 20-25 knots in the afternoon. During winter, the winds are most commonly 10-14 knots with no dominant prevailing direction. During storms winds from the west and north-west can reach 40 knots (BoM 2024).

3 FACILITY OPERATIONS

Australian Precast Solutions (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. Importantly, the concrete batching plant is temporary only, with an approximate 18-24 month lifespan (including construction, operation and decommissioning) for the project. Construction is planned to commence in August 2024 and be completed by March 2025. Production of segments will be undertaken from April 2025 to October 2025 with delivery and demobilisation occurring from November 2025 until April 2026.

The temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan.

The concrete batching plant will be located to the north of the existing shed and the carousel system for manufacturing of the precast tunnel segments located within the refurbished shed. Storage and loading of aggregates and raw materials will occur to the east of the refurbished shed.

3.1 Truck Movements

Access from the property for light vehicles will be via Eveline Road. Truck access will be via Bassett Road, to Great Northern Highway. This will be subject to agreement from BGC as trucks will be traversing through the BGC site (refer to **Appendix A**).

It is expected that the average daily truck movements will be approximately 25 trucks consisting of 15 semi-trailer/B double loads for segment delivery and 10 tipper trucks for materials deliveries. These numbers are estimates only, there may be periods in which these daily truck numbers are exceeded.

3.2 Site Commission

Commissioning will involve the refurbishment of the shed, the construction and installation of the batching plant and raw materials storage and the construction of the office compound will be undertaken. Operating hours during construction will be 7 am to 6 pm Monday to Saturday with approximately 30 staff on site.

3.3 Operations

3.3.1 Raw Material Delivery and Storage

The main processing area of the plant is comprised of sealed concrete. The gravel area outside of the main processing area is fitted with reticulation to enable regular and as required watering for dust suppression.

Sand and aggregate material will be dampened during delivery if required to minimise dust during unloading. It will then be unloaded into sand and aggregate hoppers with a capacity of 40 tonne and storage bins with a capacity of approximately 216 m^3 each, enclosed on three sides to mitigate dust.

Delivery of the dry cement is completed via a sealed hose connection from the Cockburn Cement tanker to cement storage silos compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

3.3.2 Concrete Batching

The batch plant will consist of four aggregate storage hoppers of 40 tonne each with a reticulated water system for dust control. Incline conveyors will feed the raw material to the two mixers. The cement is

batched and added directly to the mixer via a fully enclosed worm screw before the addition of water and mixing.

Once the mixing is complete and the concrete has reached the desired consistency, the wet mix is discharged from the mixer into the flying bucket for delivery to the mould.

3.3.3 Segment Manufacturing

The carousel system moulds are filled with the wet mix and vibration is used to settle the mix within the moulds. These moulds are then cured within the steam curing system. Once cured the segments are removed from the moulds and transported via cranes to the external storage area prior to transport to the final site.

3.4 Proposed Operating Times

Operating hours will involve 24 hour shifts Monday to Friday with only maintenance occurring during the day shift (7 am to 7 pm) on the weekends. The operations will be worked by approximately 68 persons during the day shift and 42 persons during the night shift.

3.5 Equipment

The concrete batching plant, aggregate storage and completed segment storage and loading areas will be located outside of the shed. The production of segments using the carousel, vibrators and steam curing plant will take place inside the shed.

Equipment and facilities that may be used onsite are provided in the Table below.

Table 1. Equipment

Equipment	Description
Site office	May be required for the management and security of small items.
Containers	Will be used for the storage of steel fibre and concrete admixtures as required.
Water tanker	Used for dust suppression on the access roads and working floors when required.
Hoppers	Used for the storage of aggregates, sand and dry cement products.
Batching plant	Used for the production of wet cement mixture.
Carousel system	Used in the construction of segments.
Vibrators	Used in the construction of segments.
Rattle guns	Used to fasten moulds for segments.
Forklift	Loading and unloading of segments
Light vehicles	Access to and around the site.
Tip truck	Delivery of raw materials and aggregate.
Front End Loader	Pouring of aggregate into batching plant bin.
Slow moving trucks	Delivery of aggregate and segments out of the site.
Gantry crane	Movement of segments within site.

4 NOISE IMPACTS AND MANAGEMENT

4.1 Sensitive Receptors

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for concrete batching plants, a buffer distance of 300 m to 500 m is recommended from sensitive land uses.

The sensitive receptors within 300 m of the proposed operations are limited to the former Swan District Hospital (non-operational), a school and residential dwellings to the west and southeast. Future residential dwelling proposed to the south of the subject site will not be constructed prior to decommissioning of the site (refer to **Figure 1**).

The operation largely complies with the recommended separation distances specified within the Guidance Statement (EPA 2005) with the nearest sensitive receptor located approximately 300 m from the premise boundary.

4.2 Noise Generating Activities

The project works will involve the use of machinery and equipment that will generate noise during operation. Sources of noise from the subject site will include:

- Machinery noise from equipment use.
- Noise from safety equipment (beepers on machinery).
- Noise from trucks departing the site.

Reversing alarms can represent significant nuisance noise to sensitive receptors. There are a number of alternatives to alarms that maintain a safe work environment and also comply with occupational health and safety legislation. Reversing alarms alert pedestrians when a vehicle is moving, however, given that no pedestrians will be onsite (private property), the applicant has committed to using flashing lights or a broadband alarm system as an alternative. The sound of a broadband alarm is much less intrusive by nature than the sound of a tonal alarm and tends to be masked by the background noise at a lesser distance. This will eliminate/reduce noise emissions associated with reversing alarms.

A summary of potential noise generating activities is presented in **Table 2** (Lloyd George 2024) (refer to **Appendix B**).

Table 2. Noise generating activities.

Activity	Equipment to be used	Sound Pressure Level (dB(A))	Comments
Batching Plant	Materials loader	104	Not used during night shift
	Pan Mixers and Silos	98	

Activity	Equipment to be used	Sound Pressure Level (dB(A))	Comments
	Steel Fibre Weighing	106	
	FEL Pouring Aggregate in Bin	96	Not used during night shift
	Truck unloading aggregate	114	Not used during night shift
Stockpile Area	Forklift	99	
	Gantry Crane	91	
	Slow moving truck	106	Not used during night shift
Inside Building	Vibrators	102	
	Rattle Gun	115	Rattle guns will be replaced with torque wrenches (or similar) during night shift.

Noise levels have been obtained from a combination of manufacturers' specifications and from data provided by the applicant (Lloyd George Acoustics 2024). Data provided by the applicant includes recorded noise levels from plant within a segment precast factory located in Sydney, run by Acciona Ferrovial Joint Venture (AFJV) with the same equipment and operation.

A Noise Assessment was undertaken by Lloyd George Acoustics (Lloyd George 2024) (refer to **Appendix B**) which demonstrated that noise levels resulting from the plant operation, are predicted to exceed the assigned level in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997* at a number of residents during night time operations. To address the noise exceedance, it is recommended to implement the following management measures as outlined within the Noise Assessment (Lloyd George 2024).

Outside of daytime hours (i.e. Monday to Saturday 7.00 am to 7.00 pm) the following is required:

- Any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining area covered with mass loaded vinyl, minimum 6mg/m^2;
- No truck movements;
- No loading associated with the batch plant;
- Torque wrenches or similar are to be used in place of rattle guns;
- Steel fibre weighing is to be screened/enclosed sufficient to achieve a minimum 14 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 1.0 mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east; and
- Mixer is to be screened/enclosed sufficient to achieve a minimum 0.6 mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east.

- Forklifts are to remain behind the shed so that there is no line-of-site to the future Stage 3 of Rivermark (future residential) area. Alternatively, a wall can be constructed effectively extending the length of the shed.

Provided the recommended noise mitigation measures are implemented, it is concluded that compliance with the applicable assigned noise level can be achieved at all noise sensitive receptors during the specified working hours.

4.3 Noise Management Measures

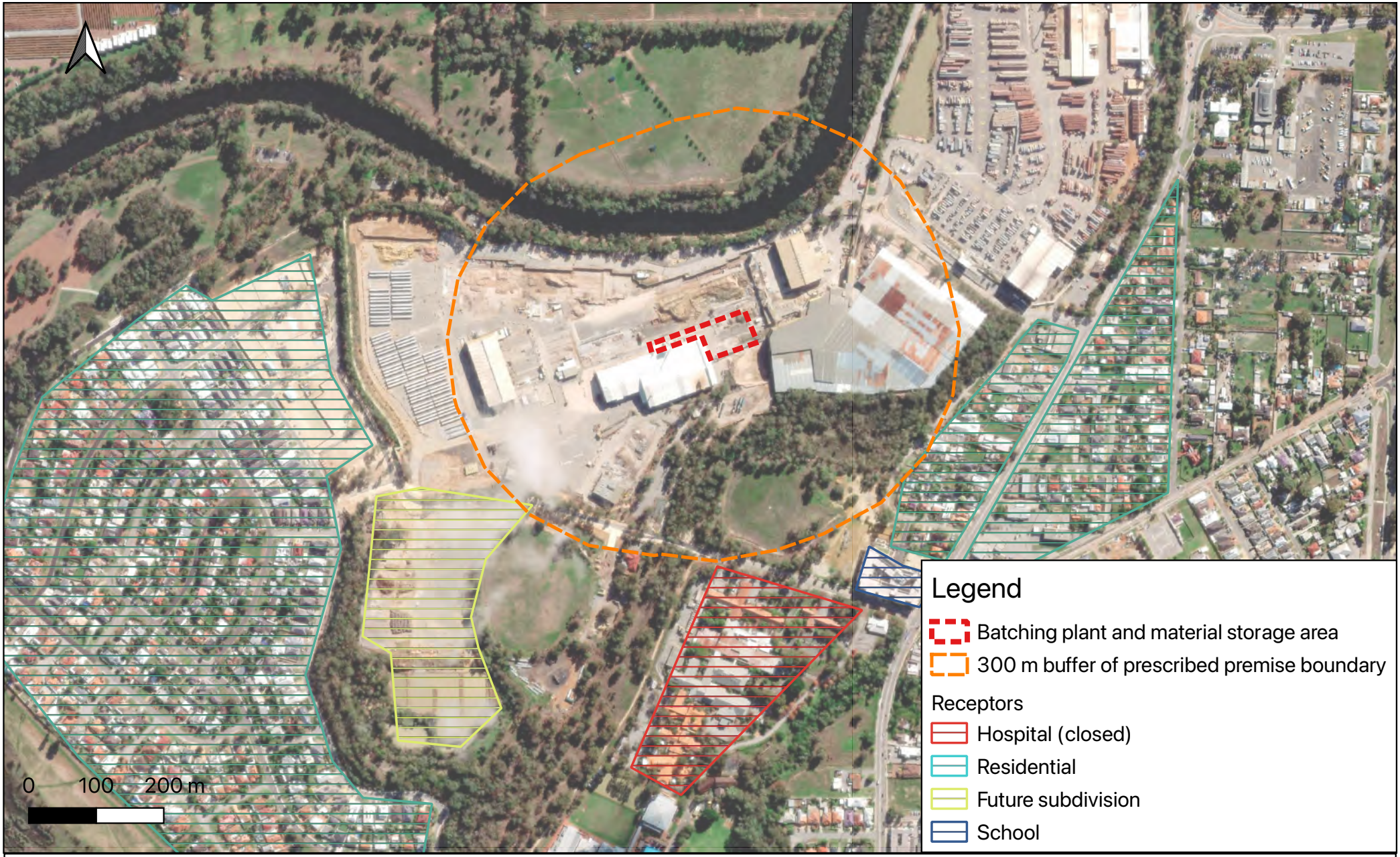
The proponent will ensure that noise emissions comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. In addition, the management measures prescribed within **Table 3** will be implemented to reduce noise emissions as far as practicable.

Table 3. Management actions for noise.

