APPENDIX 5

Operational Management Plan (Draft)

Willunga Basin Water Co Pty Ltd

ABN 49 081 133 619

WBWC-IMS-DOC-xxx
Whitings Rd Recycled Water Storage Operations Environmental Management Plan

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1. Introduction

1.1 Project overview

Willunga Basin Water Pty Ltd ('WBWC') provides recycled water to customers in McLaren Vale and the surrounding districts, predominantly for the irrigation of vineyards and other horticultural crops. The recycled water is of sewage origin and is sourced from SA Water and the City of Onkaparinga following treatment to a level appropriate for its use in agricultural irrigation.

The use of the recycled water is approved by SA Health in accordance with the Australian Guidelines for Water Recycling and this approval includes key water quality parameters and other operational guidelines that ensure the recycled water is safe for use. This SA Health approval allows for the bulk storage of the recycled water.

WBWC operates the Whitings Road storage facility, which is located at Blewitt Springs, approximately 48km south of the Adelaide CBD. The site is bound to the east, north and south by rural land, and to the Whitings road.

The Whitings Road storage facility will consist of two, 650ML lined turkey's nest embankments for the storage of water for irrigation use. The storage has negligible catchment, with inflows to the storage from the Christies Beach Wastewater Treatment Plant (WWTP) via a balancing storage located to the north of the site at the Quarry Road pumping station.

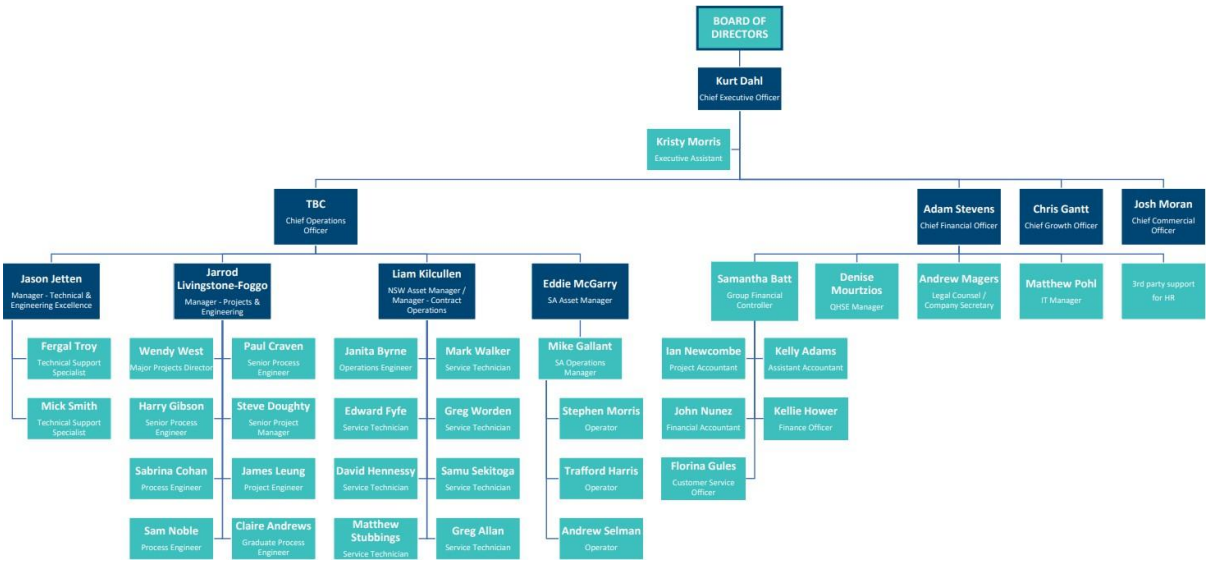
The Blewitt Springs water storage facility includes the following key infrastructure:

- An access road for operational vehicles (entering and exiting the facility from Whitings Road Farm Road)
- 2 x 650ML lined turkey's nest embankment for storage of water for irrigation use
- Inlet / outlet pipework and isolation valve
- Concrete lined storage underdrain sump
- Overflow pipeline
- Distribution pump station housing 5 x 75kW pumps

1.2 Organisational responsibilities

WBWC is wholly owned by coNEXA Infrastructure Partners Pty Ltd ('coNEXA'), a South Australian based owner of water infrastructure. An organisational structure for coNEXA is outlined below. The SA Asset Manager has operational responsibility for the Whitings Road dam within the coNEXA business structure, with support from the Chief Operating Officer at an executive management level. This is consistent with the broader responsibility for the operations of the WBWC business.

Compliance activities are also managed operationally by the SA Asset Manager with support from the Risk and Compliance Officer.



1.3 Quality management

coNEXA and WBWC use the 'Skytrust' document management system to store compliance documentation and records relating to its operations. All documents, policies, procedures and records developed and collected by coNEXA / WBWC in the operation of the SRWRA dam will be kept in Skytrust in-line with our QHSE management system.

coNEXA and WBWC's QHSE management systems is third party certified to the following standards:

- ISO 9001 Quality Management
- ISO 14001 Environmental Management
- ISO45001 Occupational Health and Safety Management

1.4 Scope and objectives

The purpose of this Operations Environmental Management Plan (OEMP) is to provide an overview of potential environmental impacts of the Whitings Road recycled water storage facility during its operational phase, and to describe the management and mitigation measures to protect the environment and sensitive receivers, both on and off the site, and minimise potential adverse impacts on the environment.

The objectives of this OEMP are to provide:

- An overview of the Whitings Road facility operations
- Guidance on compliance with relevant environmental legislation and WBWC / coNEXA policies and procedures in the operation
- Provide a means of implementing appropriate mitigation measures for the key environmental issues

- Provide a working environmental management tool to follow during the operational stage of the Whitings Road facility
- Define roles and responsibilities of the Whitings Road facility operational team
- Provide a guide for interaction with relevant government authorities and other relevant stakeholders, including the community, during the operational stage of the Whitings Road facility
- Provide a basis for monitoring, reporting and maintaining compliance with both coNEXA and regulatory requirements for the Whitings Road facility

The OEMP is a live document. The management strategies and control measures detailed within this, and relevant referenced documents and management plans, will be reviewed and updated, where necessary, to reflect changes introduced by the Whitings Road facility operational team, site specific outcomes, non-conformances and recommendations arising out of inspections, meetings and audits.

1.5 Supporting documents

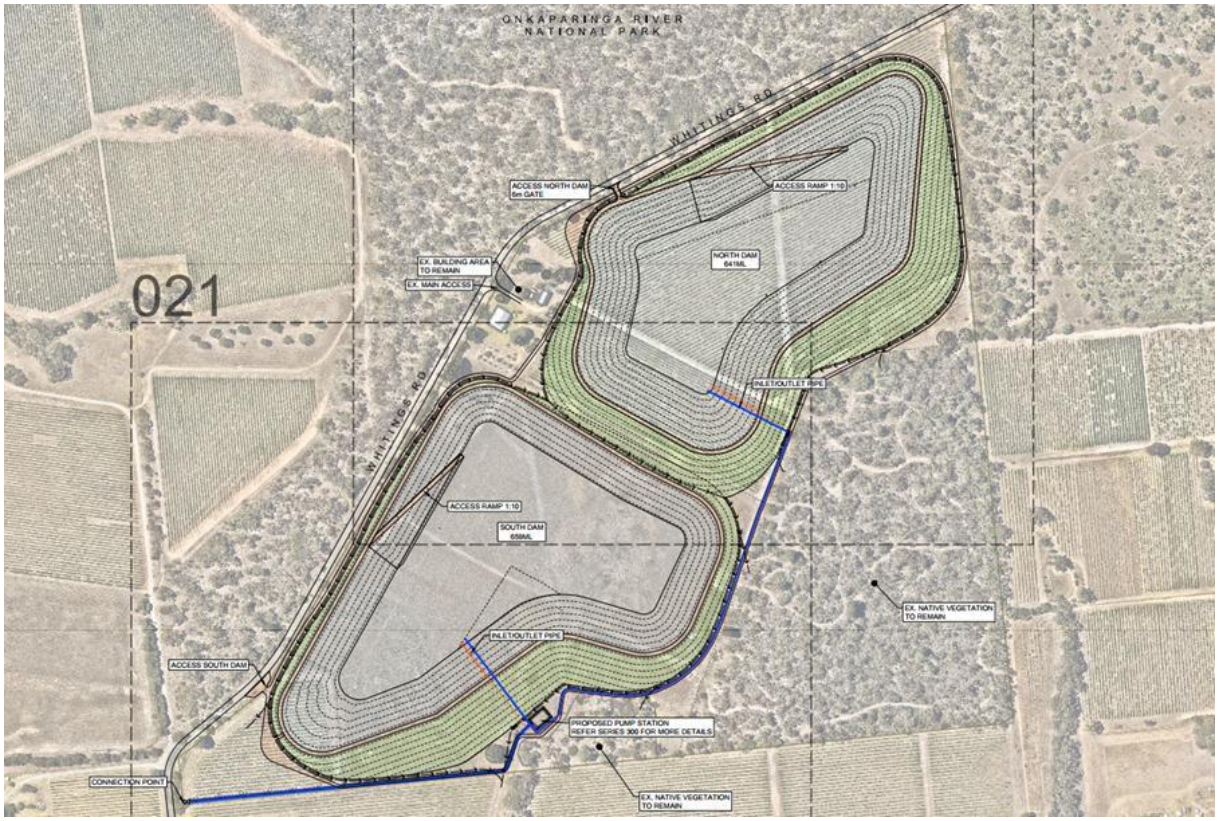
A series of management plans have been developed to support the OEMP. These plans are as follows:

- *WBWC-IMS-DOC-001 WBWC Emergency Response Plan (ERP)*
- Whitings Road Water Storage Stormwater Management Plan
- Landscape Management Plan
- *WBWC-IMS-DOC-XXX Whitings Road Storage Operation Maintenance and Inspection Manual*
- Whitings Road Storages Initial Filling Inspection and Monitoring Plan
- Vipac Odour Assessment Report
- *WBWC-IMS-DOC-008 Midge Fly Management Plan*

2. Facility overview

2.1 Site location

The Whitings Road storage facilities are located in Blewitt Springs, approximately 48km south of the Adelaide CBD.



2.2 Facility description

The storage is 2 x 650ML, HDPE lined turkey's nest embankment dams that are intended for irrigation use in the surrounding vineyards. The storages has no external catchment, with inflows transferred from the Christies Beach WWTP to the Quarry Road dam, before being pumped into the Whitings Road storages. The detailed design of the storages and construction engineering regulation was undertaken by Pinion in accordance with ANCOLD and industry recognised guidelines

The key features of the Whitings Road dam include:

- A homogenous earth fill embankment
- 600mm thick clay liner on the basin floor
- HDPE liner secured in an anchor trench on the embankment crest
- Batter slopes upstream and downstream of 3H:1V
- Crest width of 14m at its highest point on the southern boundary
- 3.1m wide crest access track comprising crushed rock
- Topsoil and grassing of the downstream batter

2.3 Operational overview

The Whiting's Road storages are a WBW network pressure node, intended to store treated water from the Christies Beach WWTP during winter, for use during the peak irrigation season ('summer') in the McLaren Vale region. The water from the Christies Beach WWTP is transferred to the Whitings Road storages by pumps at the Quarry Road dam. Releases from the Whitings Road storages are fed at pressure back to the WBW network, where they are distributed to WBW irrigation customers. Broadly speaking, the reservoir operating sequence is as follows:

- Inflows from the Christies Beach WWTP are transferred to the Quarry Road Dam, before being pumped into the Whitings Rd, storages.
- The rate of filling will vary depending on the availability of water from the treatment plant. In general, it is expected that transfers into the storage will commence in April and continue until the water level reaches the full supply level (FSL) .
- To fill the reservoir, a maximum inflow rate of 16 ML / day will be programmed into a SCADA system, which, subject to water availability, will run continuously until the water level reaches the FSL
- Assuming an average of 10 ML / day can be supplied, the storage will fill over a nominal 65-day period
- The storage is likely to be held at FSL until December, when the peak irrigation season for the surrounding vineyards begins

3. Inspection and monitoring activities

A dam surveillance program provides a means of detecting defects or unusual trends to warn of any potential deteriorating conditions that may threaten the dam. In accordance with the ANCOLD Guidelines on Dam Safety Management (2003), a surveillance program has been prepared based on recommendations by SMEC Engineering for WBWC (refer to SRWRA Operations, Maintenance and Inspection Manual). Reconditions from the SRWRA surveillance program will be deployed at the Whitings Rd storages

- Inspections
- Monitoring
- Collection of other information relating to the dam's performance
- Evaluation and interpretation of the observed data and collected information
- Surveillance reports
- Independent review of the surveillance program

The following outlines the inspection and monitoring activities for the SRWRA dam:

3.1 Inspections

The most important activity in a dam surveillance program is frequent and regular visual inspection of the dam for signs of unusual features, changes in the condition or deterioration of the structure.