Item	Action	Trigger/Timing	Responsibility
Inductions			
1	As part of site inductions, employees, contractors and visitors to the site are reminded of their responsibility to undertake work activities in an environmentally sensitive manner, including minimising noise while on site, or entering and leaving the site.	Ongoing	Site Manager
2	All management and supervisors will be trained in the noise management requirements.		
Planning Controls			
3	Daily Planning • The use of significant noise generating equipment or activities simultaneously is avoided. • The noisiest activities are scheduled to the least sensitive times of the day.	Where possible	Site Manager
4	Regular review of meteorological data, specifically wind speed and direction, to guide decisions on quarrying activities.	As required, with consideration to the intensity of activities onsite and the prevailing weather conditions	Site Manager
Operational Controls			
5	Equipment and Machinery • Use machinery and equipment with minimal noise output levels. • Ensure all machinery is regularly serviced as per the equipment's maintenance schedule to minimise noise generation. • Where appropriate, all machinery and equipment will be shut off when not in use. • Use flashing lights/broadband alarms instead of tonal reversing alarms on excavators/loaders. • Apply speed restrictions (30 km/hr within site) and a ban on exhaust braking.	Continuous	All employees & contractors
Complaints Management			
6	Erect on-site signage directing public to make complaints to the relevant person.	Prior to quarrying	Site Manager

Item	Action	Trigger/Timing	Responsibility
7	Maintain a complaints register (refer to **Appendix G**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance. • Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance. If the complaint is verified as being due to a site source, remedial action will be undertaken within 2 hours. The City of Swan will be advised of all complaints as soon as they are received. If a complaint cannot be resolved within the 2 hour response period, it may be necessary to cease operations.	Upon receiving complaint	Site Manager

FIGURES



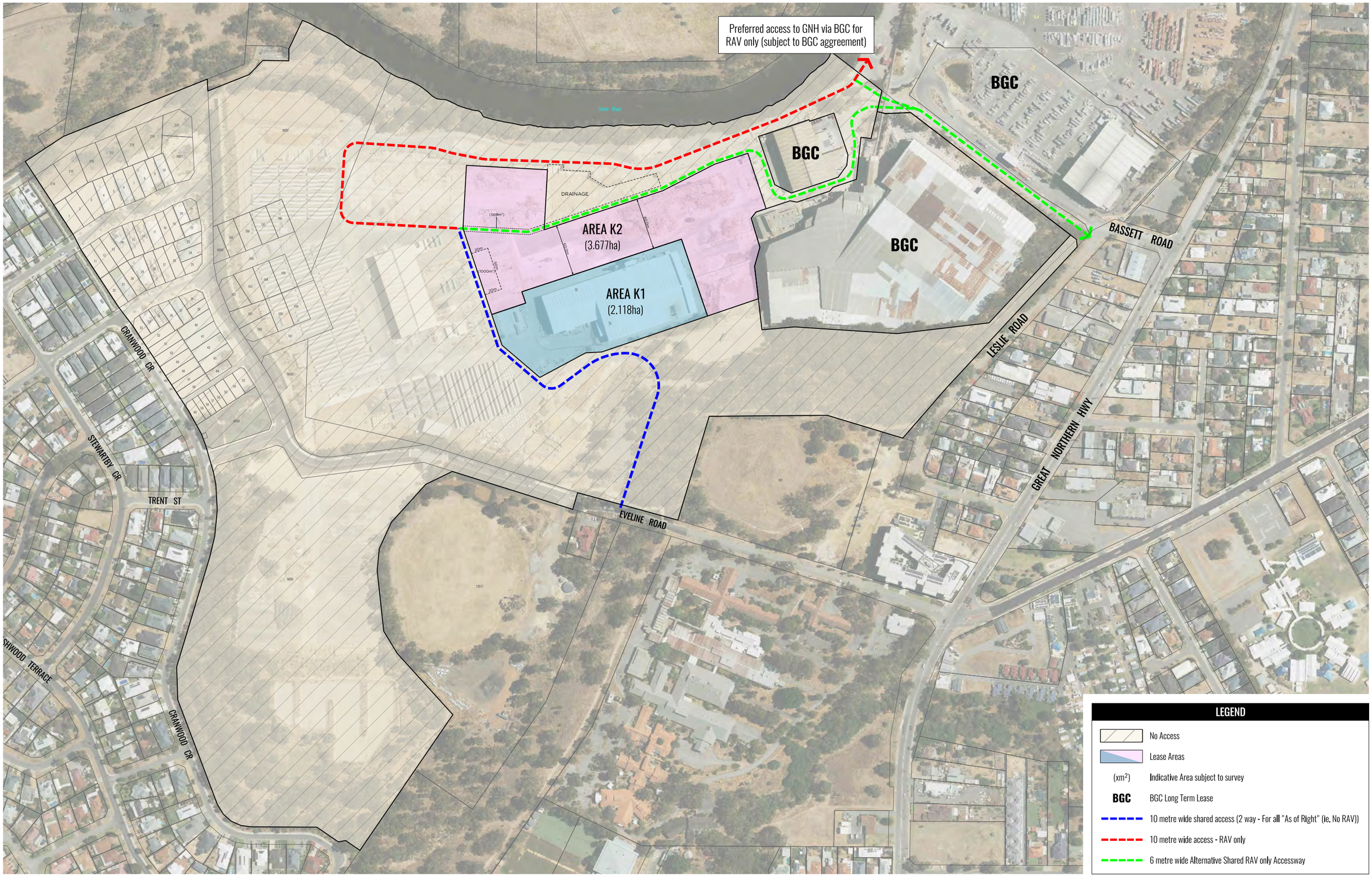
PROJECT	Lot 72 Eveline Road,Middle Swan
DRAWING TITLE	Figure 1 - Sensitive Receptors
CLIENT	Australian Precast Solutions

accendo AUSTRALIA

PO Box 5178
West Busselton
Western Australia 6280
Mobile 0418 950 852

Project Number	2438	Designed	PN
Drawing Number	Figure 1	Drawn	PN
Revision	A	Checked	
Date	13/06/2024	Approved	
Sheet 1 of 1		Local Authority	City of Swan

APPENDIX A – SITE PLAN



LEGEND

- No Access
- Lease Areas
- (xm^2) Indicative Area subject to survey
- **BGC** BGC Long Term Lease
- 10 metre wide shared access (2 way - For all "As of Right" (ie. No RAV))
- 10 metre wide access - RAV only
- 6 metre wide Alternative Shared RAV only Accessway

LEASE PLAN

Midland Brick

HESPERIA

0 30 60 90m

Date: 19/04/2024 Plan: HESMS-1-066A Scale 1:4000@A3

Note: All areas subject to detailed survey.

studio CFM TOWN PLANNING URBAN DESIGN

APPENDIX B - NOISE ASSESSMENT

[redacted]

Environmental Noise Assessment - Concrete Batching Plant

Lot 72 Eveline Road, Middle Swan

Reference: 24038850-01A

Prepared for:
Accendo Australia

This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

Date	Rev	Description	Author	Verified
23-Apr-24	0	Issued to Client as Draft	[redacted]	[redacted]
21-May-24	1	Draft 2 following client review and new data provided.	[redacted]	-
14-Jun-24	A	Finalised with no further changes	[redacted]	-
21-Jun-24	B	Rivermark Stage 3 now assessed with assigned levels assuming this is residential	[redacted]	-

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Appendices

1. INTRODUCTION

Lloyd George Acoustics was engaged by Accendo Australia to undertake an environmental noise assessment for a proposed short-term (12-18 months) concrete batching plant to be located at Lot 72 Eveline Road, Middle Swan and specifically within and adjacent the shed marked in *Figure 1-1*. The shed previously formed part of the Midland Brick operations, which is slowly being decommissioned over time, ultimately making way for residential development. The first stage of residential ("Recent Subdivision") can be seen to the west of the temporary shipping container noise wall. Further residential development ("Future Subdivision" referred to as Rivermark Stage 3) is proposed to the south and although the subject facility will no longer be operating when these homes are occupied, it is assumed this land has been rezoned residential and requires assessment.

Figure 1-1: Subject Site Location

The proposed facility is required to construct the marine tunnels associated with the Alkimos Desalination Plant and as such, will be a relatively short term project of 12-18 months. A site plan is provided in *Figure 1-2* with the following link (https://www.youtube.com/watch?v=BklgZfvitG8) providing an indication of the operations, albeit this project will be at a smaller scale.

With regard to noise emissions, consideration is given to noise from the concrete batching plant and mobile equipment outside the shed and the vibrators inside the shed at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Appendix A contains a description of some of the terminology used throughout this report.

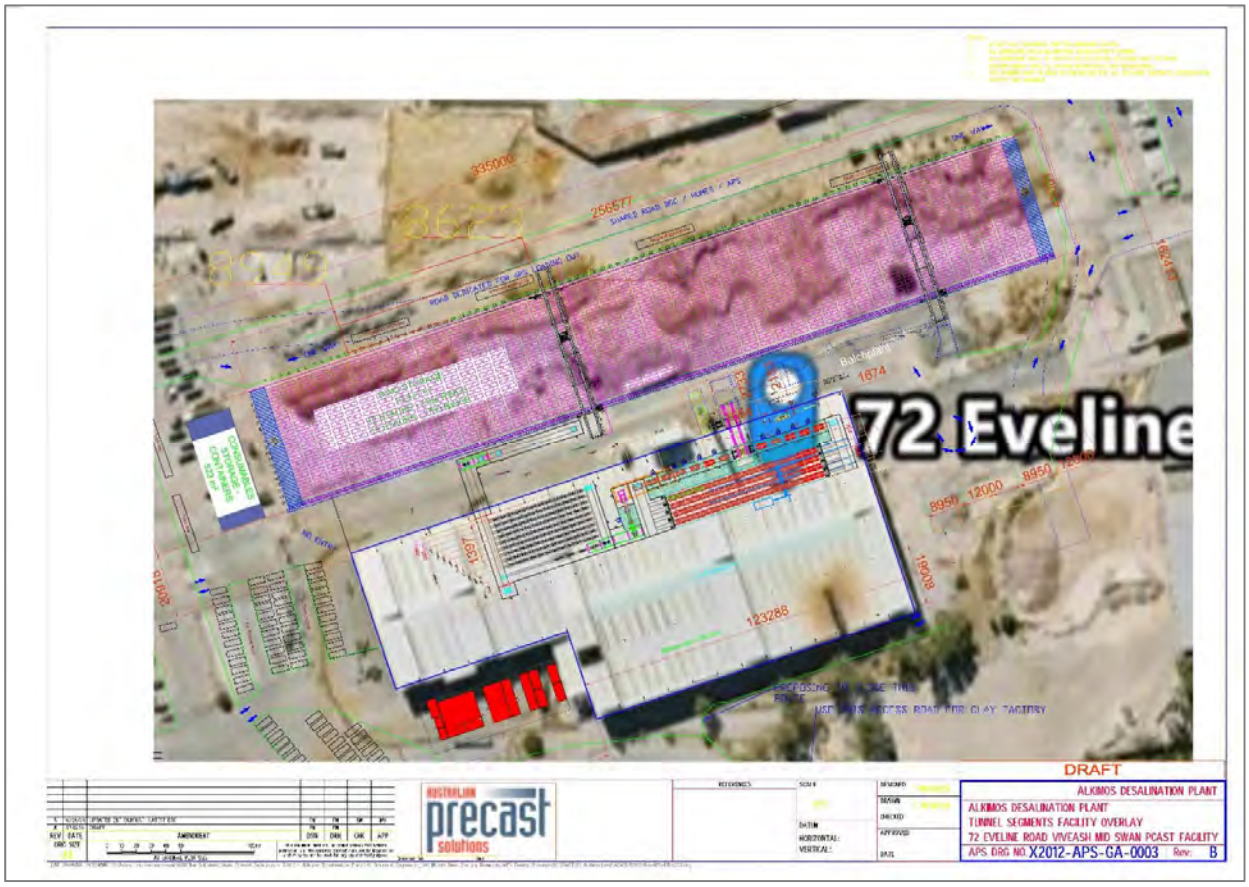


Figure 1-2: Site Plan

2. CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations) as follows:

"7. Prescribed standard for noise emissions

(1) Noise emitted from any premises or public place when received at other premises –

(a) must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) must be free of –

(i) tonality; and

(ii) impulsiveness; and

(iii) modulation,

when assessed under regulation 9.