Dam safety inspections should be conducted to determine the status of the dam and its features relative to its structural and operational safety. Different levels of inspection are required for different purposes. Four levels of dam safety inspections will be undertaken for the Whitings Road dam, as shown in Table 2.

Inspections should be undertaken by experienced personnel who are familiar with the site and are trained to recognise deficiencies in dams.

Type of inspection	By whom	Purpose
Routine visual	Operator	Undertaken by operations personnel who are familiar with the dam site The inspection involves the identification and reporting of deficiencies by visual observation and measurement of instrumentation
Intermediate	Dam engineer	Undertaken by a dam engineer and includes a visual examination of the dam and a review of the surveillance data, with the intention of identifying areas requiring corrective action
Comprehensive	Dam engineer / specialists as required	Undertaken by a dam engineer and includes thorough onsite inspection and operation of mechanical equipment, evaluation of the long-term surveillance data and an assessment of the performance of the dam with respect to current criteria and practices
Special / emergency	Dam engineer / specialists as required	An as-required inspection for a specific reason or following an unusual event such as a flood, earthquake, rapid draw down or breach The intention is usually to identify the need to take pre-emptive or corrective action

3.2 Inspection frequencies

The ANCOLD (2003) recommended inspection frequencies are dependent on its Consequence Category of the structure, as well as the level of risk, type and size of the dam.

SRWRA Dam is a '**High B'** Consequence Category structure. As such, the recommended inspection frequencies are as shown in the table below:

Inspection type	Frequency
Routine visual Inspection	Tri-weekly
Intermediate inspection	Annual
Comprehensive inspection	On first fill then five-yearly
Special	As required

3.3 Routine visual inspections (tri-weekly)

A routine visual inspection requires a systematic walk over of the embankment and its appurtenant structures. The intention of a routine visual inspection is to look for changes in the dam's condition, or defects including those resulting from vandalism. A 'drive-over' inspection from within a vehicle does not satisfy the requirements of a routine visual inspection.

Routine visual inspections should be undertaken by operations personnel who are familiar with the structure and are trained to recognise deficiencies in dams. This ensures consistency of inspection approach and reporting is achieved.

The general condition of each of the components of the structure should be closely observed, and the nature and magnitude of any changes since the last inspection recorded in a visual inspection report (IMS document *WBWC-IMS-Form-XX Whitings Rd dam tri-weekly visual inspection report*)

A general guide to the key components of a routine visual inspection is provided in the table below.

Item Number	Basic item	Key points / notes	By
1	Record reservoir level	Reading taken from SCADA system	Operator
2	Record rainfall data	Sourced from BoM website	Operator
3	Record seepage flow rates	Look for: • Obstructions and blockages • Record the flow rate • Record the flow turbidity	Operator
4	Inspect the embankment: • Upstream face • Crest • Downstream face • Downstream toe	Look for: • Excessive vegetation • Cracking • Seepage • Slope instability • Depressions or movement • Erosion	Operator

Item Number	Basic item	Key points / notes	By
		• Damage to the HDPE liner • Other maintenance concerns	
5	Inspect the overflow structure: • Intake pit • Pipe entry • Along pipe alignment • At discharge pit	Look for: • Obstructions • Cracks • Spalling • Wet areas and seepage • Erosion • Other maintenance concerns	Operator
6	Inspect the inlet / outlet works: • Concrete structures • Valves • Actuators • Pipework	Look for: • Damage • Deterioration • Cracks • Spalling • Wet areas and seepage • Corrosion • Other maintenance concerns	Operator
7	Inspect access roads	Look for: • Damage • Deterioration of the pavement • Wheel rutting and erosion	Operator

3.4 Annual intermediate inspections

Intermediate dam safety inspections should be undertaken on an annual basis. The intermediate inspections should be undertaken by an experienced dam's engineer, together with operations personnel and the SA Operations Manager (or nominated delegate). The intermediate inspection is similar to a routine visual inspection, however involves experienced dam's personnel, and accordingly a more in-depth assessment of the condition and performance of the dam.

The key items to be covered in an intermediate inspection are provided in the table below. Following the inspection, a detailed report shall be prepared and issued to the SA Operations Manager, outlining the performance and safety of the dam, and recommending any remedial or corrective measures that need to be taken.

Item Number	Basic item	Key points / notes	By
1	Inspect the embankment: • Upstream face • Crest • Downstream face	Look for: • Excessive vegetation • Cracking • Seepage	Dam safety engineer / consultant

Item Number	Basic item	Key points / notes	By
	• Downstream toe	• Instability • Depressions • Erosion • Damage to the HDPE liner	
2	Inspect the overflow structure: • Intake pit • Pipe entry • Along pipe alignment • At discharge pit	Look for: • Obstructions • Cracks • Spalling • Wet areas and seepage • Erosion	Dam safety engineer / consultant
3	Inspect the inlet / outlet works: • Concrete structures • Valves • Actuators • Pipework	Look for: • Damage • Deterioration • Cracks • Spalling • Wet areas and seepage • Corrosion	Dam safety engineer / consultant
4	Inspect instrumentation: • Surface movement points • Seepage monitoring points	Look for: • Obstructions • Damage • Deterioration	Dam safety engineer / consultant
5	Review monitoring data: • Reservoir water level • Rainfall • Surface movements • Seepage	Annual review of dam performance in accordance with ANCOLD (2003)	Dam safety engineer / consultant
6	Revise documentation	Update as required: • Drawings • DSEP • O&M Manual	Dam safety engineer / consultant

3.5 Comprehensive (five-yearly) inspections

Comprehensive dam safety inspections shall be undertaken every five years, in lieu of that year's annual Intermediate Inspection. A comprehensive inspection follows a similar format to an intermediate inspection, however, involves a more thorough inspection and assessment of the dam and appurtenant works, including test operating any mechanical and electrical equipment.

A comprehensive inspection includes the items covered in the routine visual and intermediate inspections (as outlined in the tables above), as well as the additional items listed in the table below.

The inspection team should comprise the SA Operations Manager, operations personnel familiar with the day-to-day operation and maintenance of the dam, and external consultants

with extensive experience in dam engineering, including the fields of dam surveillance and dam design.

Following the inspection, a detailed report shall be prepared and issued to the SA Operations Manager, outlining the performance and safety of the dam, and recommending any remedial or corrective measures that need to be taken.

Item Number	Basic item	Key points / notes	By
1	Surveillance review	Review of the existing inspection and instrumentation monitoring activities	Dam safety engineer / consultant
2	Review of the consequence category	Review of the development in the downstream inundation zone and assess the potential impacts on the consequence category	Dam safety engineer / consultant
3	Review of the hydrology and flood handling capability	Assess the adequacy of the most recent hydrological studies and any impacts on the flood handling capacity	Dam safety engineer / consultant
4	Review of the O&M Manual (WBWC-IMS-DOC-XXX)	Does it meet current operating requirements?	Dam safety engineer / consultant
5	Review of the dam safety emergency plan (WBWC-IMS-DOC-001)	Does it reflect current management, external response arrangements?	Dam safety engineer / consultant
6	Assessed safety of the dam	Adequacy of studies completed to date	Dam safety engineer / consultant

4. Key environmental issues and management

4.1 Air quality

To address potential concerns regarding odour from the treated water storage dam, WBWC engaged Vipac to perform an odour assessment (Refer to Vipac Odour Assessment Report, 2025).

The findings of the field odour surveys conducted at two existing treated water storage dams located at Bakewell Dr and Quarry Rd which are of comparable design, function and operational conditions to the Whitings Rd dams. These existing sites are supplied with tertiary treated water from the Christies Beach WWTP, which is also the proposed source of the new dam at 260 Whitings Rd.

The findings of the in field odour surveys indicate that odours generated by the treated water storage are of a non-offensive nature, of very mild intensity and where generally only perceivable infrequently and intermittently, even in close proximity to the source.

Based on the findings of the odour surveys, Vipac considers that the dam development does not pose a significant odour related risk to the nearest sensitive receptors. The existing separation distances are deemed appropriate given the low odour intensity and potential for infrequent winds from the source towards the receptors.

4.2 Landscape management

The subject land sits within a localised saddle formed by valleys extending south from the Onkaparinga Gorge, with long views to the South Mount Lofty Ranges and the Sellick Hill escarpment beyond. The existing landscape character is defined by the agricultural and viticultural land uses of Blewitt Springs and McLaren Flat, where vineyards, remnant woodlands, and belts of mature trees create a defined character and visual amenity. To the north, the Onkaparinga River National Park forms an enclosed visual edge.

The introduction of native grasses, shrubs along the dam walls and tree planting to the site boundaries, the development will provide a contextual landscape setting to the existing vineyards, remnant vegetation, and properties that exist in the locality. These treatments will not only reduce the visibility of the embankments but also reinforce the natural character of the area by complementing the adjacent National Park and increasing biodiversity.

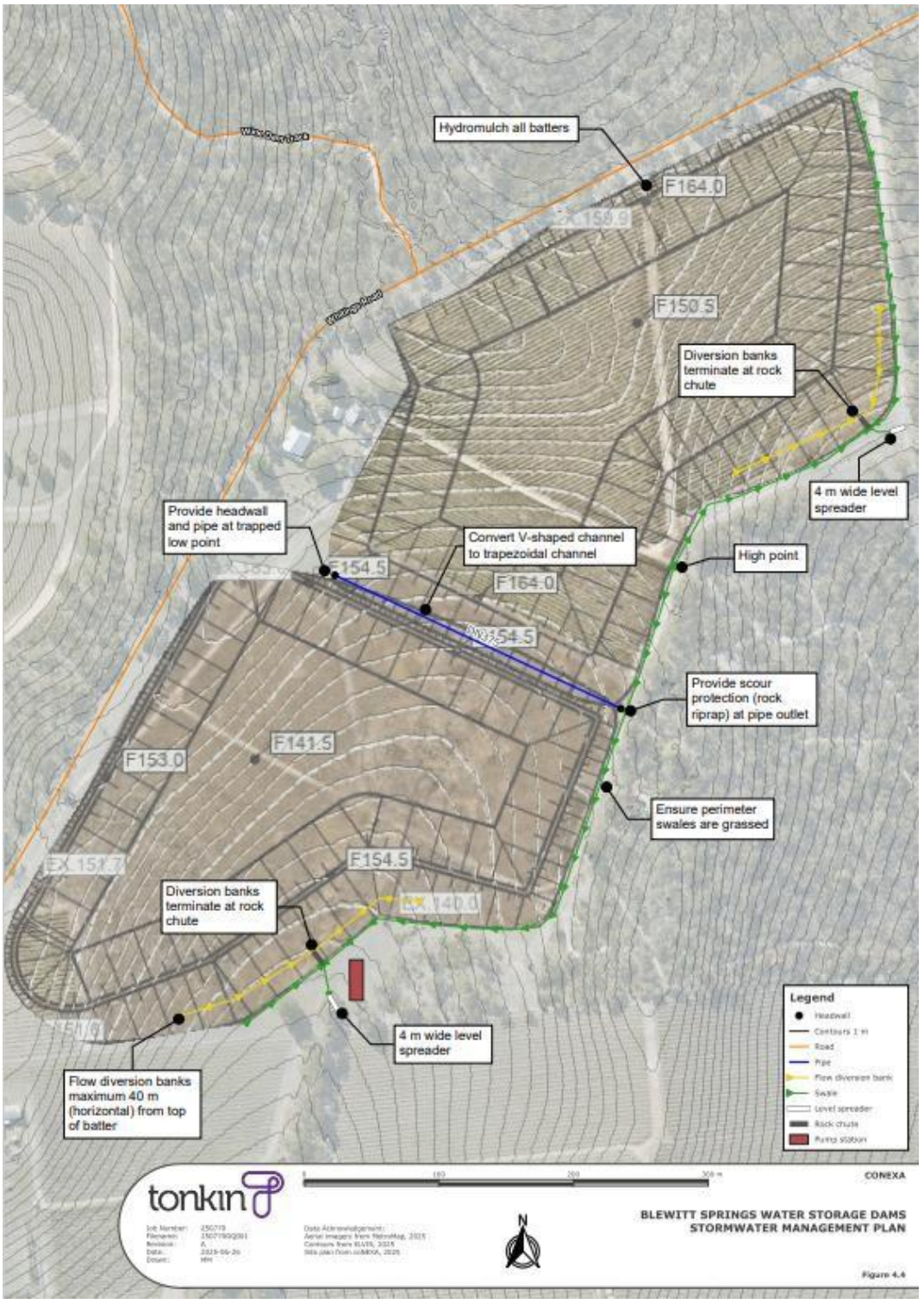
(Refer WAX Designs Visual Impact Assessment of the Proposed Water Storage at Blewitt Springs, 1 September 2025).

LANDSCAPE PLAN

4.3 Erosion and stormwater management

A Stormwater Management Plan was prepared for the development in-line with City of Onkaparinga stormwater management requirements, and consists of the following measures:

(Refer – Blewitt Springs Water Storage Dams Stormwater Management Plan)



5. Recycled water quality

5.1 Source water quality

WBWC provides recycled water to customers in McLaren Vale and the surrounding districts predominantly for the irrigation of vineyards and other horticultural crops. The recycled water is of sewage origin and is sourced from SA Water and the City of Onkaparinga following treatment to a level appropriate for its use in agricultural irrigation.

WBWC has an approval from SA Health (previously Department for Health and Ageing) that specifies the levels of treatment and treatment processes required prior to the water being deemed appropriate for agricultural reuse. The key parameters that determine its suitability for reuse are outlined below:

- E. Coli < 100 per 100mL (annual median)
- BOD < 20mg/L (annual mean)
- SS < 30mg/L (annual mean)

An indicative analysis of the recycled water provided is outlined in the following table, noting that the water quality may vary subject to the quality received from SA Water or the City of Onkaparinga.

Analyte	Units	Value
Biochemical Oxygen Demand	mg/L	0 - 10
Suspended Solids	mg/L	< 30
Chemical Oxygen Demand	mg/L	30.0 - 100.0
pH	pH units	6.5 - 8.5
Total Dissolved Solids	mg/L	600 - 850
Colour - True (456nm)	HU	< 50
E.coli	/100mL	< 100
Alkalinity as Calcium Carbonate	mg/L	100 - 300
Total Hardness as CaCO3	mg/L	< 300
Bicarbonate	mg/L	100 - 300
Chloride	mg/L	200 - 250
Fluoride	mg/L	0.5 - 1.0
Phosphorus - Total	mg/L	2.0 - 10.0
Sulphate	mg/L	50 -100
Ammonia as N	mg/L	0 - 20
TKN as Nitrogen	mg/L	2.0 - 20.0
Nitrate + Nitrite as N	mg/L	5.0 - 20.0
Nitrogen - Total	mg/L	5.0 - 30.0
Calcium	mg/L	35 - 50
Sodium Adsorption Ratio - Calculation		5.0 - 10.0
Aluminium - Total	mg/L	< 0.1
Arsenic - Total	mg/L	< 0.001
Beryllium - Total	mg/L	<0.0005
Boron - Soluble	mg/L	< 0.5
Cadmium - Total	mg/L	<0.0005
Chromium - Total	mg/L	< 0.001
Cobalt - Total	mg/L	< 0.002
Copper - Total	mg/L	< 0.01
Iron - Total	mg/L	< 0.05
Lead - Total	mg/L	< 0.001
Lithium - Total	mg/L	< 0.001
Magnesium	mg/L	15 - 50
Manganese - Total	mg/L	< 0.03
Mercury - Total	mg/L	< 0.0005
Molybdenum - Total	mg/L	< 0.002
Nickel - Total	mg/L	< 0.008
Potassium	mg/L	20.0 - 30.0
Selenium - Total	mg/L	< 0.001
Silver - Total	mg/L	< 0.001
Sodium	mg/L	< 250
Vanadium - Total	mg/L	< 0.005
Zinc - Total	mg/L	< 0.05
Antimony - Total	mg/L	< 0.001
Tin - Total	mg/L	< 0.001
Thallium - Total	mg/L	< 0.0005

Disclaimer - this data represents indicative water quality of the Willunga Basin Water Company supplied water. This does not constitute the actual water quality delivered in any specific period which may vary from this data. This data should not be used for any purpose other than for general guidance on suggested irrigation practices.

Key parameters of interest with regard to the use of this recycled water for agricultural irrigation are:

- Nutrients (total nitrogen, total phosphorous, etc.)
- Salt (total dissolved solids)
- Sodium absorption ratio (SAR)

The recycled water also contains trace levels of metals and other contaminants and the analysis provided is a guide to the quality of the water provided and for determining appropriate long term management strategies for their properties.

5.2 Monitoring and reporting

All routine and non-routine water quality sampling activities will be conducted in accordance with the IMS document CIP-IMS-DOC-QA-004 – Water Quality Sampling Procedure. WBWC engages a NATA-accredited laboratory for all water quality analysis.

Routine water quality monitoring at the Whitings Road storage facility will be undertaken at the pump station discharge, consistent with the monitoring processes applied across other Willunga Basin Water storage and supply facilities.

WBWC already operates a number of similar recycled water storage facilities in the McLaren Vale region, and based on these other sites, does not anticipate material changes in water quality as a result of the storag5e. The most likely water quality issue may be the presence of algal growth in the Blewitt Springs storage facility which will be monitored as part of the tri-weekly inspections undertaken by operational staff.

If there is an observed present of algal blooms, WBWC may elect to undertake ad-hoc water quality samples to identify the dominant algal species. Algal blooms can be treated with the use of copper based algicides and WBWC have historically applied ‘Control’ as an algicide in their other storage facilities.

5.3 Short-term evaluation of results

These results are reported back to WBWC and incorporated into the water quality database. These results are then reviewed by the SA Operations Manager and the SA Asset Manager (if required).

If any anomalies are detected during this review appropriate action is taken to rectify the failure (if possible), carry out further enquiries with the recycled water suppliers or resample the distribution system to determine if the problem persists.

Where a failure has occurred with relation to limits imposed by a regulatory body, the SA Asset Manager is to report the failure to SA Health, the EPA and the OTR as required under the agencies’ notification protocols.

5.4 Corrective responses

Where the short-term evaluation of results (or customer feedback) indicates that there may be an issue with the recycled water quality, the SA Operations Manager shall instigate an investigation. This investigation shall be in the form of a root cause analysis which seeks to arrive at a conclusion about the origin of the failure and put in place actions to ensure this cannot happen again. All the root cause analyses outcomes shall be communicated with all relevant staff and shall be retained on Skytrust and / or SharePoint so that all staff can view them as necessary.

Communications during an event are to be carried out in accordance with IMS document *WBWC-IMS-DOC-001 WBWC Emergency Response Plan (ERP)* and the notification protocols established by SA Health.

5.5 Communication

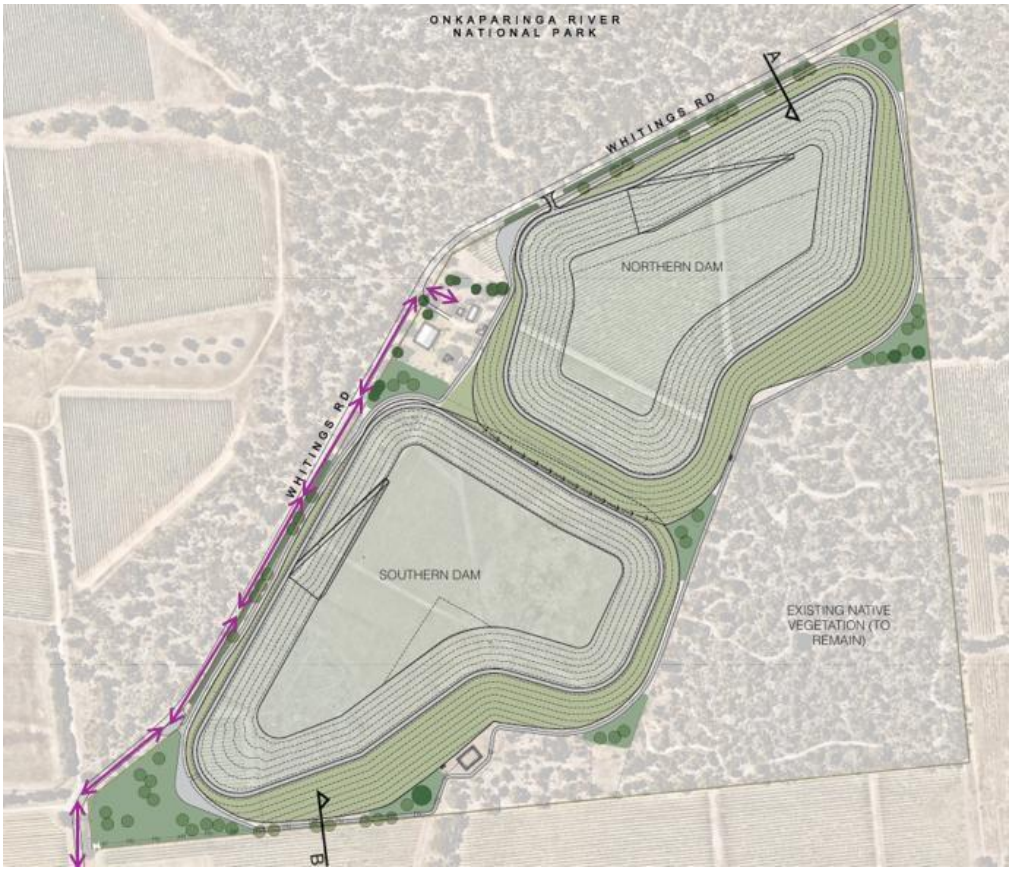
Communication with relevant agencies is carried out in accordance with the incident notification protocols controlled by SA Health. This protocol defines all the key agencies and stakeholders and their contact details. Internal communication contact details are on the corporate contact lists available to all staff.

The public and communication procedures relating to the recycled water system operated by WBWC are governed by the corporate coNEXA procedures which define who can undertake communications with the media. All staff will be appropriately trained in the interactions they are likely to have as part of their role with regards to communication with the public. Further information is contained in IMS document *WBWC-IMS-DOC-001 WBWC Emergency Response Plan (ERP)*.

6. Site safety management

6.1 Traffic and access management

During general operations, it is anticipated that a single utility vehicle would visit the Whitings Rd dam site tri-weekly for dam inspection and maintenance purposes. Vehicle traffic will enter from the south via Whitings Rd turning right onto the site and exit the site turning left back onto on to Whitings Rd outlined in the diagram below:



6.2 Public safety

Unauthorised access to the Whitings Road site is strictly prohibited. This perimeter of the dam site is surrounded by a two-metre high chain mesh fence with three rungs of barb wire atop, to prevent unauthorised access.

Access to the Whitings Road site will only be granted after completion of the WBWC induction or under the accompaniment of a coNEXA staff member.

6.3 Operational safety

coNEXA / WBWC uses a range of protocols, site-specific operational procedures, generic operational procedures, and administrative procedures to manage WHS obligations. coNEXA / WBWC are third party certified to ISO 45001 Occupational Health and Safety Management. The safety management system utilises the following document types:

Safe operating procedures

Safe operating procedures (SOPs) are developed by risk analysis of each task in the procedure and prescribe the safe methods for routine work. Other procedures in place to ensure work safety during non-standard or non-routine activities, and when multiple activities occur include the following:

Job safety and environmental analysis

Job safety and environmental analysis (JSEA) processes are used to identify, assess and mitigate risks and hazards at a workgroup level, on a daily operational task basis. It is a simple, effective tool for planning and communicating job hazards and risks to individual work groups and involves all employees in applying their skills and knowledge to plan how the job should be undertaken safely and effectively. It is completed jointly by all the people involved in the task, documented and then approved and signed off by all participants before the task is undertaken, with the objective of enabling all tasks to be completed with minimal risk. Workers are trained in the JSEA process: what it is, when it is required, and the process for carrying out the JSEA.

High risk work procedures

coNEXA has a number of policies and procedures that deal specifically with work defined as high-risk work under SafeWork SA legislation including:

- Confined space entry
- Hazardous manual tasks
- Personal protective equipment use
- Preventing risk of falls
- Energy isolation
- Fitness for work
- Electrical safety
- Working in extreme conditions, including managing heat stress
- Safe handling of hazardous chemicals
- Remote or isolated work
- Managing noise in the workplace
- Safe driving policy

Maintenance, inspection, testing and modification

All assets used either directly or indirectly for maintaining water quality, plant performance and integrity are maintained in accordance with the manufacturer's recommended maintenance schedule. The relevant asset operations manual describes the routine inspection, testing and maintenance required for all equipment including instrumentation. Documents are maintained by the SA Operations Manager on the coNEXA SharePoint folder.