(2) For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level at the point of reception."

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix A*). Under regulation 9(3), *"Noise is taken to be free of the characteristics of tonality, impulsiveness and modulation if -*

(a) the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] … are made to the noise emission as measured at the point of reception."

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music*			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

* These adjustments are cumulative to a maximum of 15 dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to "steady-state" noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2 Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises, varies depending on the proximity to industrial land. These have been based on those presented in the Herring Storer Acoustics[1] (HSA) report for the Existing LSP-17 (refer *Figure 2-1* taken from the HSA Report), reduced to allow for the rezoning of Rivermark Stage 3.

[1] *Acoustic Assessment, Midland Brick Site Redevelopment for Capitary No. 2;* June 2021, Reference: 27982-2-20355-02

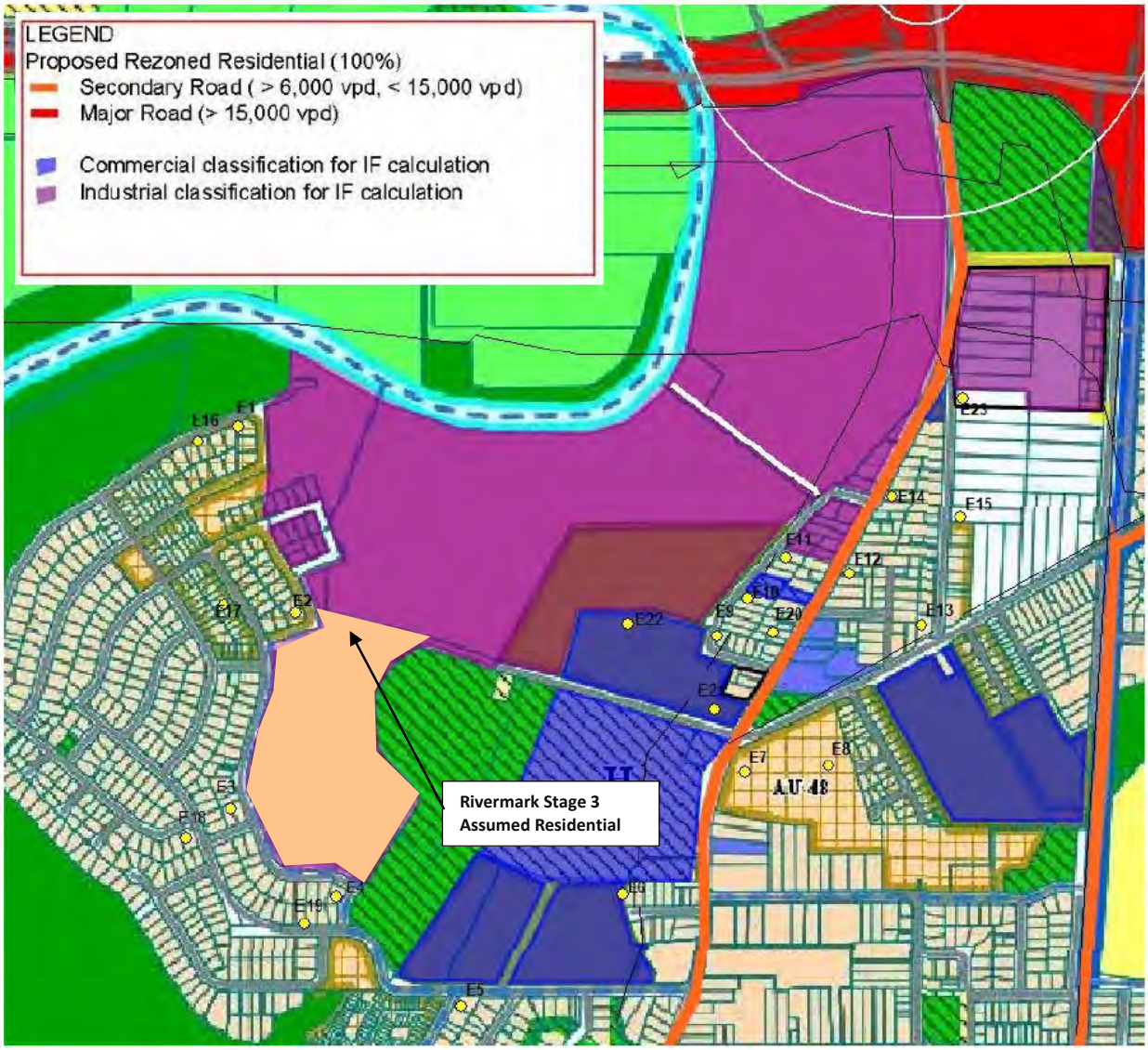


Figure 2-1: Receiver Locations from HSA Report and Rivermark Stage 3

The critical receivers in this assessment are considered to be E1 to E4, E9 to E11 and E22 and Rivermark Stage 3.

3. METHODOLOGY

Computer modelling has been used to predict the noise emissions from the development to all nearby receivers. The software used was *SoundPLAN 8.1* with the ISO 9613 algorithms selected, as they include the influence of meteorological conditions. Input data required in the model are listed below and discussed in *Section 3.1* to *Section 3.4*:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1. Meteorological Conditions

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1: Modelling Meteorological Conditions

Parameter	Day (7.00am to 7.00pm)	Night (7.00pm to 7.00am)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5	Up to 5
Wind Direction*	All	All

* The modelling package allows for all wind directions to be modelled simultaneously.

Alternatives to the above default conditions can be used where one year of weather data is available and the analysis considers the worst 2% of the day and night for the month of the year in which the worst-case weather conditions prevail (source: *Draft Guideline on Environmental Noise for Prescribed Premises*, May 2016). In most cases, the default conditions occur for more than 2% of the time and therefore must be satisfied.

3.2. Topographical Data

Topographical data was obtained from previous LG Acoustics work on the Midland Brick project and include topography as well as the bund and shipping container wall. This was also combined with Lidar information provided by Acciona.

3.3. Ground Absorption

The Midland Brick site has been modelled as acoustically hard (0.0), public open space and scrub as acoustically soft (1.0) and residential land as a combination of the two, albeit mostly hard (0.3).

3.4. Source Sound Levels

The source sound power levels used in the modelling are provided in *Table 3-2*. Whilst these may not represent all noise sources, they are considered to represent those that are most dominant.

Table 3-2: Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Batching Plant									
Materials Loader	89	91	101	96	101	98	93	89	**104**
Pan Mixers and Silos	97	98	104	98	99	104	98	96	**98**
Steel Fibre Weighing	98	107	103	103	101	98	93	85	**106**
FEL Pouring Aggregate in Bin	89	90	96	90	91	96	90	88	**96**
Truck Unloading Aggregate	103	104	110	104	105	110	104	102	**114**
Stockpile Area									
Forklift x 2	72	86	87	91	93	95	85	78	**99**
Gantry Crane x 2	67	76	77	84	86	87	78	-	**91**
Slow Moving Truck	110	106	105	101	102	99	92	-	**106**
Inside Building (Typical Enclosed R_w 25)									
Vibrators (Inside Building)	113	106	101	99	96	91	92	81	**102**
Rattle Gun	90	93	98	101	102	109	110	109	**115**

The following is noted in relation to *Table 3-2*:

- Batching plant sound level data provided from CTP via Acciona (email 16 May 2024);
- Advice from Acciona is that vibrators were measured to be 88 dB(A) at 1.5 metres;
- Other sources have utilised file data.
- The building is assumed to be of typical construction, achieving R_w 25 acoustic performance. This means that any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining open area covered with mass loaded vinyl, minimum 6kg/m^2.

4. RESULTS & ASSESSMENT

Three scenarios are considered as follows:

- Scenario 1: Daytime L_{A10} Noise - All Plant
- Scenario 2: Night-time L_{A10} Noise – Reduced Plant (refer *Section 4.2*)
- Scenario 3: Daytime Truck Movements

4.1. Scenario 1: Daytime Noise All Plant

The results for the All Plant during the day are provided in *Table 4-1*. A noise contour plot is also provided in *Figure 4-1* showing noise levels at ground floor. Being during the day, no adjustments are applied for intrusive characteristics.

Table 4-1: Scenario 1 Predicted Levels, dB L_{A10}

Receiver	Predicted Level	Assigned Level	Assessment
E1 – 67 Winston Crescent, Viveash	44	49	*Complies*
E2 – 16 York Lane, Viveash	42	53	*Complies*
E3 – 22 Cranwood Crescent, Viveash	38	45	*Complies*
E4 – 2 Cranwood Crescent, Viveash	39	45	*Complies*
E22 – 6 Eveline Road, Middle Swan	39	57	*Complies*
E9 – 8 Richardson Road, Middle Swan	36	53	*Complies*
E10 – 10 Leslie Road, Middle Swan	35	55	*Complies*
E11 - 20 Leslie Road, Middle Swan	30	57	*Complies*
Stage 3 Rivermark	43	51	*Complies*

Figure 4-1

Noise levels
L_{A10}, dB

= 45
= 50
= 55
= 60
= 65

Signs and symbols

- Receiver
- Point Source

N

Length Scale 1:7000

0 35 70 140 210 280 m

Proposed Concrete Batching Plant for Alkimos Desalination Plant -
Scenario 1 - Daytime Noise Levels

L_{A10} Noise Level Contours Based
Ground Floor Level

SoundPLAN v8.1
ISO 9613 Algorithms

21 June 2024

Lloyd George Acoustics
[redacted]

4.2. Night-time Noise – Reduced Plant

During the night, the only plant that would be operational are:

- the vibrators inside the shed;
- the forklifts and gantry cranes in the stockpile area; and
- the mixers and steel weighing as part of the batch plant.

Note, rather than rattle guns, torque wrenches would be used during the night. The results for the Reduced Plant during the night are provided in *Table 4-2*. A noise contour plot is also provided in *Figure 4-2* showing noise levels at ground floor. Being during the night, a + 5 dB adjustment is applied for possible tonality.

Table 4-2: Scenario 2 Predicted Levels, dB L_{A10}

Receiver	Predicted Level	Adjusted*	Assigned Level	Assessment
E1 – 67 Winston Crescent, Viveash	37	42	39	+ 3 dB
E2 – 16 York Lane, Viveash	36	41	43	*Complies*
E3 – 22 Cranwood Crescent, Viveash	33	38	35	+ 3 dB
E4 – 2 Cranwood Crescent, Viveash	32	37	35	+ 2 dB
E22 – 6 Eveline Road, Middle Swan	35	40	47	*Complies*
E9 – 8 Richardson Road, Middle Swan	34	39	43	*Complies*
E10 – 10 Leslie Road, Middle Swan	32	37	45	*Complies*
E11 - 20 Leslie Road, Middle Swan	24	29	47	*Complies*
Stage 3 Rivermark	40	45	41	+ 4 dB

* Noise is adjusted for tonality.

With the inclusion of tonality, there are some relatively minor exceedances of 2-4 dB. To achieve compliance at residences E1, E3 and E4, it is recommended that both the Steel Fibre Weighing and the Mixers are enclosed, which is offered by the supplier. The Steel Fibre Weighing is to achieve a noise reduction of 14 dB in the direction of E1 and the Mixers a 10 dB reduction. Any openings required for this equipment are to be to the east. To Stage 3 Rivermark, the highest noise source is one of the forklifts, which in the model is located towards the western end of the shed and therefore has line-of-sight. This can managed by ensuring the forklift is located behind the shed so that it does not have line-of-sight at night. Alternatively, a wall could be constructed, effectively extending the western end of the shed.

It is noted the calculations assume both gantry cranes and forklifts are moving simultaneously which may not be the case. Also, it is assumed the stockpile of the marine tunnels is non-existent and therefore is not providing any barrier attenuation. When stockpiling does occur, if this can be done from west to east, this may assist in further reducing noise emissions to the west.

Figure 4-2

Noise levels
L_{A10}, dB

	=	35
	=	40
	=	45
	=	50
	=	55

Signs and symbols

- Receiver
- Point Source

N

Length Scale 1:7000

0 35 70 140 210 280 m

Proposed Concrete Batching Plant for Alkimos Desalination Plant -
Scenario 2 - Night-time Noise Levels

L_{A10} Noise Level Contours Based Ground Floor Level

SoundPLAN v8.1
ISO 9613 Algorithms

21 June 2024

LLOYD GEORGE Acoustics

[redacted]

4.3. Daytime Truck Movements

The truck movement paths across the site are shown on *Figure 4-3* in red and green. The blue path to the south is for light vehicles only. As trucks move over a large area, these are modelled differently to the other scenarios. In this case, the truck speed is assumed to be 8m/s (approximately 30 km/hr) and the noise from the trucks are calculated over time. The noise from a truck entering and exiting for E1 is shown in *Figure 4-4*, whereby 1 truck takes approximately 260 seconds to travel the route.

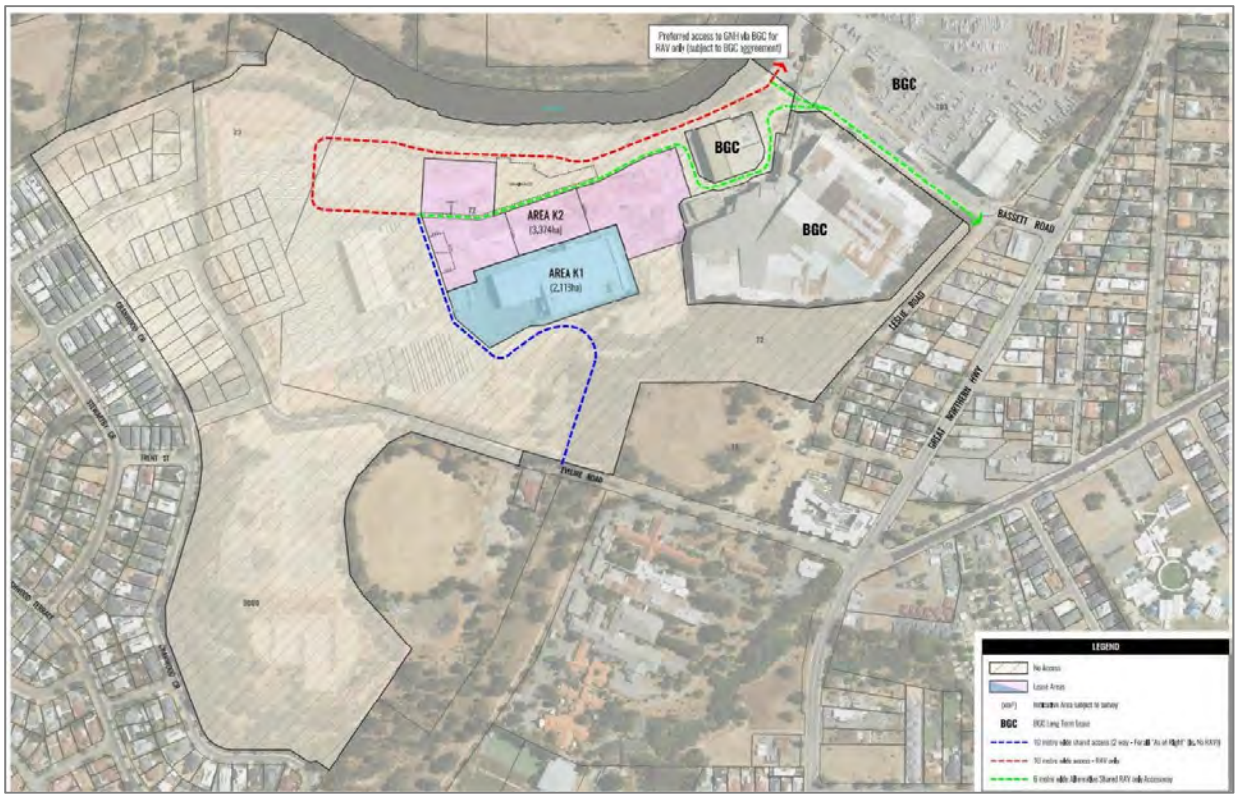


Figure 4-3: Proposed Truck Route

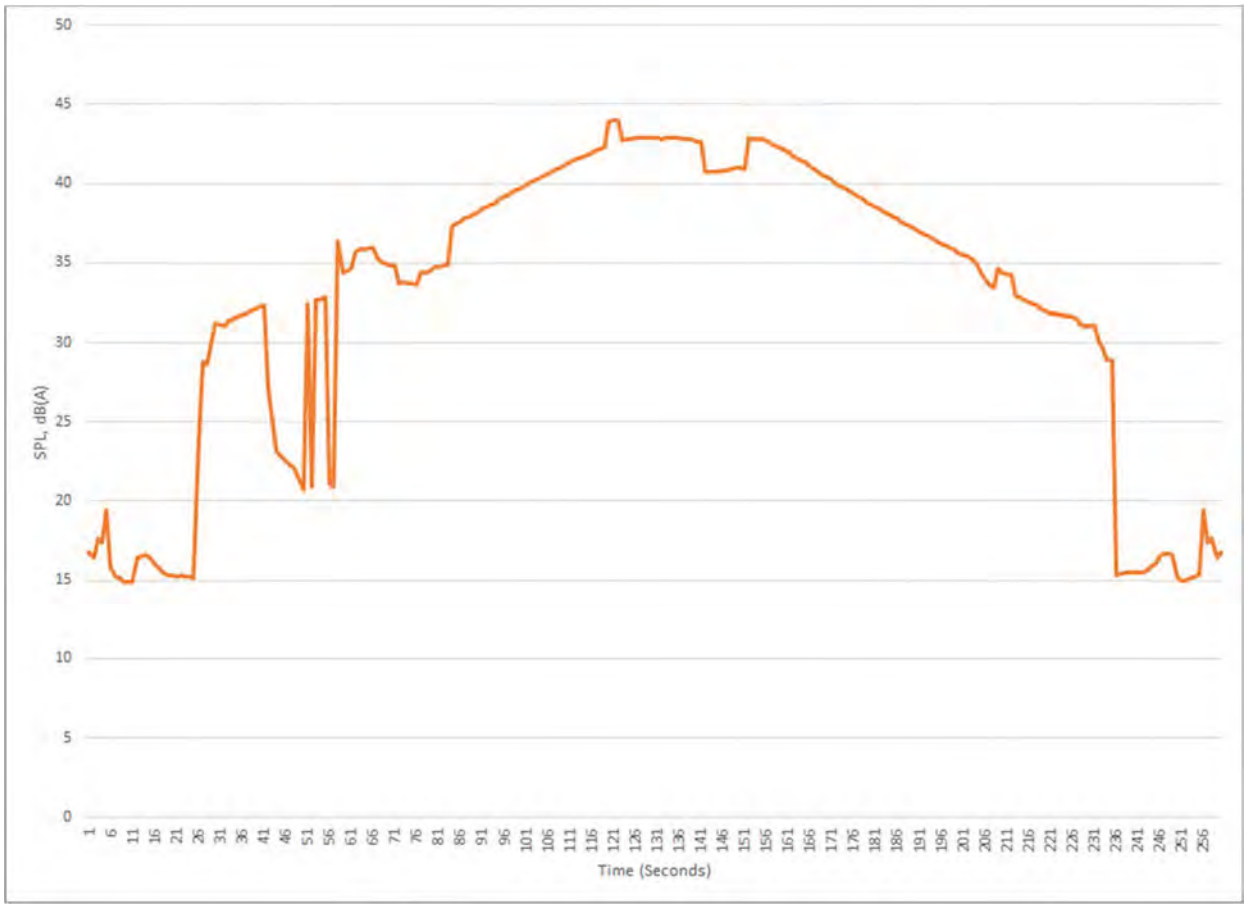


Figure 4-4: Time History at E1 for Truck Entering and Exiting

Table 4-3 to *Table 4-10* provides the different percentile predicted noise levels at each assessment location, depending on the number of truck movements per hour, noting these will be daytime only.

Table 4-3: Scenario 3 Predicted Levels to E1

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	44	43	N/A	69	59	49	*Complies*	*Complies*	*Complies*
2	44	43	32						
3	44	44	36						
4	44	44	39						
5	44	44	40						
6	44	44	41						

Table 4-4: Scenario 3 Predicted Levels to E2

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	42	41	N/A	73	63	53	*Complies*	*Complies*	*Complies*
2	42	42	28						
3	42	42	34						
4	42	42	35						
5	42	42	36						
6	42	42	36						

Table 4-5: Scenario 3 Predicted Levels to E3

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	37	35	N/A	65	55	45	*Complies*	*Complies*	*Complies*
2	37	35	22						
3	37	35	29						
4	37	36	32						
5	37	36	33						
6	37	36	34						

Table 4-6: Scenario 3 Predicted Levels to E4

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	39	36	N/A	65	55	45	*Complies*	*Complies*	*Complies*
2	39	37	27						
3	39	37	33						
4	39	37	34						
5	39	38	35						
6	39	38	35						

Table 4-7: Scenario 3 Predicted Levels to E9

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	44	36	N/A	73	63	53	*Complies*	*Complies*	*Complies*
2	44	38	22						
3	44	42	26						
4	44	43	33						
5	44	43	35						
6	44	43	35						

Table 4-8: Scenario 3 Predicted Levels to E10

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	47	34	N/A	75	65	55	*Complies*	*Complies*	*Complies*
2	47	36	23						
3	47	45	24						
4	47	46	26						
5	47	47	27						
6	47	47	31						

Table 4-9: Scenario 3 Predicted Levels to E11

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	41	39	N/A	77	67	57	*Complies*	*Complies*	*Complies*
2	41	40	27						
3	41	40	33						
4	41	40	34						
5	41	40	34						
6	41	40	35						

Table 4-10: Scenario 3 Predicted Levels to E22

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	40	35	N/A	77	67	57	*Complies*	*Complies*	*Complies*
2	40	36	21						
3	40	39	31						
4	40	39	32						
5	40	39	33						
6	40	39	33						

Table 4-11: Scenario 3 Predicted Levels to Rivermark Stage 3

Trucks Per Hour	Predicted Level, dB(A)			Assigned Level			Assessment		
	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}	L_{max}	L_1	L_{10}
1	49	46	N/A	71	61	51	*Complies*	*Complies*	*Complies*
2	49	47	31						
3	49	48	38						
4	49	48	39						
5	49	48	44						
6	49	48	45						

Where a result is shown as "N/A", this is because a single truck per hour is calculated to be present for less than 10% of the time and therefore there is no L_{A10} value.

5. DISCUSSION

The analysis within this report shows that compliance during the daytime (Mondays to Saturdays, 7am to 7pm) can be achieved from the proposed operations, including proposed plant and truck movements.

Outside of daytime hours (Monday to Saturday 7.00am to 7.00pm) the following is required:

- Any openings in the existing shed are to be sealed. Where openings are required for the conveyor associated with the batching plant, the opening size is to be minimised with the remaining open area covered with mass loaded vinyl, minimum 6kg/m^2.
- No truck movements;
- No loading associated with the batch plant;
- Torque wrenches are to be used in place of rattle guns;

- Steel Fibre Weighing is to be screened/enclosed sufficient to achieve a minimum 14 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 1.0mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east;
- Mixer is to be screened/enclosed sufficient to achieve a minimum 10 dB reduction to the north-west. The supplier has noted that insulated cladding can be provided. Cladding is to be minimum 0.6mm thick steel or approved equivalent, internally lined with acoustic absorption. Any openings are to be to the east; and
- Forklifts are to remain behind the shed so that there is no line-of-sight to the future Stage 3 of Rivermark. Alternatively, a wall can be constructed effectively extending the length of the shed.

General good practice requirements are:

- Equipment is to be maintained in good working order to minimise noise emissions;
- Trucks and staff are to be advised of the requirement to minimise noise emissions as far as practicable;
- Mobile equipment is to either operate with no reversing alarms where deemed safe to do so by others or shall be fitted with broadband alarms rather than tonal type alarms.

Appendix A – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A, dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{A1}**

The L_{A1} level is the A-weighted noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{A10}**

The L_{A10} level is the A-weighted noise level exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

- **L_{A90}**

The L_{A90} level is the A-weighted noise level exceeded for 90 percent of the measurement period and is considered to represent the "background" noise level.