Routine maintenance tasks are undertaken monthly to ensure suitable ongoing operation of the assets and a long-term assessment of asset condition and performance allows for non-routine maintenance and replacement of assets.

Routine and non-routine expenditure is approved annually based on asset risk and the condition of assets is reviewed periodically to identify underlying issues that require longer term planning for asset renewal.

7. Midge fly management

To prevent occurrences of nuisance midge fly populations emerging from the Whitings Rd storages a multi barrier management approach has been implemented in accordance with IMS document *WBWC- IMS-DOC-008 Midge Fly Management Plan*. A multi barrier approach adopted consists of primary, secondary, tertiary and contingency barriers to manage midge fly populations. Whilst targeted toward non-biting midge flies the plan can also be used in response to nuisance mosquito events and the enhanced monitoring program will assist in identifying other potential nuisance insects.

7.1 Primary barrier

Application of Bti larvicide using a boat to enable even dosing of Bti across the surface of the water body with the Bti mixed into the water body using the propellor of the boat. This method of dosing is based on dosing of a similar sized recycled water storage for algae control in a regional supply scheme in NSW and is the method employed by SA Water for dosing of water supply reservoirs with copper sulphate again for algae control. Bti larvicide will be applied fortnightly at an application rate of 1.8 kg / ha with dosing frequency and dose rate modified as required in response to enhanced midge monitoring results.

7.2 Secondary barrier

Secondary barriers have been implemented to minimise the risk of midge fly migration towards the residential properties on the Whitings Road dam's southwestern boundary. Implementation of secondary barriers provide increased response time should a failure of the primary barrier be experienced. The secondary barrier consists of a enhanced vegetation barrier using species consistent with the species detailed in the current approved Landscape Management Plan.

7.3 Tertiary barrier

Upon detection of increased midge populations operations staff will implement reactive measures to reduce nuisance midge populations as a tertiary barrier. Tertiary options are designed to provide a reactive mechanism that can be initiated to enhance the effectiveness of primary and secondary controls should the enhanced monitoring program detect midge population above alert levels.

Tertiary barriers to be implemented to enhance the effectiveness of primary and secondary barriers are:

- Reactive insecticide spraying
- Installation of white lights

7.4 Contingency plan

In the unlikely event that nuisance midge populations occur and continue to persist after the implantation of multi barrier controls, a contingency plan will be implemented.

The ERP considers two primary options to reduce the risk of an ongoing midge outbreak:

- Prioritisation approach to rapidly drain down water levels within the Whiting Road storages
- Dosing an alternative chemical insecticide, Methoprene

7.5 Emergency Management Inspection frequencies

Inspection type	Frequency
Visual Inspection and emergency monitoring	Weekly
Dusk / dawn dam inspection	Fortnightly
Visual inspection of housing development streets	Monthly

Frequency of inspections will be adjusted in response to midge fly emergence events as per the Midge Management Plan Process Map outlined in IMS document *WBWC-IMS-DOC-008 Midge Fly Management Plan*.

8. Complaints management

All staff must ensure that all customer complaints or enquiries (either by phone, email, mail or in person) are handled in an efficient and courteous manner in accordance with IMS document *WBWC-IMS-DOC-002 Customer Service Process*. A response must be provided back to the customer within 48 hours of receiving the complaint, even if that response is that further investigation is required.

WBWC reports all customer complaints to the Senior Management Team of coNEXA on a monthly basis, with customer complaints also reported by the Senior Management Team to the Board of coNEXA on a bi-annual basis.

9. Reporting and compliance management

WBWC implements a series of reporting and compliance management regimes to ensure their operations meet the necessary legislative, contractual, regulatory, WHS and internal performance requirements. These include the following:

- Operational monitoring – routine monitoring including site inspections, water quality sampling and other routine monitoring undertaken by operational staff enabling non-compliance to be identified and escalated
- SCADA monitoring – use of a computerised control system to monitor WBWC's operations including monitoring the Blewitt Springs storage for aspects such as water level, filling rate, discharge rate, etc. with alarms sent to an on-call operator on a 24/7 basis
- Toolbox meetings – regular (weekly) operational meetings to discuss operational matters and enable performance and compliance issues to be discussed
- Incident reports and investigations – undertaken in response to specific incidents to ensure appropriate review and implement mitigation measures to prevent a recurrence of the event
- Monthly reporting – monthly reporting from the WBWC business to the coNEXA Senior Management Team including reporting on compliance issues, business risks and customer complaints

- Board reporting – bi-monthly reporting from the coNEXA Senior Management Team to the coNEXA Board including reporting on compliance issues, business risks and customer complaints
- Quarterly management reviews – quarterly detailed business reviews of the WBWC business to review WHS performance and incidents, operational performance including water quality, supply interruptions and other operational issues, financial performance, customer feedback and customer service issues, resources and training requirements, and active and new risk issues.

10. Incident and emergency response

Responsibility for emergency preparedness and response within WBWC rests with the Chief Operations Officer. The IMS documents *CIP-IMS-DOC-009 coNEXA Corporate Emergency Response and Management Plan* and *WBWC-IMS-DOC-001 WBWC Emergency Response Plan (ERP)* provide details of the organisational responsibilities adopted during emergency situations. The plans are communicated to all relevant employees within the organisation, from senior management through to operators and maintenance workers. The plans undergo regular review to maintain relevance.

WBWC has developed an ERP for the Whitings Road storage facility to provide specific response actions for a range of emergency scenarios. The ERP is reviewed annually and outlines actions to be taken by plant operators and managers in response to a range of potential emergencies and incidents that may occur at the Whitings Road storage facility, including but not limited to:

- Fire
- Medical emergency
- Hazardous substance spill
- Loss of supply / power supply failure – major pump station
- Loss of SCADA communications
- Overflow, leakage or failure of dams and storages
- Major leakage of failure of the Quarry Road / SRWRA interface dam inlet / outlet pipe or interface manifold

11. OEMP monitoring and review

coNEXA is committed to monitor and audit its operations commensurate with licence conditions and all other relevant contractual and regulatory obligations. Performance is reported monthly at SMT meetings and bi-monthly at management review meetings to ensure ongoing assessment of business performance and to identify issues requiring further investigation.

Reporting and review processes includes monitoring of the following parameters to ensure all aspects of business operations are addressed on a routine basis:

- Water quality
- Water infrastructure reliability
- Adherence to legal and contractual obligations
- Adherence to internal policies and procedures
- Customer satisfaction
- Safety and environmental risk
- Resources

An annual audit of the OEMP will be undertaken, reviewed and approved by the SA Asset Manager on an annual basis and is structured to focus on high-risk activities, area for improvement and to ensure continual assessment of business-as-usual activities.

12. Communication directory

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APPENDIX 6

Midge Fly Management Plan (Example)

Willunga Basin Water Co Pty Ltd

ABN 49 081 133 619

WBWC-IMS-DOC-008
Midge Fly Management Plan

Version Number	Version Date	Approved By	Status	Next Revision Date
1.0	29 June 2021	Chief Operating Officer	Superseded	29 June 2024
2.0	23 February 2023	SA Asset Manager	Released	23 February 2026

Document Owner: SA Asset Manager

Document Reviewer: SA Operations Manager

Document Approver: SA Asset Manager

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1. Ongoing midge management plan

This plan has been developed to control the reoccurrence of nuisance populations of non-biting midges associated with the Southern Region Waste Resource Authority (SRWRA) dam in McLaren Vale.

1.1 Background

This management plan was developed in response to the emergence of nuisance populations of midges in the Seaford Heights residential development. The midges were found to be associated with the SRWRA recycled water storage dam

1.2 Midge management plan

WBWC are committed to enacting a midge management plan reduce the risk of a reoccurrence of nuisance midge populations in the future. The midge management plan will incorporate a multi-barrier approach that is designed to result in a significant reduction in risk of future outbreaks.

WBWC have developed a midge management process map response plan. This will ensure that actions taken to reduce midge emergence from the SRWRA dam are proactive, justified and effective to reduce the risk of impact to the community (refer Appendix 1).

1.2.1 Options assessment

The management plan has been informed by an extensive literature review of various management strategies that are utilised around the world. The options assessment was further supported by an investigation of effective midge management strategies from local case studies in South Australia. The two local case studies reviewed were Kapunda Waste Water Treatment Plant (WWTP) and Bolivar WWTP.

The options assessment resulted in the development of a detailed long list of potentially feasible options for consideration at the SRWRA dam site. The options were shortlisted by assessing each strategy against a strict list of criteria that considered:

- Efficacy
- Reputability
- Financial risk
- Practicality
- Safety
- Aesthetics
- Risk of persisting issues
- Risk for the consumer
- Additional benefits

The options assessment identified that there was no single option that would on its own effectively mitigate the risk associated with midge fly emergence in the future. Therefore, the implementation of a three tiered multi-barrier approach has been recommended.

The options short listing process identified the options that were suitable for primary, secondary and tertiary barriers within the multi-barrier approach (figure 1). The consideration of a contingency plan was also detailed to provide an alternative strategy to control midge populations in the event that nuisance populations persisted.

A primary barrier has been considered an effective solitary barrier to reduce the occurrence of nuisance midge populations. The primary barriers selected interface directly with the SRWRA dam. The secondary barrier provides an additional physical barrier that is external to the dam interface. The secondary barrier acts as a buffer to minimise the migration of nuisance midge populations in the event of their future occurrence. A tertiary barrier is either designed to enhance a primary or secondary barrier or provides a reactive mechanism that can be utilised upon identification of a nuisance midge outbreak. A contingency has also been identified as a failsafe action plan in extraordinary circumstances when the multi barrier approach does not remedy identified nuisance midge populations.

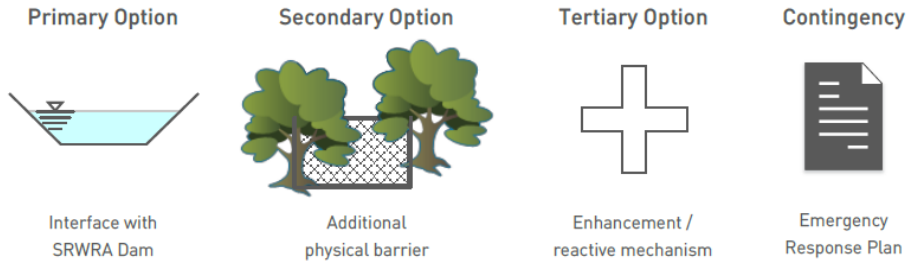

Figure 1: multi-barrier approach

1.2.2 Primary barrier

Bti Dosing

The options assessment identified that dosing the SRWRA dam with Bacillus thuringiensis israelensis (Bti) larvacide will be an effective primary strategy to significantly minimise the emergence of adult midge flies from the dam surface. Additionally, this strategy has a short lead time and can therefore be implemented immediately for the 2021/22 viticulture season.

It is common practice to utilise Bti larvacide to reduce the prevalence of mosquitos and midges worldwide. Further, Bti larvacide has been utilised locally at Bolivar WWTP to control nuisance midge populations that inhabit the WWTP lagoons. Bti is a naturally occurring soil bacterium that has been proven to reduce the number of midges in both laboratory and field experiments across various climates[1]. Additionally, Bti was successfully utilised by WBWC to effectively reduce midge populations that were emerging from the remnant pools of water after the initial outbreak identified in early 2021.

For effective and consistent reduction of midge populations at the SRWRA dam, application of Bti at a rate of 1.8kg/ha will be dosed. This dose rate is higher than the recommended dose rate indicated by the supplier (0.6kg/ha). The recommended dose rate will result in significant reductions in midge populations, however, recent literature indicates that substantially higher mortality rates can be achieved by application of Bti at 1.8kg/ha[2]. The provisional frequency of Bti dosing will be once per fortnight. The frequency of Bti dosing will be dependent on the results of the monitoring program. Bti has been found to show large reductions in midge fly populations over extended periods of time[3].

WBWC will utilise a boat to enable even dosing of Bti across the surface of the water body. Bti will be effectively mixed into the water body using the motion of the boat's propeller. This adopted method is based on the dosing of a similar sized recycle water storage for algae control in a regional supply scheme in New South Wales. Additionally, this method is also effectively utilised by water utilities for dosing water supply reservoirs with copper sulphate for algal control.