- **L_{Aeq}**

The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

– the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

– a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band; and

(b) is present for at least 10% of the representative assessment period; and

(c) is regular, cyclic and audible.

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

– a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

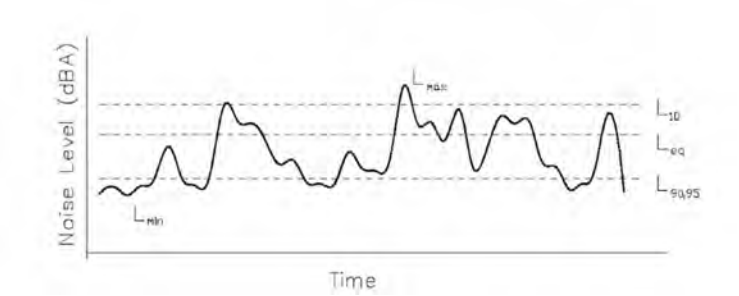
- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

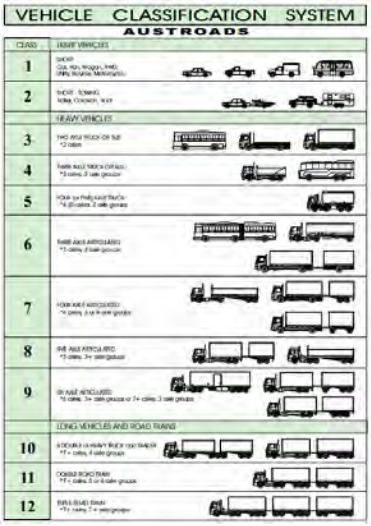
- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

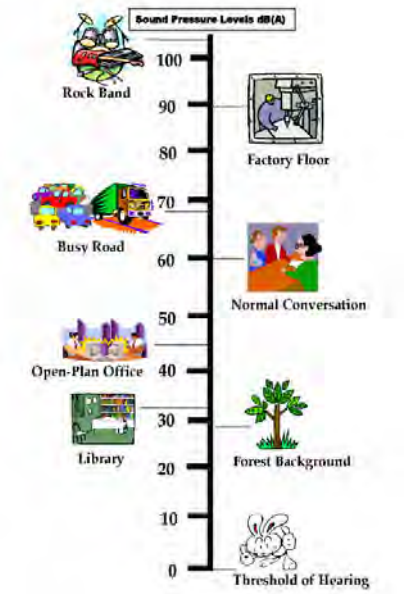
- **Chart of Noise Level Descriptors**



- **Austroads Vehicle Class**



- **Typical Noise Levels**



APPENDIX C - COMPLAINTS REGISTER

Complaints Register

Ref. No.	Date	Name & Address of Complainant	Time/Date of Complaint	Detail of Complaint	Summary of Actions Taken	Shire Notified	Person Responsible

APPENDIX G - COMPLAINTS REGISTER

Complaints Register

Ref. No.	Date	Name & Address of Complainant	Time/Date of Complaint	Detail of Complaint	Summary of Actions Taken	Shire Notified	Person Responsible

APPENDIX H – DUST MANGEMENT PLAN

DUST MANAGEMENT PLAN

LOT 72 EVELINE ROAD, MIDDLE SWAN

Australian Precast Solutions

JUNE 2024

[redacted]

Document Control

Version	Date	Author	Reviewer
V1	11/06/2024	PN	KMT
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Limitations

This report has been prepared by Accendo Australia Pty Ltd in accordance with the scope limitations provided in this report, or as otherwise agreed, between the Client and Accendo.

This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

This report has been prepared based upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report, which Accendo has not independently verified or checked beyond the agreed scope of work. Accendo does not accept liability in connection with such unverified information.

The conclusions and recommendations in this report are based on assumptions made by Accendo described in this report where and as they are required. Accendo disclaims liability arising from any of the assumptions being incorrect.

The report is based on site specific conditions encountered and information received at the time of preparation of this report or the time that site investigations were undertaken. Accendo disclaims responsibility for any changes that may have occurred after this time.

The preparation of this report has been undertaken and performed in a professional manner, in consideration of the scope of services and in accordance with environmental consulting practices. No other warranty is made.

TABLES

FIGURES

1 INTRODUCTION

1.1 Background

Australian Precast Solutions (APS) (the applicant) has been contracted to establish a concrete batching plant and pre-cast concrete facility to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. A temporary facility will be constructed within a portion of the Midland Brick Facility utilising a refurbished shed on their property located at Lot 72 Eveline Road, Middle Swan. The property is approximately 30.5 hectares (ha) in size and is currently utilised by the Midland Brick Facility (BGC), to the east of the proposed APS facility. The area to be leased by APS is shown in **Appendix A** and is herein referred to as the subject site.

The subject site is located in the municipality of the City of Swan, within the City's locality of Middle Swan, approximately 18 kilometres (km) north east of Perth. The Swan River borders the north of the Lot.

The main elements of the proposed operations will include:

- Batching Plant
    - Dual Pan Mixer (EURO Star)
    - 2 x 65 tonne cement silos with discharge point ducted to the wedge point within 1 m of ground level;
    - Four sand and aggregate 40 tonne hoppers and four storage bins with a capacity of approximately 216 m^3 each;
- Approximately 3,600 m^2 site workshop, office and amenities;
- Carousel system for manufacturing of precast tunnel segments;
- Gantry crane for handling and loading of precast tunnel segments;
- Gravel and concrete hardstand; and
- Vehicle parking facilities.

Importantly, the concrete batching plant is temporary only, with an approximate 18-24 month lifespan (including construction, operation and decommissioning) for the project. Construction is planned to commence in August 2024 and be completed by March 2025. Production of segments will be undertaken from April 2025 to October 2025 with delivery and demobilisation occurring from November 2025 until April 2026.

1.2 Purpose and Scope

Recognised industry standard practices for dust control are well-established within Western Australia. The utilisation of these standard practices is proposed at the subject site to suppress dust and reduced potential impacts associated with dust emissions. The plant and proposed site plan are designed to be fully compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

Management of these activities are an effective means to prevent adverse effects of dust. The purpose of this Dust Management Plan (DMP) is to review the risks and control measures to appropriately manage dust and mitigate its impact.

The scope of the DMP is to cover the following:

- Legislative and regulatory compliance;
- Existing environment;
- Risk assessment of potential dust sources and air quality impacts;

- Mitigation and measurement measures;
- Roles and responsibilities in relation to dust management; and
- Monitoring framework to assess the effectiveness of the management measures implemented.

1.3 Legislative and Regulatory Compliance

Relevant State and Commonwealth legislation relating to dust management and air quality within the subject site have been consulted during the preparation of this DMP and are listed below:

- *Environmental Protection Act 1986*;
- *Environmental Protection Regulations 1987*;
- *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*;
- *Environmental Protection Act 1986 – Environmental Protection (Unauthorised Discharges) Regulation 2004*;
- *Local Government Act 1995*;
- *National Environment Protection Council Act 1994*; and
- *National Environment Protection Measure for Ambient Air Quality 2003*, revised 2011.

2 EXISTING ENVIRONMENT

2.1 Site Description

The subject site is located within the central portion of 72 Eveline Road, Middle Swan. The property is approximately 30.5 ha in size and is currently utilised by three separate businesses. The BGC Facility is located to the east of the property, with the proposed APS plant to be located in the central area, comprised of approximately 5.8 ha.

The subject site consists of an existing shed, offices and concrete and gravel hardstand areas. A new site office compound is also proposed.

2.2 Climate

The subject site has a Mediterranean type climate with hot dry summers and cool wet winters. According to data from the nearest weather station with complete records, Perth Airport (Station number 009021, accessed at www.bom.gov.au) located less than 7 km to the south of the site, the average annual rainfall is approximately 757.2 mm, with approximately 90% of this rainfall occurring between the months of April to October. The average monthly maximum temperatures range from 32°C in February to 18.0°C in July.

Wind data from the site indicates that the prevailing wind direction is easterly in the morning and south westerly in the afternoon during summer, with lighter winds from the northeast occurring during the winter months (refer to **Appendix B**).

2.3 Surrounding Land Use

2.3.1 Sensitive Receptors

The Environmental Protection Authority (EPA) *Guidance Statement No. 3 Separation Distances between Industrial and Sensitive Land Uses* (2005) identifies land uses considered to be potentially sensitive to emissions from industry and infrastructure to include residential developments, hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, childcare facilities, shopping centres, playgrounds, and some public buildings. In accordance with this Guidance Statement (EPA 2005) the recommended separation distances between a concrete batching plant or cement products (bricks) manufacture operation and a sensitive receptor is between 300 to 500 m depending on the size of the operation.

The sensitive receptors within 300 m of the proposed operations are limited to the former Swan District Hospital (non-operational), a school and residential dwellings to the west and southeast. Noting that this proposed operation only has an approximate 18 to 24 month lifespan, future residential dwellings proposed to the south of the subject site will not be constructed prior to decommissioning of the operation (refer to **Figure 1**).

The operation largely complies with the recommended separation distances specified within the Guidance Statement (EPA 2005) with the nearest sensitive receptor located approximately 300 m from the premise boundary. It should be noted that the operations likely to cause dust emissions are predominantly located to the north of the subject site greater than 300 m from the sensitive receptors.

2.3.2 Adjacent Land Use

The BGC facility is located to the east of the property, with the proposed APS plant to be located in the central area. The Swan River is located directly to the north of the subject site. Residential dwellings are

located to the east, south and west with future residential development proposed within the western portion of Lot 72 and in the vacant land to the south west. As discussed above, this facility has a short-term lifespan and will be decommissioned prior to the development of these future residential areas.

3 RISK ASSESSMENT

3.1 Dust Sources

The Department of Water and Environmental Regulation (DWER) (formerly the Department of Environment and Conservation (DEC)) released *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated site remediation and other related activities* (2011) in which dust is defined as '*the generic term used to describe solid airborne particles generated and dispersed into the air by processes such as handling, crushing and grinding of organic and inorganic materials such as rock, ore, metal, coal, wood or grain and stockpiling of materials and wind blown dust*'.

Dust sources associated with the proposed operations are discussed in detail below.

3.1.1 Raw Material Delivery

The main processing area of the plant is comprised of sealed concrete. The gravel area outside of the main processing area will be fitted with reticulation to enable regular and as required watering for dust suppression.

Sand and aggregate material will be dampened during delivery if required (i.e. during summer months) to minimise dust during unloading. It will then be unloaded into sand and aggregate hoppers with a capacity of 40 tonne and storage bins with a capacity of approximately 216 m^3 each, enclosed on three sides to mitigate dust. An automated water reticulation system will be used as an additional dust control measure.

Delivery of the dry cement is completed via a sealed hose connection from the Cockburn Cement tanker to cement storage silos compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.

3.1.2 Manufacturing

The plant will consist of four aggregate storage hoppers at 40 tonne each with a reticulated water system for dust control. Incline conveyors will feed the raw material to the two mixers. The cement is batched and added directly to the mixer via a fully enclosed worm screw before the addition of water and mixing.

All surfaces surrounding the plant will be constructed to a hardstand standard, with the water cart located onsite able to water down the batching plant area to minimise dust during summer. Water recycled from the operations will be available for dust suppression when required.

The *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* provides guidance on the storage and handling of materials to be used in the operation. The proposed plant and site plan is designed to be fully compliant with these regulations as discussed in **Table 1**.

Table 1. Risk assessment based on concrete batching regulation requirements for dust control.

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Minimisation of dust						
3 (1)	An operator must not carry on concrete batching or cement product manufacturing unless it is carried on in such a manner that no visible dust escapes from the premises.	Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Training will be supplied on dust management to all personnel onsite to ensure the presence of visible dust is monitored. Should dust be observed operations will cease until the problem is rectified.	1	2	Low
3(2)	An operator must immediately clean up any material spilt during concrete batching or cement product manufacturing.	Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Training will be supplied to all personnel onsite and cleaning equipment will be readily available and accessible at all times. Regular daily washing will occur to minimise dust impacts.	1	2	Low
Control of dust from trafficable areas						
4 (1)	An operator must ensure that all parts of the premises to which vehicles have access – (a) Are either – a. Paved or sealed; or b. Treated with water or surfactants as often as is necessary; and (b) Are swept, hosed or otherwise cleared of any loose aggregate, sand, cement,	Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	All surfaces surrounding the plant are to be constructed to a minimum hardstand standard. A water cart will be located onsite able to water down the batching plant area to minimise dust during summer. Reticulation of the gravel road area will be utilised in summer and when dust is observed.	1	2	Low

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
	concrete or other material as often as is necessary. to prevent loose material adhering to vehicles and to minimise dust.					
(2)	An operator must not allow any vehicles carrying concrete, or any of the ingredients of concrete, to leave the premises until it has been washed free of cement slurry and dust.	Cement dust may be transported offsite exposing receptors to dust causing amenity and health impacts.	Wash out bays are located adjacent to the cement silo and all trucks will be washed prior to leaving the premises.	1	2	Low
Storage of aggregate and sand						
5(1)	An operator must store all aggregate and sand kept on the premises in storage bins or bays which are designed to minimise airborne dust, or where the use of such bins or bays is not practicable, in stockpiles on the ground.	Airborne dust could be transported within the site and offsite and cause health and amenity impacts to onsite personnel or receptors.	All aggregate and sand will be stored within covered hoppers or the three-sided concrete storage bins located within the hardstand processing area.	1	2	Low
(2)	An operator must not allow the height of aggregate or sand in a storage bin or bay to exceed the height of the bin or bay (including any windshields fitted to it).	Wind could cause airborne dust to be produced if aggregate or sand is higher than the protective walls causing health and amenity impacts.	No material within the bins will exceed the height of the bins as outlined in procedures. All operators will be trained and adhere to procedures.	1	2	Low
(3)	Where aggregate or sand is stored in a stockpile on the ground the operator must keep it covered or damp, or otherwise treat it so as to minimise the airborne dust.	N/A	Aggregate and sand will not be stored on the ground at any time.	NA	NA	NA

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
(4)	If, during the unloading of aggregate or sand, any visible dust escapes from the premises the operator must ensure that unloading stops immediately and does not resume until appropriate measures have been taken to prevent the escape of the dust from the premises.	Airborne dust cause health and amenity impacts to onsite personnel or nearby receptors.	All aggregate and sand will be dampened during delivery in summer and if visible dust is observed. Sprinklers will be available if required.	1	2	Low
Storage of cement						
6 (1)	An operator must store all cement kept on the premises – (a) In bags; or (b) In a cement storage silo- a. Which complies with subregulation (2); or b. Which is one of a series of interconnected silos at least one of which complies with subregulation (2).	Loading and unloading of the silo could cause dust to be produced. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Cement will be stored in a fully compliant sealed silo.	1	2	Low
(2)	To comply with this subregulation a cement storage silo must be fitted with – (a) An air cleaning system, which complies with regulation 7, through which all air extracted from the silo while it is being filled must pass before it is discharged into the environment; and (b) either –	Loading and unloading of the silo could cause dust to be produced. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Silos are fully compliant with Regulations 7 and 8 with discharge located within 1 metre of the ground level.	1	2	Low

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
	a. a level indicator which complies with regulation 8(1); or b. a relief valve, which complies with regulation 8(3).					
(3)	An operator must seal all inspection ports, hatches and other opening to a cement storage silo while cement is being unloaded into the silo.		Operators will be trained in the correct procedures for unloading cement into the silo.	2	2	Low
(4)	If, during the filling of a cement storage silo, any visible cement dust escapes from the silo the operator must ensure that no further loads of cement are unloaded into the silo until appropriate measures have been taken to prevent the escape of dust from the silo.		Unloading is to cease immediately if visible dust is observed. All valves and filter units will be checked and replaced where necessary. Regular maintenance and inspections will be undertaken of the equipment and air cleaning system will be undertaken.	1	2	Low
Air clearing system for cement storage silo						
7 (1)	The air cleaning system for a cement storage silo must – (a) be either – (i) a mechanical rapping air cleaning system with a minimum filter area of 23 square metres; or (ii) a reverse pulse air cleaning system which reduces dust emissions to less than 50 milligrams of particulate matter per cubic meter.	Loading and unloading of the silo could cause dust to be produced. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	The cement storage silo is fully compliant with the Regulations. Discharge air from the system is to an outlet which is within one metre from the ground.	1	2	Low

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
	(b) discharge air from the system into a weigh hopper or to an outlet which is within one metre of the ground.					
(2)	An operator must inspect the filters or if the system is fitted with pressure gauges for the detection of blockages or leaks, check those gauges, at least weekly and immediately clean repair or replace any filter which is blocked or damaged or has an excessive build-up of dust.	Blocked or damaged air cleaning systems may result in the escape of dust from the silo. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Regular maintenance will be scheduled and undertaken. Air cleaning cartridges will be changed if dust build-up is observed or at scheduled maintenance intervals.	2	2	Low
(3)	An operator must test the air cleaning system for a cement storage silo weekly and if it is not working efficiently, must not unload any cement into the silo until the system is repaired.	Blocked or damaged air cleaning systems may result in the escape of dust from the silo. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Air cleaning system will be tested regularly and must be working to manufacturers specifications prior to cement unloading commencing.	2	2	Low
(4)	An operator must keep on the premises, or in a readily accessible place, sufficient spare filters to replace all such bags or cartridges used in the air cleaning systems of all cement storage silos on the premises.	Blocked or damaged air cleaning systems may result in the escape of dust from the silo. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Sufficient spare filters to replace all bags and cartridges will be stored onsite and readily accessible in case of emergency or routine maintenance requirements.	2	2	Low
Level indicator system or relief valve for cement storage silos						

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
8(1)	A level indicator system for a cement storage silo must include – (a) an audible alarm which sounds if cement stored in the silo reaches – (i) 0.6 m below the inlet to the silo's air cleaning system; or (ii) 2 tonnes less than the silo's maximum capacity; and (b) A test circuit which indicates whether the level indicator and alarm are working correctly.	Overfilling of cement silo could result in dust being produced and discharged to the environment. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	The cement silo is compliant with all regulations and the software to be used for the cement batching will provide real time information on current silo levels and will alarm when required. A test circuit which indicates whether the level indicator and alarm are working will be installed.	2	2	Low
(2)	Where a level indicator is used to comply with regulation 6(2)(b) the operator must ensure that the test circuit is activated before a load of cement is unloaded into the silo and that no cement is unloaded into the silo if the level indicator or alarm are not working correctly.	Failure of the level indicator could lead to overfilling of cement silo could result in dust being produced and discharged to the environment. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Operator will be trained in the correct procedures for unloading cement into the silo including the requirement to ensure that the test circuit is activated prior to unloading commencing.	1	2	Low
(3)	A relief valve for a cement storage silo must be designed – (a) to automatically prevent the level of cement in the silo rising above the level referred to in subregulation 1(a)(i) or (ii); and	Failure of the level indicator could lead to overfilling of cement silo could result in dust being produced and discharged to the environment. Personnel onsite and receptors located in proximity to the site could be	A relief valve is fitted to the silo with the outlet within one metre of the ground.	1	2	Low

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
	(b) so that any excess cement is piped into a weigh hopper or an outlet which is within one metre of the ground.	exposed to dust causing amenity and health impacts.				
Movement of materials on premises and loading of agitators						
9 (1)	An operator must not use – (a) a hopper conveyor, chute, bucket elevator or transfer point to move material on the premises; or (b) any area of the premises to load agitators , unless it is – (a) enclosed; (b) fitted with wind shields, water sprays or a dust extraction system; or (c) otherwise designed and operated, so as to prevent the escape of any visible dust.	Exposed movement of materials could lead to the production and discharge of dust to the environment. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Incline conveyors loading aggregates and raw materials are fitted with spray bars and a reticulated water system to dampen materials prior to entry to the mixer.	1	2	Low
(2)	An operator must maintain in good working order all wind shields, water sprays, dust extraction systems and other devices used to comply with subregulation (1).	Exposed movement of materials could lead to the production and discharge of dust to the environment. Personnel onsite and receptors located in proximity to the site could be exposed to dust causing amenity and health impacts.	Regular maintenance and inspections will be scheduled on all equipment to ensure the plant complies with subregulation (1).	1	2	Low

No.	Concrete Batching Regulation	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Cement product manufacturing premises to be cleaned						
10(1)	An operator carrying on cement product manufacturing must regularly clean all inside areas on the premises to prevent the accumulation of dust on any surface	Insufficient cleaning of plant areas may result in a build up of cement and dust increasing the risk of discharge of cement and dust to the environment.	Operator will be trained in housekeeping, regular cleaning of all inside areas on the premise will be undertaken to prevent the accumulation of dust.	2	2	Low
(2)	An operator must not use water to carry out the clearing referred to in subregulation (1) unless all fitting and electrical installations in that are of the premises are waterproof or otherwise design to withstand water.	Incorrect use of water may result in electrocution or failure of equipment.	Operator will be trained with the knowledge of equipment that is waterproof. Any equipment not waterproof will be cleaned in accordance with the manufacturer's instructions.	1	2	Low
(3)	Subregulation (2) does not apply in relation to a building in which cement product manufacturing was being carried on before these regulations came into operation.	NA	Noted.	NA	NA	NA

While the above processes have been designed to reduce dust emissions during operations, the following processes have the potential to generate dust that, if not adequately controlled, can cause nuisance and safety risks.

- Cement unloading;
- Aggregate and sand movement;
- Spillage of raw materials from trucks, hoppers and storage bins;
- Truck loading; and
- Vehicle movement across gravel hardstand.

3.2 Wind Direction

As discussed in **Section 2.2**, wind data from the Perth Airport indicates that the prevailing wind direction is easterly in the morning and south westerly in the afternoon during the summer months when dust emissions are most problematic.

The design of the processing area along with the location between the material bins and the existing BGC shed ensures that the area is protected from both the easterly and south westerly winds. It is likely that the morning easterly winds would be abated by the BGC shed and reduce the production of dust. Furthermore, any material that is disturbed by the easterly wind will be contained by the APS shed. It is therefore unlikely to reach the residential dwellings located to the west of the subject site. Likewise, the shed is likely to shelter the processing area and restrict the south westerly winds from producing dust within the processing area. In addition, there are no sensitive receptors located within 500 m to the north-west of the subject site (i.e. upwind of the prevailing wind direction during the afternoon in summer).

4 MANGEMENT MEASURES

Based on the results from the risk assessment and the separation distances to sensitive receptors, the following dust management measures are proposed.

4.1 Training

Training will be supplied to all operators and personnel onsite in dust management and housekeeping measures to ensure the accumulation and transport offsite of dust does not occur. Operators will not be allowed to undertake any aspect of the operations without first receiving training in all equipment and processes required. Training will be supported by documented and reviewed procedures.

4.2 Dust Suppression within trafficable areas

All surfaces surrounding the plant not sealed will be constructed to a hardstand standard. A water cart will be located onsite able to water down the batching plant area to minimise dust during summer. Reticulation for any gravel area will be utilised on a regular basis and when dust is observed.

4.3 Storage of materials

All aggregate and sand will be stored within the covered hoppers or three-sided concrete storage bins located within the hardstand processing area. Aggregate and sand will not be stored in stockpiles on the ground nor will material stored within the bins be stored at a height greater than the walls of the bins. Sprinklers will be utilised in summer and if visible dust is observed.

Cement will be stored in sealed silos fully compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* or bulk bags. Operators will be trained in the correct procedure for unloading cement to the silo and all inspections, cleaning and maintenance. Operations will cease immediately if visible dust is observed, all filters and valves will be checked and replaced as necessary.

4.4 Operation

Minimal dust will be produced during operation due to the wet nature of the plant. Visible observations will be undertaken during operation to ensure no equipment malfunctions result in dust emissions. All operators will be trained in the appropriate housekeeping and maintenance requirements, and all required parts, filters etc will be stored onsite in case of an emergency.

4.5 Summary

The potential impacts to amenity and health from dust emissions are considered low with the application of suitable management measures. A summary of these proposed management measures is provided in **Table 2**.