[1] *Ali, 1991, Ali et al, 2009, Bruhl et al, 2020 and Vaughan et al, 2008*
[2] *Allgeier et al, 2019*
[3] *Bruhl et al, 2020*

1.2.3 Secondary barrier

The secondary barrier to be implemented at the SRWRA dam site is a combination of increased vegetation buffer and the installation of a three metre high shade cloth fence barrier.

The use of a secondary barrier helps to minimise the risk of midge fly migration towards the residential area whilst providing an increased response time in the instance that the primary option fails to control nuisance midge populations. The installation of a shade cloth fence can provide this physical barrier instantly. The shade cloth fence will be transitioned to a vegetation barrier once it has become sufficiently established. The use of a vegetated barrier has been shown to be effective in reducing drift of midge flies[4]. The speciation of flora and the density of the vegetation barrier has been designed to provide an effective barrier at various heights.

Shade cloth fence

The installation of a shade cloth covered fence will provide an instantaneous partial barrier to minimise the risk of nuisance population of midges reaching the residential development. The conceptual design of the fence is to include a 255m long section that creates a barrier between the residential development and the dam. The fence design will also contain smaller sections that will run from the fence barrier towards the dam to assist keeping the midges trapped within the fenced off area and minimise the number of midge flies dispersed by strong prevailing winds (figure 2).

Figure 2: the fence (pink) will enclose and surround the western perimeter of the dam closest to the housing development; vegetation (green) will be planted on the inside of the fence

Increased vegetation

The development of an increased vegetation barrier further complements the installation of a shade cloth fence and provides an additional buffering layer. For improved efficacy of this barrier it is important that the barrier is dense, staggered and covers a range of shrubs, medium plantings and tall plantings. Further, the vegetation barrier will improve the aesthetics of the western side of the dam and ultimately replace the shade cloth fence at full development. The increased vegetation buffer will also provide an additional habitat for the

[4] *Frouz, 1997*

midge flies to be attracted to in an attempt to restrict the number of midge flies seeking out vegetation further away (ie gardens, streetscapes and nearby parks). Attraction of midge flies to the vegetation buffer will provide a concentrated area for insecticide spray application during the implementation of a reactive tertiary mechanism (section 1.2.4).

The vegetation selected for the development of a physical barrier is consistent with the species in the current approved landscape management plan.

1.2.4 Tertiary barrier

Upon the detection of increased populations of midges associated with the SRWRA dam, WBWC will implement a reactive and enhancement strategy to reduce nuisance midge populations associated with the SRWRA dam as a tertiary barrier.

Tertiary options are designed to enhance the effectiveness of the primary or secondary options, or provide a reactive mechanism that can be enabled during the detection of midge flies above alert levels.

The application of tertiary strategies are not effective barriers in their own right. However, these options provide a reactive mechanism to reduce midge populations or an enhancement mechanism to reduce the risk to help deal with a detected outbreak.

The tertiary barriers identified to improve the effectiveness of the multi-barrier strategy are:

- Reactive insecticide spraying
- Installation of white lights

Reactive mechanism

Reactive insecticide spraying will improve the effectiveness of the secondary barriers.

Application of pyrethrin (or similar insecticide) on the surface of the shade cloth fence and / or the vegetation buffer will help to eliminate adult midges contained by these buffers. This tertiary barrier will help to short circuit the life cycle of the adult midges that have emerged from the dam.

Enhancement strategy

The installation and use of white lights will help attract adult midge flies towards the source of the fluorescent white light.

Specifically, research indicates that the fluorescent white lights are more likely to attract females carrying eggs. This phenomenon is likely attributed to the natural reflection of moonlight from water bodies which acts as a cue to help female flies seeks out a water surface to lay their eggs on[5].

The attraction of adult midge flies to a specific location (ie shade cloth fence and vegetation buffer) will provide a concentrated area to treat with insecticide. This will enhance the effectiveness if the secondary barriers and improve the mortality rate of insecticide application as a reactive mechanism.

[5] *Goretti, E et al, 2011*

1.3 Evaluation of efficacy

The midge management plan will be supported by the midge monitoring program that will provide a greater understanding of the effectiveness of the management plan (section 2). The monitoring program will allow for WBWC to quickly respond to any outbreaks of midges associated with the SRWRA dam and inform WBWC of any changes necessary to improve the effectiveness of the management plan. The midge management plan contains a contingency plan to implement in the event the midge management plan does not sufficiently to contain an outbreak.

2. Midge monitoring program

The development and execution of a midge monitoring program provides an essential tool to ensure the risk of nuisance midge populations emerging from the SRWRA dam are minimised.

2.1 Monitoring program

The development of a midge monitoring program will help to identify the emergence of midge populations above baseline levels to enable a proactive response before causing community nuisance. Routine monitoring will enable WBWC to actively track emergence rates and make rapid and informed decisions regarding the necessary response actions to be taken.

Routine monitoring will be conducted around the dam with a focus on the western perimeter near the residential development. Positive and proactive engagement with community representatives will assist to help alert WBWC of sightings of any nuisance midge populations through a collaborative approach. This will provide a failsafe method to ensure that staff are aware of any nuisance populations that may occur between monitoring dates or that have gone undetected.

2.1.1 Frequency

The frequency of the midge monitoring will occur on a weekly basis to help develop baseline measures and provide a brief window of time to react to a detection of increased midge flies. The frequency of the monitoring program will be adaptive based on the observed emergence of midge populations. This adaptive strategy allows for an increase in midge monitoring during an identified emergence event, and a relaxing of monitoring once such an event is considered under control. It is recommended that during the warmer months (Nov – Mar), routine monitoring will occur at least once per week. If monitoring indicates a stabilisation below baseline measures, then monitoring can be reduced to once per fortnight. The frequency of the monitoring program will be informed by the development of baseline measurements.

2.1.2 Baseline measurements

The initial monitoring is critical to identify a baseline measure of midge populations specific to the SRWRA dam site.

A strong baseline measurement of midge populations in the area will provide a better indication of population dynamics, seasonal fluctuations, identification of nuisance midge population triggers and feedback on the efficacy of the implemented midge management strategies.

During a midge emergence event, measurements of midge populations need to be referenced back to the baseline measures to provide context to the observed measures. This will help to justify internal decisions to increase or decrease the necessary response levels (section 4). refer IMS document *WBWC-IMS-Form-012 SRWRA midge inspection dosing checklist*.

2.1.3 Methodology

The midge management plan aims to eliminate the occurrence of nuisance midge populations associated with the SRWRA dam. The nuisance midge swarms have impacted the local residents of the Seaford Heights residential development. The monitoring program is designed to primarily identify the emergence of midges from the SRWRA dam. This will coincide with a visual inspection around the perimeter of the dam.

The midge monitoring requirements will be incorporated into the weekly site inspection checklist which will be a key management reporting tool.

Emergence monitoring

Emergence monitoring will identify the extent of emerging adult midge flies from a known surface area of the SRWRA dam.

Emergence monitoring will be conducted by using a float such as a rubber tube / lifebuoy similar to those employed by SA Water at Bolivar (figure 3). The top of the float is covered with a sticky substrate to ensure that the entire internal area is enclosed. The float will naturally provide a sealed environment when placed in the water. Any adult midges that emerge from within the covered area of the floatation device will adhere to the sticky substrate that covers any escape to allow for easy enumeration. After emerging midges have been assessed, the float should be lined with a new adhesive substrate so that consecutive measurements are not cumulative.

Figure 3: emergence monitoring buoy

This simple device provides a known area of cover over the dam surface and can be extrapolated to provide an indicative estimation of adult midge numbers emerging from the SRWRA dam.

WBWC will install numerous devices on the surface of the SRWRA dam. The devices will be anchored to each corner of the dam to help identify hotspot areas and provide sufficient emergence monitoring coverage of the site.

Visual inspection

A visual inspection at the site will also be conducted. This inspection will include a perimeter check of the site to investigate sightings of flying adult midges, as well as inspection of foliage around the dam where midge flies are likely to be attracted to.

2.1.4 Feedback loop

Regular monitoring of midge populations will provide instantaneous feedback on the efficacy of the implemented midge management strategy. Further, a long term data trend will provide insight into the likely triggers for increased midge populations in the area that can be

attributed to climate, seasonality, water quality, etc. Comparing the population trend of nuisance midge populations to community feedback will also help to provide feedback on the efficacy of the treatment strategies and provide clearer definitions around alert levels identified during monitoring. The midge monitoring program feedback loop will allow for responsive strategies to be more accurately tailored to provide an appropriate response. The feedback loop will inform the review of the midge management plan.

3. Contingency

The midge management plan has been developed to include an emergency response plan that can be enacted in the unlikely event that a midge outbreak associated with the SRWRA dam persists after the implementation of the multi-barrier approach detailed in section 1.

3.1 Response

In the event that nuisance midge populations occur and continue to persist after the implementation of the multi-barrier approach, then, an emergency response plan will be implemented.

The emergency response plan considers two primary options to reduce the risk of an ongoing midge outbreak. The plan considers:

- A prioritisation approach to rapidly drain down the water resources within the SRWRA dam
- The dosing of an alternative chemical insecticide, methoprene

3.1.1 Prioritisation drainage

The SRWRA dam can be drained through alterations in the operation of the WBWC irrigation scheme. The ability to drain the dam will depend on the timing of an identified midge outbreak and the impact that drainage of the dam could have on the irrigation season for WBWC customers. If the prioritised drainage of the SRWRA dam's water resources is not attainable then the emergency response plan will consider the application of methoprene.

3.1.2 Methoprene

The emergency response plan considers the application of a chemical insect growth regulator, methoprene. The application of methoprene will significantly reduce the emerging population of adult midges from the SRWRA dam by impacting the ability for the organism to progress from juvenile to adult throughout their life cycle. This strategy is only to be implemented in the event of a persisting outbreak that is not effectively controlled via the proposed multi-barrier approach. The application of methoprene will complement the multi-barrier options and significantly reduce the emerging populations. Research has indicated that the application of methoprene can effectively reduce nuisance midge population emergence by >90 % at application rates of <0.3 mg/ha of active ingredient.

Methoprene is cited to be highly effective, however, its use was excluded from consideration as a primary option as it will negatively impact the certification of organic growers in McLaren Vale. Upon utilisation in the proposed emergency response plan, the SRWRA dam can be disconnected from the network to ensure that methoprene does not impact organic growers in the region.

3.2 Emergency response plan

WBWC have developed an internal emergency response plan (IMS document *WBWC-IMS-DOC-001 WBWC Emergency Response Plan*) that will assist the Board and the senior management team (SMT) to enact a suitable and effective response to control the situation.

3.3 Management process map

A midge management process map (Appendix 1) has been developed to inform operators:

- Of business as usual protocols
- How to effectively respond to an incident
- Frequency of Bti dosing
- Frequency of monitoring
- Trigger point to implement tertiary barriers
- When to escalate the response level
- When to de-escalate a response level
- What external engagement is necessary

The midge management process map provides a clear and concise decision making guide to inform operators on the appropriate response required to a midge emergence incident.

3.3.1 Business as usual

WBWC will actively dose the dam with Bti at a rate of 1.8kg/ha once every fortnight to manage insect populations throughout the irrigation season. This will coincide with a weekly monitoring program to be included into routine site safety checks. Further, monthly visual inspections of the housing development will also be conducted.

3.3.2 Response level 1

Response Level 1 will be enacted in the instance an increase in midge fly populations above baseline values has been detected by the monitoring program. The frequency of Bti dosing at the SRWRA dam will be increased to weekly. Additionally, the application of an insecticide on the secondary barriers will be utilised. The routine monitoring will be increased to twice weekly to enable faster detection in changes in midge fly populations. Additionally, routine visual inspections around the housing development will increase to fortnightly.

3.3.3 Response level 2

In the instance a further increase in midge fly populations is detected; or there have been numerous community complaints regarding the presence of midge flies originating from the SRWRA dam then, response level 2 will be implemented. Here, the frequency of Bti dosing increases to bi-weekly. At response level 2 WBWC will also enable the tertiary enhancement barrier, which is to attract the adult midge flies towards the secondary barrier using bright fluorescent white lights. This will allow for a concentrated area to be sprayed with an insecticide to short circuit the midge fly life cycle. During response level 2, WBWC will increase the frequency of dam monitoring to daily, and visual inspections around the housing development to weekly.