Table 2. Dust management measures.

Legislation and Key Standards		
Environmental Protection Act 1986 (EP Act) *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC 2011) *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*		
Objectives		
• Minimise dust lift during all activities. • No adverse dust impacts to sensitive receptors from the processing operations.		
Targets		
• No visible dust beyond the property boundary. • Address all complaints regarding dust emissions.		
Management Actions		
Description	**Responsibility**	**Timing**
Notice to be erected at the site, providing contact details of the person to be contacted regarding the works. This person will also be available outside of operational hours to address any complaints.	Site Manager	Ongoing
Induction for all employees will include information on: • Potential sources of dust • Dust Management Plan • Speed limits onsite and staying on designated roads • Reporting procedure for dust issues	Site Manager	Prior to commencement of employment
All surfaces surrounding the plant are to be constructed to at least a hardstand standard. A water cart will be located onsite able to water down the batching plant area to minimise dust during summer. Reticulation of any gravel area will be utilised when dust is observed.	Site Manager	As required
All aggregate and sand will be stored within the three-sided concrete storage bins located within the hardstand processing area. Aggregate and sand will not be stored in stockpiles on the ground, nor will material stored within the bins be stored at a height greater than the walls of the bins.	Site Manager	At all times
All aggregate and sand will be covered to prevent moisture changes and reduce dust liftoff. Sprinklers will be utilised if visible dust is observed.	Site Manager	As required
Cement will be stored in sealed silos fully compliant with the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998*.	Site Manager	At all times
Operators will be trained in the correct procedure for unloading cement to the silo. Operations will cease immediately if visible dust is observed, all filters and valves will be checked and replaced as necessary.	Site operators	As required
Vehicle speeds will be restricted to no more than 30km/hr on the site to minimize dust lift off.	Drivers	At all times
Visible observations will be undertaken at all times to ensure no malfunction of the processing equipment is resulting in the production of dust. Works will cease immediately in the event dust is produced by the processing plant.	Site operators	At all times
Spare filters, air cartridges and essential maintenance items will be available and stored on site at all times in case of an emergency.	Site Manager	As required
Maintain a complaints register (refer to **Appendix C**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance.	Site Manager	As required

• Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance.			
Monitoring			
Description	**Parameter**	**Responsibility**	**Frequency**
Visual monitoring of dust will be ongoing throughout the day during operations. All monitoring is to be maintained on a logging sheet for reference and proof of compliance.	Dust lift and signs of dust deposition near property boundary. Evidence of no visible dust crossing the site boundary will be used as the monitoring criteria for compliance.	Site Manager	Continuous
Contingency and Corrective Actions			
Incident or Consequence	**Corrective Action**	**Responsibility**	
Observation of excessive dust lift onsite	Report and investigate as incident.	Site Manager	
	Halt work within proximity of the area until cause of dust is addressed.	Site Manager	
	Increase dust mitigation measures (e.g. additional watering of exposed areas).	Site Manager	
Complaint received	Report and investigate as incident. To determine the validity of the complaint, the wind direction, wind speed and activities being undertaken on site at the time of the complaint will be established.	Site Manager	
	If required, halt work until cause of dust is addressed.	Site Manager	
	If the complaint is verified as being due to a site source, consultation between the site manager and the City of Swan will be undertaken to identify the need for any supplementary dust measures (depending on the nature of any complaint) such as (but not limited to) the following: • Additional use of the water truck to regularly water down the concrete batching site; • The use of a streetsweeper on the process water catchment area and site crossover; • (re)sealing of the ingress/egress (crossover) for the site; and/or • Wind shielding measures for the storage bins.	Site Manager	
	Review dust management procedures and adjust if deemed necessary.	Site Manager	

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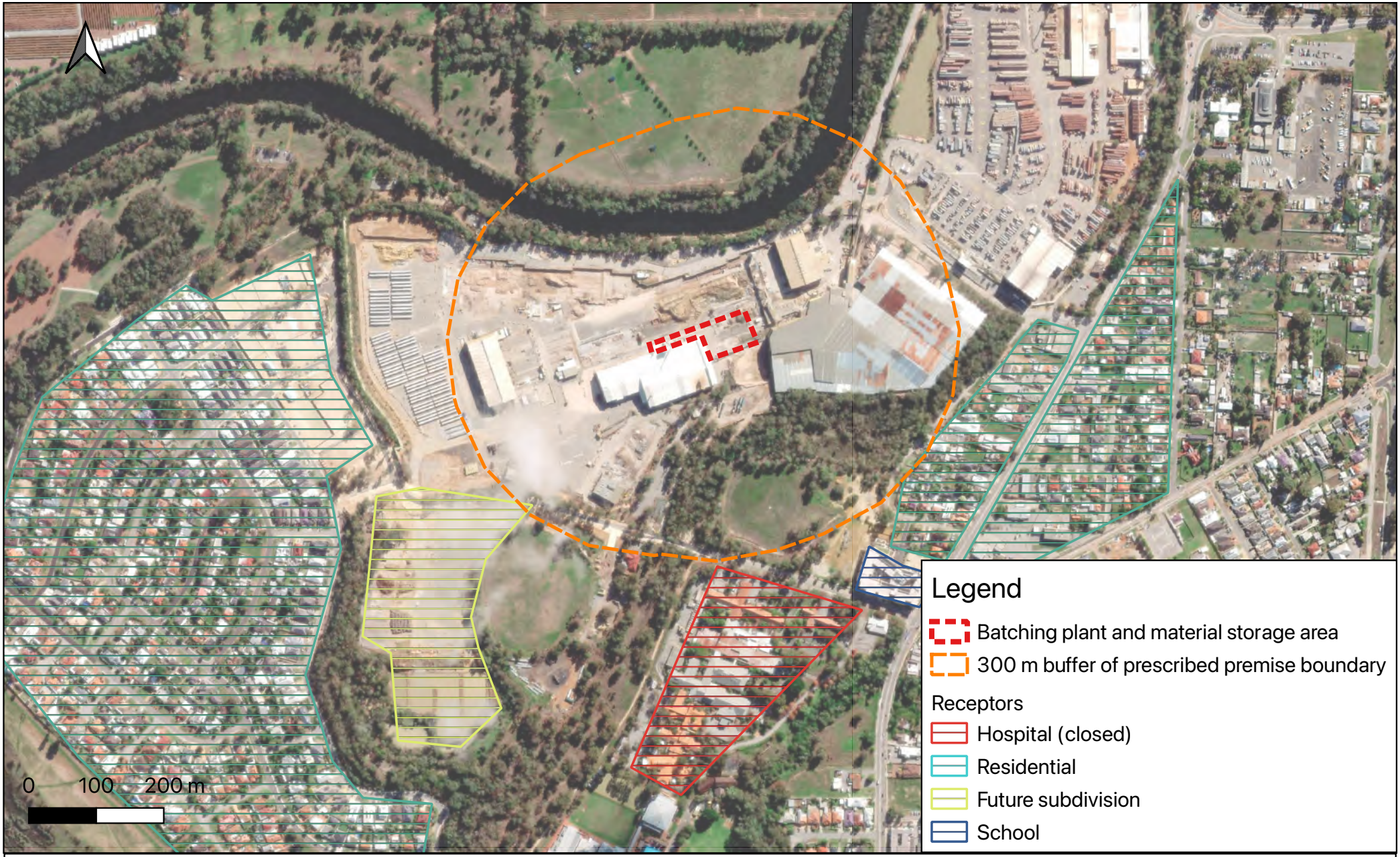
FIGURES



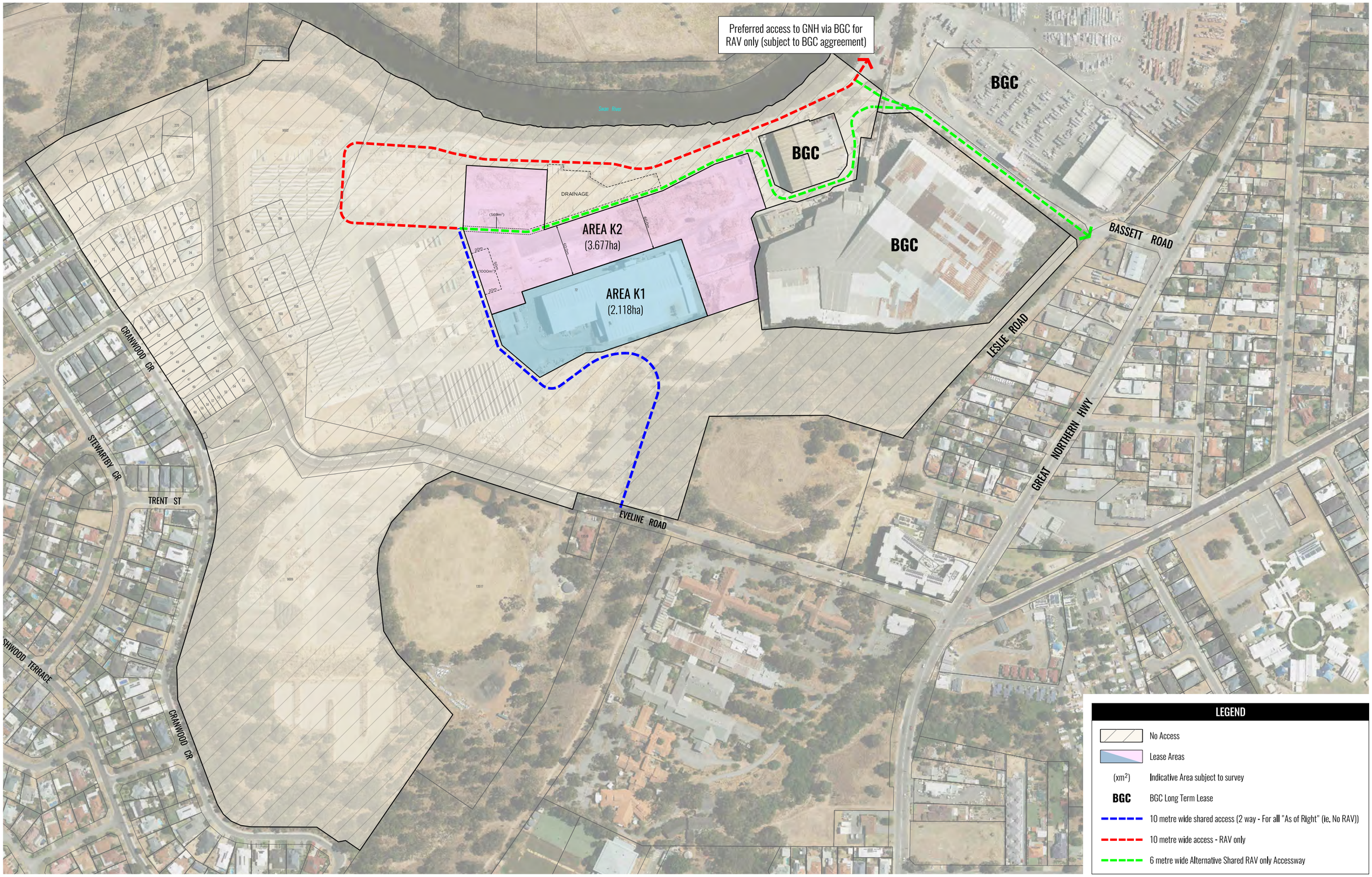
PROJECT	Lot 72 Eveline Road,Middle Swan
DRAWING TITLE	Figure 1 - Sensitive Receptors
CLIENT	Australian Precast Solutions

accendo AUSTRALIA

PO Box 5178
West Busselton
Western Australia 6280
Mobile 0418 950 852

Project Number	2438	Designed	PN
Drawing Number	Figure 1	Drawn	PN
Revision	A	Checked	
Date	13/06/2024	Approved	
Sheet 1 of 1		Local Authority	City of Swan

APPENDIX A – SITE PLAN



LEGEND

- No Access
- Lease Areas
- (xm^2) Indicative Area subject to survey
- **BGC** BGC Long Term Lease
- 10 metre wide shared access (2 way - For all "As of Right" (ie. No RAV))
- 10 metre wide access - RAV only
- 6 metre wide Alternative Shared RAV only Accessway

LEASE PLAN

Midland Brick

HESPERIA

0 30 60 90m

Date: 19/04/2024 Plan: HESMS-1-066A Scale 1:4000@A3

Note: All areas subject to detailed survey.

studio CFM TOWN PLANNING URBAN DESIGN

APPENDIX B - WIND ROSES

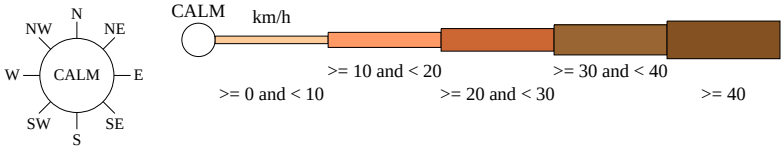
Rose of Wind direction versus Wind speed in km/h (01 May 1944 to 10 Aug 2023)

Custom times selected, refer to attached note for details

PERTH AIRPORT

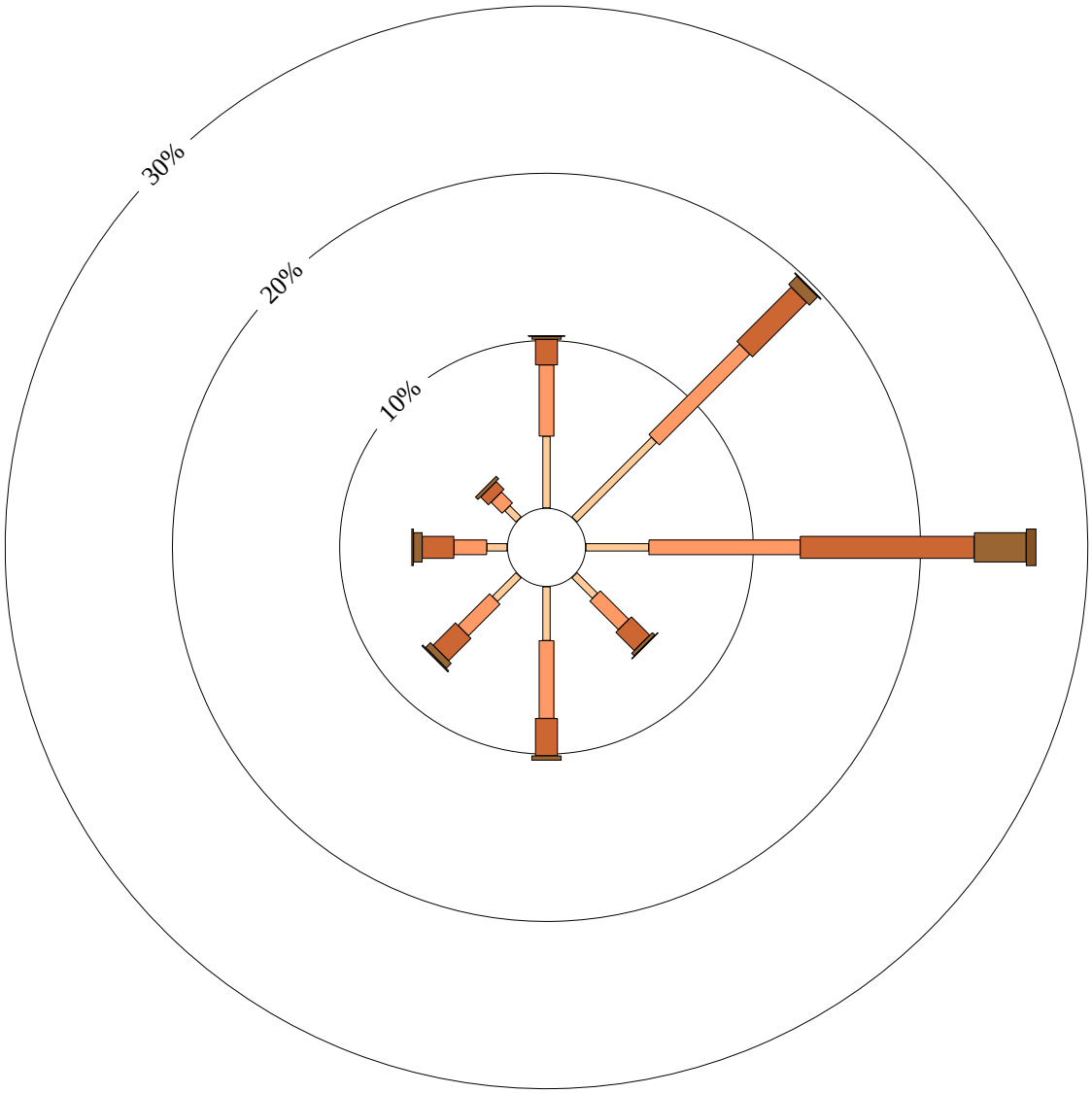
Site No: 009021 • Opened Jan 1944 • Still Open • Latitude: -31.9275° • Longitude: 115.9764° • Elevation 15.m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
28945 Total Observations

Calm 12%



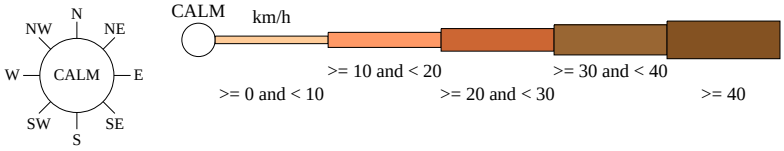
Rose of Wind direction versus Wind speed in km/h (01 May 1944 to 10 Aug 2023)

Custom times selected, refer to attached note for details

PERTH AIRPORT

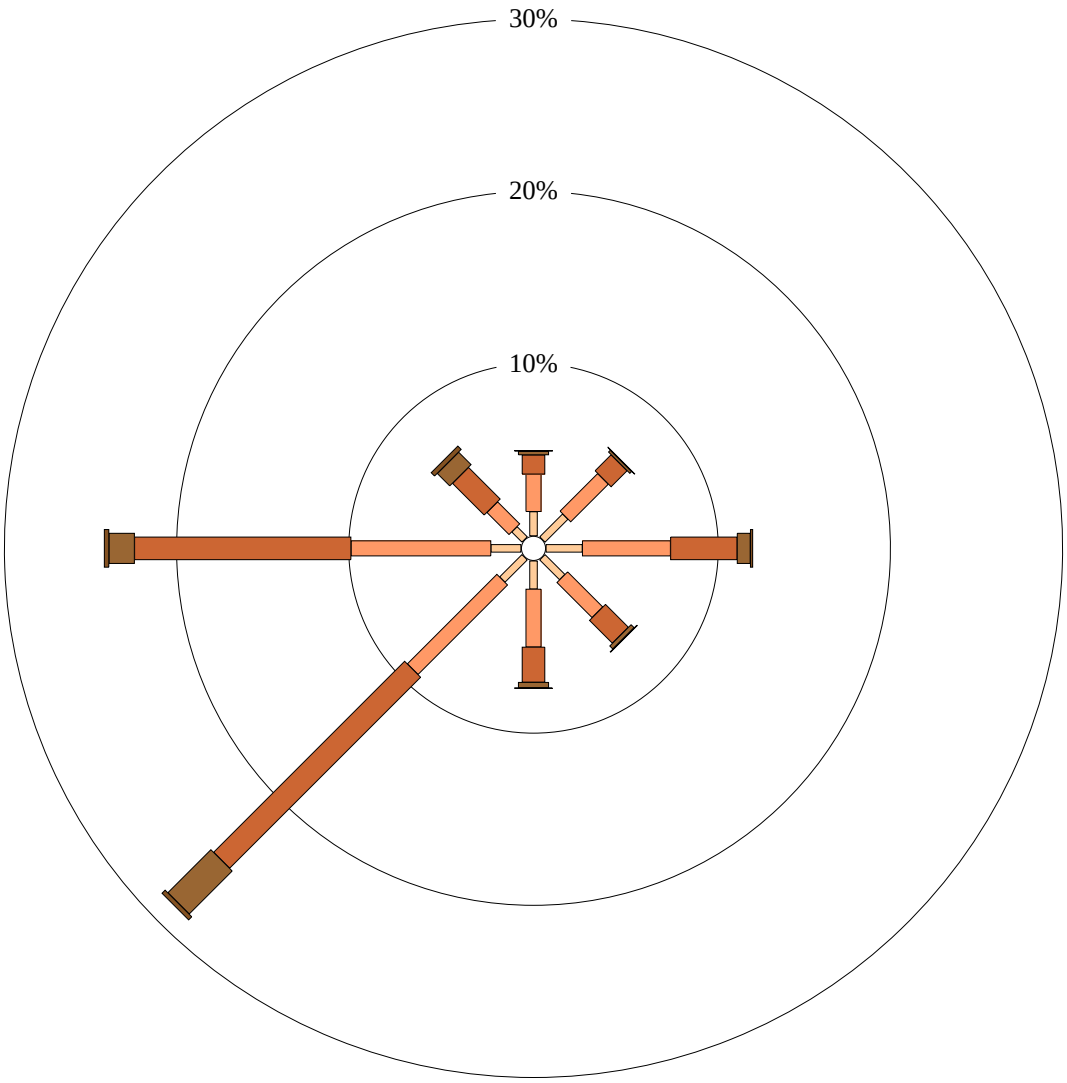
Site No: 009021 • Opened Jan 1944 • Still Open • Latitude: -31.9275° • Longitude: 115.9764° • Elevation 15.m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
28930 Total Observations

Calm 4%



APPENDIX C – COMPLAINTS REGISTER

Complaints Register

Ref. No.	Date	Name & Address of Complainant	Time/Date of Complaint	Detail of Complaint	Summary of Actions Taken	Shire Notified	Person Responsible

APPENDIX I – RISK RATINGS

Table A1. Impact risk assessment descriptors.

Likelihood		
Level	**Description**	**Criteria**
1	Rare	The environmental event may occur or one or more conservation significant species or communities may be present in exceptional circumstances.
2	Unlikely	The environmental event could occur or one or more conservation significant species or communities may be present in exceptional circumstances.
3	Moderate	The environmental event should occur or one or more conservation significant species or communities should be present at some time.
4	Likely	The environmental event will probably occur or one or more conservation significant species or communities will be present in most circumstances.
5	Almost certain	The environmental event is expected to occur or one or more conservation significant species or communities is expected be present in most circumstances.
Consequences		
Level	**Description**	**Criteria**
1	Insignificant	Insignificant impact on species or communities of conservation significance or regional biodiversity, and the loss will be insignificant in the context of the availability of similar flora, vegetation or fauna in the area.
2	Minor	Impact on flora, vegetation or fauna will be localised and no significant impact on species or communities of conservation significance in the project area. Loss of species or communities at the local scale.
3	Moderate	An appreciable loss of flora, vegetation or fauna in a regional context or limited impact on species or communities of conservation significance in the project area.
4	Major	Significant impact on conservation significant flora, vegetation or fauna or their habitat in the project area and/or regional biodiversity and/or a significant loss in the biodiversity at the landscape scale.
5	Catastrophic	Loss of species or communities at the regional scale and/or a significant loss of species categorised as 'vulnerable' or 'endangered' under the EPBC Act at a regional scale.
Acceptability of Risk		
Level of Risk	**Management Action Required**	
1 to 4	**Acceptable, no action required**	
5 to 6	**Moderate, avoid if possible, routine management with internal audit and review of monitoring results annually**	

7 to 8	**High, externally approved management plan to reduce risks, monitor major risks annually with external audit and review of management plan outcomes annually. May require referral to the Commonwealth under the EPBC Act**
9 to 10	**Extreme, unacceptable, project should be redesigned or not proceed. Requires a referral to the Commonwealth under the EPBC Act**

Table A2. Level of acceptable risk.

		Likelihood				
		Rare or very low (1)	**Unlikely or low (2)**	**Moderate (3)**	**Likely (4)**	**Almost certain (5)**
Consequences	Insignificant	2	3	4	5	6
	Minor	3	4	5	6	7
	Moderate	4	5	6	7	8
	Major	5	6	7	8	9
	Catastrophic	6	7	8	9	10