3.3.4 Response level 3

A further increase in midge fly populations will result in the implementation of response level 3, the ERP. The ERP will consider the prioritisation of water resources from the dam to rapidly draw down the water resources. This response will remove the habitable environment to stop the midge fly life cycle. Alternatively, the ERP will also consider the application of an alternative insecticide, methoprene.

During response level 3, WBWC will continue to monitor the SRWRA dam site daily and increase visual inspections around the housing development to twice weekly.

4. References

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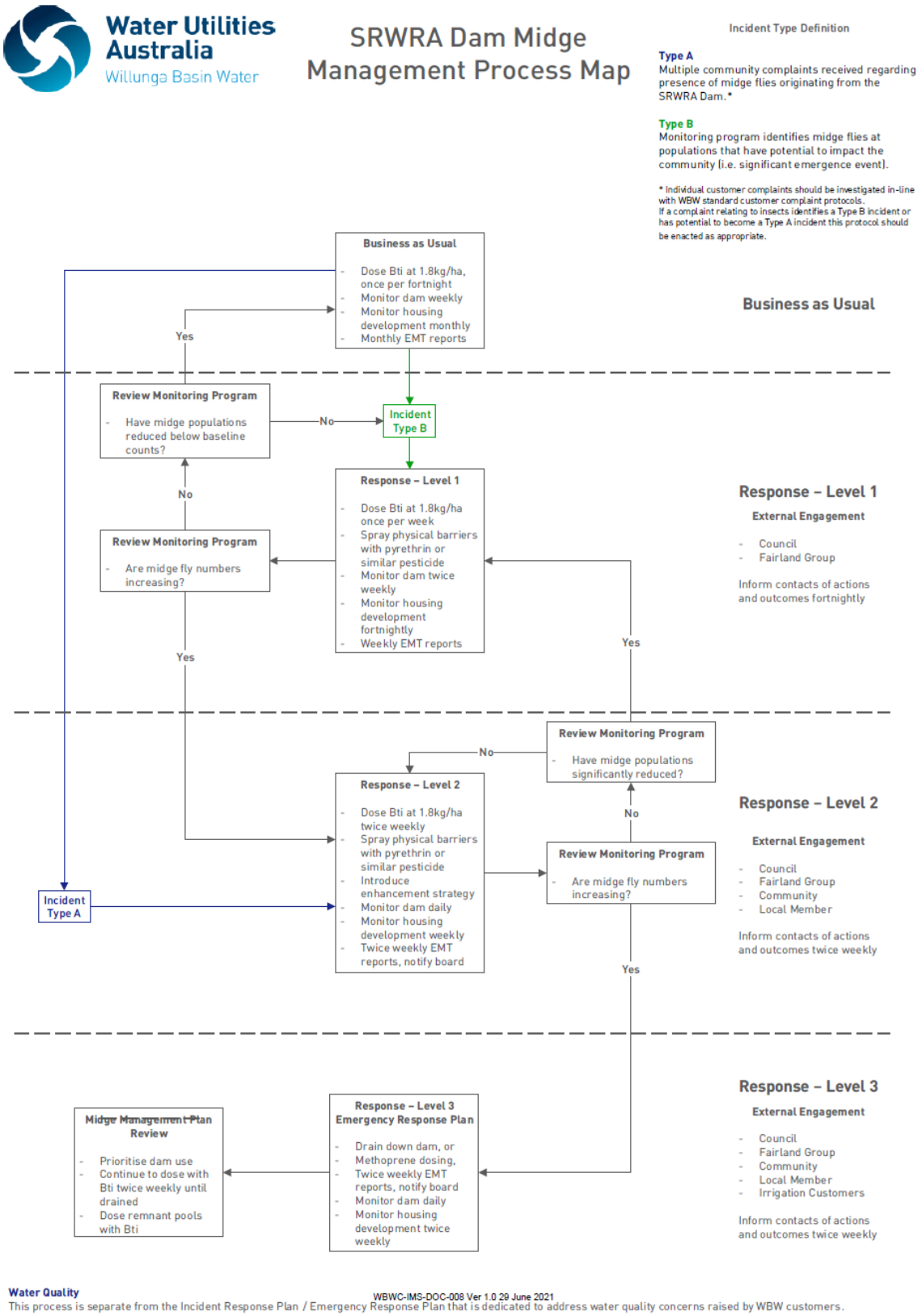
Appendix 1: Midge management process map



APPENDIX 7

Visual Impact Assessment & Landscape Design

25BSP (Blewitt Springs Dam)

Visual Impact Assessment of the Proposed Water Storage at Blewitt Springs

Prepared for coNEXA

By Warwick Digby Charles Keates

1 September 2025

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1 Introduction and Background

1.1 Relevant Experience of Warwick Keates

1.1.1 Warwick is a director of WAX Design with over 25 years' experience in Landscape Architecture practising in South Australia, Australia, the Middle East and the United Kingdom. During this period of time, he has prepared numerous visual impact and landscape assessments, and strategic plans for Planning Appeals, Expert Witness Statements and Environmental Impact Assessments.

1.1.2 Warwick has prepared visual assessments for a variety of developments, including major road corridors, telecommunication towers, residential developments, significant trees, wind farms and numerous mine expansions. During the course of his employment, he has appeared as an expert witness before the Environment, Resources and Development Court and Development Assessment Commission on numerous occasions. Warwick has also made presentations at Parliamentary Hearings, both in Australia and the United Kingdom and presented a number of papers on visual impact assessment.

1.2 Qualifications

1.2.1 Graduate Diploma in Landscape Architecture 1990, Leeds Polytechnic, UK

1.2.2 Bachelor of Landscape Architecture (Honours) 1988, Leeds Polytechnic, UK

1.3 Affiliations

1.3.1 Fellow of the Australian Institute of Landscape Architects

1.3.2 Registered Landscape Architect

1.3.3 Chartered Member of the Landscape Institute (United Kingdom)

1.4 Visual Impact Assessment Methodology

1.4.1 The visual assessment methodology uses site observations and Global Positioning Systems (GPS) to identify the extent to which the proposed development is visible in the locality and over what distance. Using the GPS and site investigations, the location and visual extent of the subject land within the locality were assessed.

1.4.2 This methodology quantifies where the subject land is in the locality (relative distance between the proposed development and the viewpoints) and whether it is visible and to what extent.

1.4.3 The visual character and extent are assessed and discussed in Section 3 of this report. This allows a detailed understanding of the visual effect of the proposed development.

1.4.4 The visual assessment contained in this report has been undertaken on site. It should be noted that due to the differences between viewing the subject land on site in person and the constraints of reproducing this photographically at a smaller scale and on paper, the site photos and photomontages contained in this report can only give an indication of the visual effects and should be taken into consideration alongside the visual assessment discussion and analysis.

1 Introduction and Background

1.5 Relevant Documents

1.5.1 In forming my opinion and the preparation of the Visual Impact Assessment, I have viewed the following documentation:

- Pinion Advisory Project Ref: 17639. Sheet 211 Overall Plans – Location and Key Plan Rev A; Date 20 June 2025.
- Pinion Advisory Project Ref: 17639. Sheet 212 Overall Plans – Cut & Fill Depth Analysis Plan and Sheet 233 Sections – Cut & Fill Sections Rev A; Date 20 June 2025.
- Pinion Advisory Project Ref: 17639. Sheets 221 & 222 Overall Plans – Site Plan Rev A; Date 20 June 2025.
- Pinion Advisory Project Ref: 17639. Sheets 231 & 232 Sections Rev A; Date 20 June 2025.

1.6 Locality

1.6.1 In assessing the landscape character of the site, a landscape character locality has been determined in which the subject land sits. This includes the following, as indicated in Figure 1:

- The edge of Chapel Hill Road to the north of the subject land
- Land to the north, incorporating the Onkaparinga River National Park
- The surrounding vineyards and the Manning Fauna and Flora Reserve to the west
- The surrounding vineyards and residential properties to the east to the edge of Blewitt Springs Road

1 Introduction and Background

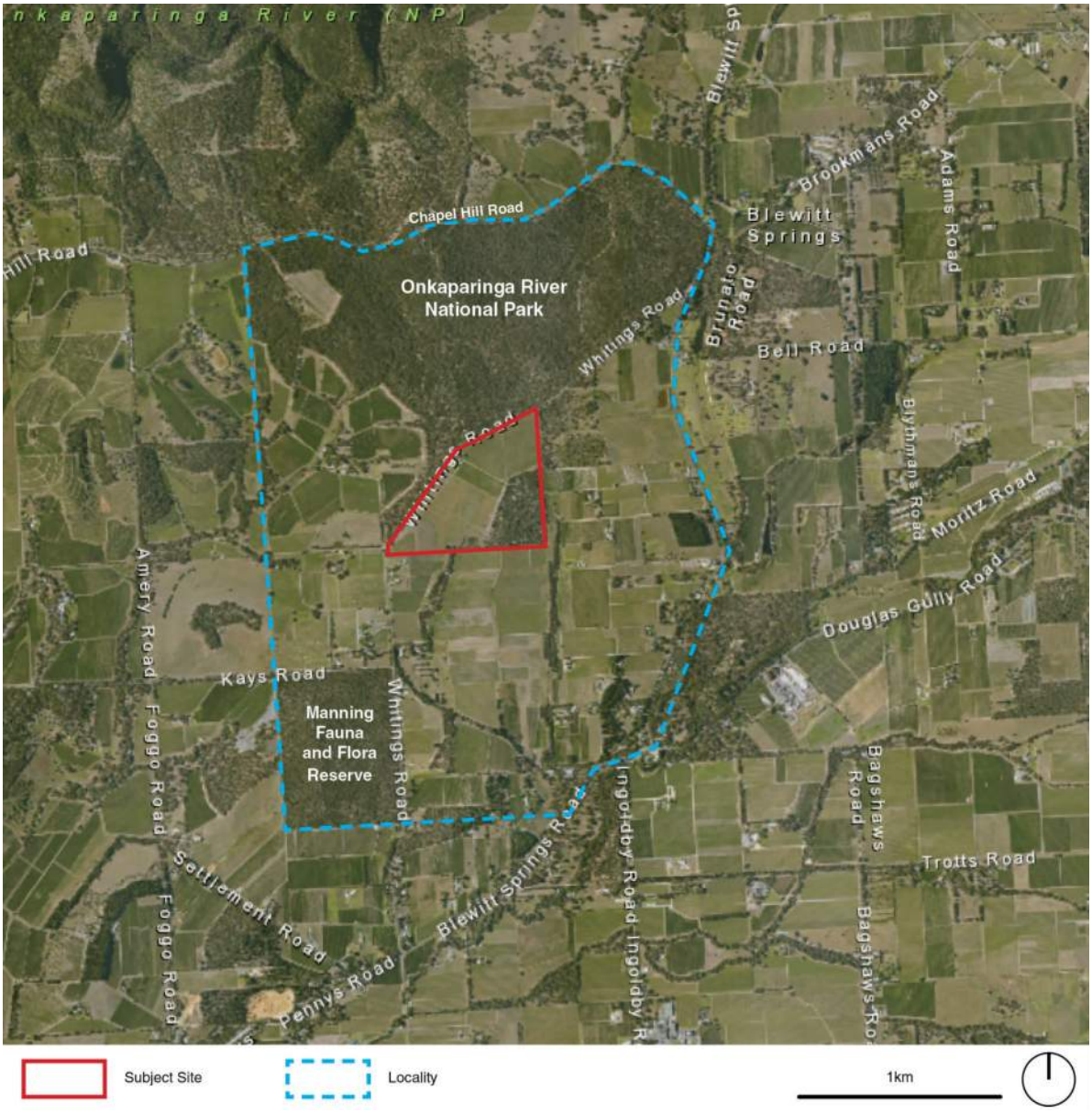


Figure 1: Locality plan

2 Landscape Character and Site Context

2.1 Description of Development

2.1.1 The proposed development is currently in the concept design phase and entails the development of two recycled water storage dams with a combined capacity of approximately 1.3 gigalitres, as shown in Figure 2. The proposed northern dam will measure 420 metres in length, 213 metres in width and 16 metres at its deepest point. The proposed southern dam will measure 400 metres in length, 305 metres in width, and 13 metres at its deepest point.

2.1.2 Both dams will be constructed using a 'turkey's nest' formation with the top of the dam embankment elevated above the natural ground level of the subject land.

2.1.3 As a result of the sloping site, the dam embankments vary in height above natural ground level. Along the Whitings Road boundary, it will vary between natural ground level and 4.6 metres above existing ground. Along the eastern boundary, it will vary between 5.8 metres and 14.9 metres above natural ground.

2.1.4 The dam will be constructed with a 1 in 3 internal batter, which will be plastic-lined. There will be an external 1 in 3 slope (typical) surrounding the dam, which will be constructed with compacted earth. At the base of this dam embankment will be an access road, security fencing and a swale to collect stormwater runoff.

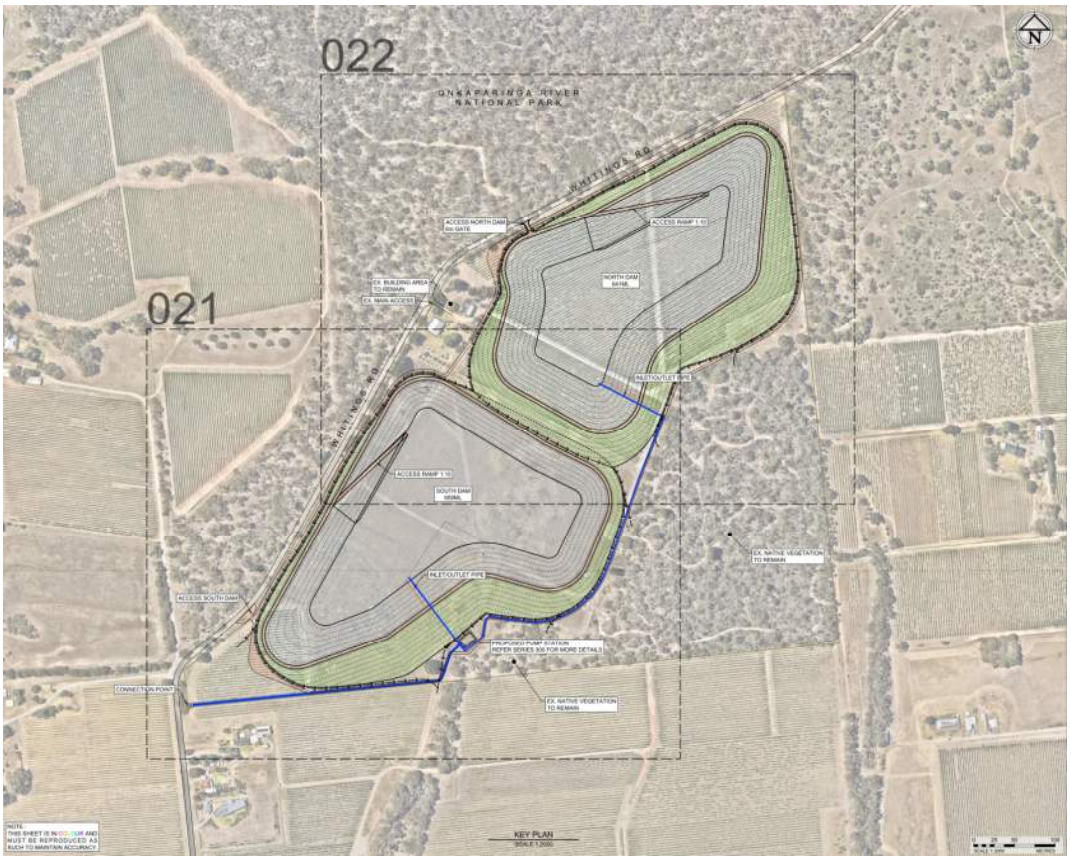


Figure 2: Location and Site Plan of Proposed Development.

2 Landscape Character and Site Context

2.2 The Subject Land

2.2.1 The subject land is located on 260 Whitings Road, Blewitt Springs and comprises of a portion of Certificate of Title Volume 5667 Folio 407. The subject land is approximately 35 hectares in size and is located within the Onkaparinga Council area.

2.2.2 The subject land includes an existing dwelling and associated ancillary structures, located in the middle of the site with access from Whitings Road. The existing land cover of the subject land in the northern section of the site is a vineyard, as shown in Figure 3, with grazing land in the southern portion. This results in seasonal variations in vegetation retention, harvesting and other agricultural operations on the land.

Figure 3: View of the subject land looking west

2.2.3 The subject land is formed by a small localised topographic saddle that results from the valleys extending to the southwest and south from the ridgeline associated with the Onkaparinga Gorge, which is north of the site. The saddle results in an undulating site with landforms running in a north-south direction, and valleys sloping towards the south. There are long views towards the South Mount Lofty Ranges to the east.

2.2.4 The eastern and south-eastern edges of the subject land are defined by established belts of mature native vegetation that create a landscape foreground when looking east from the subject land. There are approximately 8.3 hectares of established native vegetation located on the subject land, shown in Figure 4, which will be retained. This forms an established landscape buffer to the east and south-east.

2 Landscape Character and Site Context

Figure 4: Looking south east over the subject land with established native vegetation visible along the eastern boundary.

2.2.5 To the south-east, south and south-west of the subject land, the topography falls away to form local valleys associated with Blewitt Springs and McLaren Flat. This area is predominantly an agricultural landscape which contains vineyards, fields, valleys and significant belts of vegetation located on large allotments that follow the underlying topography.

2.2.6 The topography of the subject land and surrounding context creates a fragmented and enclosed visual character, which is reinforced by the surrounding vegetation. Typically, the site is visible from distances of 1 to 2 kilometres, which increases to the south. At greater distances, the visibility of the site reduces as the layered screening of the existing vegetation fragments the views, as well as the potential visual effect associated with the proposed development.

2 Landscape Character and Site Context

2.3 Landscape Character and Locality

2.3.1 The landscape character of the locality is defined by the undulating topography, associated with the Onkaparinga Gorge, the McLaren Flat plateau, and the escarpment of the Sellick Hill Range. The locality is criss-crossed by a series of ridgelines, tree-line ridges, and valleys, which create significant complexity in relation to visual containment, character, and visual envelopes produced in the locality.

2.3.2 To the north and north-west of the subject land is the Onkaparinga River National Park, which is formed by the ridgelines and valleys associated with the Onkaparinga River and its tributaries. The predominant east-west alignment of the river creates a defined visual envelope to the north. The national park comprises of established native trees and shrubs, shown in Figure 5. This dense vegetation forms an enclosed visual edge to the north along the road corridor and subject land.

Figure 5: View looking south-west along Whitings Road with the Onkaparinga River National Park on the

2.3.3 North of the subject land is 386 Whitings Road, which is a large allotment associated with the Blewitt Springs Wine Company. The structures are located in the northern section of this allotment with frontages to Whitings Road and Blewitt Springs Road. In the south-western section of this allotment, there is approximately 12 hectares of established native vegetation which forms a landscape screen to the subject land, shown in Figure 6.

2.3.4 There is a ridgeline to the north-east of the subject land which forms an enclosed visual envelop to the north-east before descending into a valley which runs along the alignment of Blewitt Springs Road in the east.

2 Landscape Character and Site Context

Figure 6: 386 Whitings Road looking south west towards the subject land which is screened by established native vegetation

2.3.5 To the east and southeast at a distance of approximately 5km is the rising escarpment of the Sellick Hill Range, which forms part of the Southern Mount Lofty Ranges. This elevated landform provides a distinct visual envelope to the locality. The well-vegetated land cover provides an attractive backdrop, reinforcing the rural amenity of the area.

2.3.6 Across Blewitt Springs and McLaren Flat, the existing land cover is defined by extensive areas of vegetation, and various rural land uses, predominantly vineyards and grazing, with small areas of cropping. The combination of mature trees, remnant woodlands, and areas of vineyards creates an attractive landscape setting for the locality. Extensive belts of vegetation, vineyards, rural properties, and productive winemaking areas define the landscape character of McLaren Flat.

2.3.7 To the east of the subject land, a local valley defines the alignment of Blewitt Springs Road. The surrounding topography provides distinct visual screens, and the visibility of the subject land is limited. This visibility is further reduced by small topographic features and tree plantations that add to the screening.

2.3.8 Within the immediate vicinity of the subject land to the south are several dwellings and vineyards that reflect the area's viticultural and tourism land uses. This includes four residential properties: numbers 175, 186, 192 and 194 Whitings Road. The dwellings along Whitings Road are typically oriented toward the south and southeast, capitalising on the views across the low-lying character of McLaren Flat towards the Sellick Hill Range.

2.3.9 The Vineyard Retreat is located at 165 Whitings Road, approximately 400 metres south-west of the subject land, and provides short-term accommodation for visitors to the region. The Vineyard is located at a similar elevation to the subject land. Guest houses located along the east of the site, shown in Figure 7, and capitalise on the views towards the South Mount Lofty Ranges and, as such, there will be some views towards the proposed dam development.

Figure 7: The Vineyard Retreat; located at 165 Whitings Road

2.3.10 The Local Heritage Place (Heritage Register ID 5293), the Former 'Tintara Winery' Ruins, is located approximately 550 metres west of the subject land, at the Ox Hardy winery. The Local Heritage Listing includes the remnants of walls, foundations and tanks, as shown in Figure 8.

Figure 8: The Former 'Tintara Winery' Ruins

3 Visual Impact Assessment

3 Visual Assessment

3.1.1 The visual assessment considers the visibility of the proposed development and the contribution to the amenity of the locality that the proposed development will make. This assessment has been considered in relation to the viewpoints indicated in Appendix A.

3.2 Whitings Road (south-east of subject land)

3.2.1 Directly adjacent to the subject land are the residential properties numbers 175, 186, 192 and 194 Whitings Road. The orientation of these dwellings is typically towards the broader views of McLaren Flat and the Southern Mount Lofty Ranges, which is likely to minimise the visibility of the subject land from within the dwellings. However, from the properties, there will likely be visual effects resulting from the proposed dam development due to the proximity to the subject land.

3.2.2 Along Whitings Road, adjacent to 165 Whitings Road, there is a defined view corridor towards the subject land, as shown in Figure 9. This is a result of the proximity to the subject land, local topography and vegetation. This local view corridor will increase the visibility of the southern dam wall. The proposed landform of the southern dam wall will appear as a constructed topographic element within the existing undulating landscape character. The proposed landform is likely to visually replace the existing vine-covered slope with a more inclined landscaped profile. The existing foreground land uses and vegetation will remain.

Figure 9: View towards the subject land taken from The Vineyard Retreat, 165 Whitings Road

3.2.3 The proposed dam will alter the visual character when looking towards the subject land from this location. Over time, the remediation of the earthworks and the introduction of vegetation or other landscape treatments, and with ongoing landscape management, the visual effect of the proposed dam wall is likely to be reduced. It is worth noting that the field of view is narrow (recorded as a 17-degree view corridor), which reduces the potential visual effect within the broader landscape context.

3 Visual Impact Assessment

3.3 Whitings Road (adjacent to the subject land)

3.3.1 The northern boundary of the subject land is located adjacent to Whitings Road, shown in Figure 10. This boundary is approximately 1 kilometre in length. The dense vegetation and established woodland of the Onkaparinga River National Park will remain along the northern road edge. The boundary treatment of the proposed dams will alter the visual character along the southern edge of the road corridor, effectively creating an asymmetrical cross-section profile along Whiting Road.

3.3.2 Looking south across the subject land, the existing agricultural land use and glimpsed views towards the south will be replaced by vegetated dam walls. The proposed dam wall varies from natural ground directly adjacent to the existing dwelling at 260 Whitings Road, to 2.8 metres above natural ground in the south and 4.6 metres above natural ground in the north.

3.3.3 The resulting earthworks and landscape treatments will modify the visual character, screening views to the south and replacing them with a revegetated embankment of grasses and shrubs that respond to the remnant native vegetation of the adjacent National Park. Views to the top of the Sellick Hill Range escarpment are likely to remain, becoming a prominent backdrop to the north eastern extent of Whitings Road. These views may become filtered with the planting of verge-side trees.

Figure 10: 260 Whitings Road and Onkaparinga River National Park

3.4 Blewitt Springs and Kays Road (east and south of the subject land)

3.4.1 Blewitt Springs Road is located within a valley to the east of the subject land. At the same time, Kays Road is located to the south of the subject land at a lower elevation than the subject land, following the underlying topography to the south.

3.4.2 There are limited views towards the subject land from Blewitt Springs Road or Kays Road due to local topographic variations and existing stands of vegetation. Significant areas of established native vegetation to the north-east and east of the proposed development provide a substantial amount of screening towards the subject land from the east. Consequently, the underlying topography and established vegetation screen view towards the subject land from the south at distances greater than 600 metres.

3.4.3 There will be a limited visual effect from the proposed development experienced from the north-east, east and south of the subject land.

3.5 West of the subject land

3.5.1 West of the subject land, there are several existing wineries, including the local heritage site of the former Tintara Winery ruins located at Ox Hardy Winery. There are limited views towards the subject land from the west, as the land to the west is located at a lower elevation than the subject land, and views are further fragmented by existing stands of vegetation.

3.5.2 The former Tintara Winery ruins are located at a lower elevation than the subject land. Between the ruins and the subject land, there is a section of established native vegetation along Whitings Road; this is approximately 60-130 metres in depth. The established vegetation creates a landscape buffer which screens the subject land from the Tintara Winery ruins.

3.5.3 In conclusion, the visual effect of the proposed development will be mainly experienced from two key locations, along Whitings Road adjacent to the subject land and directly south-east of the subject land. This is a result of the modification of the existing undulating topography and agricultural land-use to the constructed dam wall profiles and vegetated land cover. There will be limited visual effect experienced from the proposed development in the broader area due to local topographical variations and existing established vegetation, which will screen the subject land from many locations in the wider area.

3.5.4 The development of different landscape treatments across the subject land will provide mitigation of the visual effects over time. The potential for tree planting along the verge of Whitings Road is likely to screen the development further.

3 Visual Impact Assessment

3.6 Management of Visual Impacts

3.6.1 The visual effect of the proposed development will be mitigated through additional landscape treatments and ongoing landscape management of the site.

3.6.2 The locality surrounding the subject land is characterised by defined visual envelopes, tree screens and topographic features that limit the visibility of the proposed development. The visibility of the dam is confined to Whiting Road, particularly the north eastern and southern extents of Whiting Road. The photomontages in Appendix A illustrate the visibility and potential visual impacts

3.6.3 The landscape treatments, selected boundary treatments and species selection will reduce and limit the visibility of the dam embankment from viewpoints on Whitings Road.

3.6.4 The introduction of the new landscape treatments into the locality will be seen within the context of the wider landscape character. Existing ridgelines to the north are covered with belts of vegetation and trees that provide amenity to the local landscape character. The proposed dam walls, landscape mounds, and vegetated treatments attempt to replicate these existing characteristics, providing areas of vegetation over the elevated landforms of the dam walls.

3.6.5 The profile and topography of the proposed development are likely to result in a visual change with the gentle slope of the existing south-facing vineyard, replaced with a vegetated slope covered with native grasses and small shrubs. The natural landscape cover will be visually fragmented by strategic native tree planting along the boundary of the site.

3.6.6 The use of native tree and shrub species will complement and increase the existing landscape amenity of the locality. The productive viticulture landscape will be replaced with native grasses and trees, providing increased habitat biodiversity.

3.6.7 As the dam will be elevated above the surrounding locality, the water within the dam will not be visible from any external points. In combination with the proposed landscape treatment to the perimeter of the site, there is likely to be little indication that the subject land contains a water storage dam.

4 Planning and Design Code Assessment

4 Planning and Design Code Assessment

4.1 Relevant Development Plan provisions

4.1.1 The following provisions of the Planning and Design Code (in effect) Version 2025. Eleven (11) have been considered as the most relevant to the assessment of the visual impact of the proposed development.

4.2 Hills Face Zone

4.2.1 Desired Outcome:

DO1 To maintain the western slopes of the South Mount Lofty Ranges as an important natural asset of Greater Adelaide by limiting development to low-intensity agricultural activities and public and private open space. The natural character of the zone will be preserved, enhanced and re-established to:

(a) provide a natural backdrop to the Adelaide Plain and a contrast to the urban area

(b) preserve biodiversity and restore locally indigenous vegetation and fauna habitats close to metropolitan Adelaide

(c) provide for passive recreation in an area of natural character close to the metropolitan area

(d) provide a part of the buffer area between metropolitan districts and prevent the urban area extending into the western slopes of the Mount Lofty Ranges.

'Natural character' refers to the natural topography, native vegetation and colours, such as greens and browns of non-reflective earthen tones, normally associated with a natural landscape. Additionally, natural character refers to the open character of the land in those areas of the zone where open grazing currently predominates.

4.2.2 Performance Outcomes:

PO 1.1 Low-intensity, low-scale activities that complement the natural, rural and scenic qualities of the hills face landscape.

PO 3.1 Excavation and/or filling of land outside townships and urban areas is:

(a) kept to a minimum so as to preserve the natural form of the land and native vegetation

(b) only undertaken in order to reduce the visual impact of buildings, including structures, or in order to construct water storage facilities for use on the allotment

(c) directly required for the portion of a building that is fully underground, an underground dwelling, underground tank, cellar, pipeline or waste disposal and treatment system.

PO 3.2 Excavation and/or filling of land is only undertaken if the resultant slope can be stabilised to prevent erosion, and results in stable scree slopes which are covered with top soil and landscaped so as to preserve and enhance the natural character or assist in the re-establishment of the natural character of the area.

PO 8.1 Driveways, access tracks and car parking areas constructed in a manner which preserves landscape character and are:

(a) sited and constructed to follow contours of the land to reduce their visual impact and potential for erosion from water runoff

(b) surfaced with dark materials.

PO 10.4 Development is not undertaken if it is likely to result in loss of amenity to adjoining land or surrounding localities from:

(a) the visual impact of buildings, structures or earthworks

(b) the intensity of activity associated with any such use, including significant adverse impacts arising from:

(i) chemical spray drift

(ii) use of audible bird or animal deterrent devices

(iii) the use of associated vehicles and machinery.

PO 11.2 Development is screened by locally indigenous plant species or use of screening mounds, including scree slopes created as a result of excavation and/or filling of land, in such a way that the bushfire hazard is not increased.

PO 12.2 Fences:

(a) are sited to minimise their visual impact

(b) are constructed of post and wire or other materials which can be seen through

(c) avoid construction of obtrusive gateways, particularly of brick or masonry.

Assessment

4.2.3 The zone focuses on preserving, enhancing or re-establishing the natural character of the locality. Natural character has been defined to refer to the natural topography as well as the native vegetation and colours. This is included in the Desired Outcome 1 as well as Performance Outcomes 1.1, 3.2, 10.4 and 11.2.

4.2.4 The proposed development will modify the underlying natural topography and will result in dam embankments, the height of which will vary across the subject land. Adjacent to Whitings Road, the dam embankments vary from natural ground to 4.4 meters above ground level.

4.2.5 There are more significant earthworks required along the eastern and southern embankments of the dam, with up to 14.9 meters of fill placed above natural ground, due to the underlying topography of the site. While the proposed development results in a modified topographic character, the dam embankment walls have been designed to have a 1 in 3 slope gradient. This gradient is similar in profile to the natural topographic forms in the surrounding locality, and the proposed landscape treatments will contribute to the natural character of the locality and the intent of the Hills Face Zone.

4.2.6 The landscape plan for the development includes re-establishing native grasses and ground cover species on the dam embankments with a mix of native trees and understorey planting to the perimeter. This will replicate the existing vegetation cover within the locality and provide landscape amenity to the proposed development.

4.2.7 The landscape character of the subject land is currently agricultural with sloped vineyard and grazing areas, this will be replaced with a native grassland embankment. The existing landscape character changes, but the visual amenity in terms of natural land cover and the absence of built form is retained. The proposed plants are native and have been selected to be consistent with and complement the amenity of the area and the natural character of the Onkaparinga River National Park.

4.2.8 There will be a series of access tracks as part of the proposed development located at the base and on top of the dam walls. These access tracks will be constructed from compacted rubble, which is consistent with informal access tracks and unsealed roads in the locality. The location of these access tracks will limit the visibility of the access tracks from the wider locality, meeting the intent of Performance Outcome 8.1.

4.2.9 The perimeter fence around the subject land is proposed to be a 1.8-meter-high chain link fence; this fence type will be visually permeable, which meets Performance Outcome 12.2. The landscape plan for the proposed development suggests that additional shrubs and ground covers could be planted along the Whitings Road verge, subject to council approval, which would further reduce the visibility of the fence and proposed development when viewed from Whitings Road

4.3 Character Preservation District Overlay (subject land located Not in Township)

4.3.1 Desired Outcome:

DO 1 Recognise, protect and enhance the special character of Character Preservation Districts.

DO 2 The long term use of land outside of townships for primary production and associated value adding enterprises is assured and promoted.

4.3.2 Performance Outcomes:

PO 3.1 Preservation of existing natural features including topography, watercourses and mature trees.

PO 4.1 Excavation and filling of land is limited to that associated with:

(a) minimising the visual impact of buildings or structures; or

(b) construction of water storage facilities.

Assessment

4.3.3 While the subject land is located within the Character Preservation District for the McLaren Vale region, the location has been carefully selected to minimise the impact of the proposed development on the surrounding locality. As discussed in the visual impact assessment, the surrounding topography and established vegetation limit views of the subject land significantly, with the proposed development visible from Whitings Road when in close proximity to the site. The proposed landscape treatments, over time, will further reduce the visibility of the proposed development and seek to replace the existing rural land use with a more natural landscape setting.

4.3.4 The proposed development is a water storage facility, which is identified in Performance Outcome 4.1 as consistent with the intent of the area. The water from this storage facility will be utilised by the surrounding primary production land uses and will ensure the long-term viability of primary production in this location.

4.4 Heritage Adjacency Overlay

4.4.1 Desired Outcome:

DO 1 Development adjacent to State and Local Heritage Places maintains the heritage and cultural values of those Places.

4.4.2 Performance Outcomes:

PO 1.1 Development adjacent to a State or Local Heritage Place does not dominate, encroach on or unduly impact on the setting of the Place.

Assessment

4.4.3 The former Tintara Winery ruins are a Local Heritage Place and are located at a lower elevation than the subject land. There is a section of established native vegetation along Whitings Road, approximately 60-130 metres in depth, between the ruins and the subject land. The established vegetation creates a landscape buffer which screens the subject land from the Tintara Winery ruins.

4.5 General Development Policies: Design

4.5.1 Desired Outcome:

DO 1 Development is:

(a) contextual - by considering, recognising and carefully responding to its natural surroundings or built environment and positively contributes to the character of the immediate area

(b) durable - fit for purpose, adaptable and long lasting

(c) inclusive - by integrating landscape design to optimise pedestrian and cyclist usability, privacy and equitable access, and promoting the provision of quality spaces integrated with the public realm that can be used for access and recreation and help optimise security and safety both internally and within the public realm, for occupants and visitors

(d) sustainable - by integrating sustainable techniques into the design and siting of development and landscaping to improve community health, urban heat, water management, environmental performance, biodiversity and local amenity and to minimise energy consumption

4.5.2 Performance Outcomes:

PO 3.1 Soft landscaping and tree planting is incorporated to:

(a) minimise heat absorption and reflection

(b) maximise shade and shelter

(c) maximise stormwater infiltration

(d) enhance the appearance of land and streetscapes

(e) contribute to biodiversity.

PO 3.2 Soft landscaping and tree planting maximises the use of locally indigenous plant species, incorporates plant species best suited to current and future climate conditions and avoids pest plant and weed species.

PO 8.1 Development, including any associated driveways and access tracks, minimises the need for earthworks to limit disturbance to natural topography.

PO 9.1 Fences, walls and retaining walls are of sufficient height to maintain privacy and security without unreasonably impacting the visual amenity and adjoining land's access to sunlight or the amenity of public places

Assessment

4.5.3 The proposed development is focused on water storage and management to ensure the long-term viability of primary production in the surrounding area. The subject land has been carefully selected to minimise the visibility of the proposed development in the broader area.

4.5.4 A landscape plan has been developed, which seeks to re-establish the natural landscape character of the locality and assist in mitigating the visibility of the development along Whitings Road. Native plants have been selected to be consistent with the surrounding landscape, contribute to biodiversity and best suit the current and future climate conditions.

4.5.5 The access tracks will reflect the modified topography, located at the base or on top of the dam embankments. These will be constructed with compacted rubble, which is reflective of the surrounding unsealed roads and local access tracks. The perimeter fence line will be 1.8-meters-high and will be a chain link fence, which is visually permeable, allowing the landscape treatments within the site to be seen through the fence.

5 Conclusion and Opinion

5 Conclusion and Opinion

5.1.1 The proposed development for recycled water storage dams at 260 Whitings Road, Blewitt Springs, will introduce new landforms into an existing landscape character defined by complex landforms and strong vegetation patterns.

5.1.2 The subject land sits within a localised saddle formed by valleys extending south from the Onkaparinga Gorge, with long views to the South Mount Lofty Ranges and the Sellick Hill escarpment beyond. The existing landscape character is defined by the agricultural and viticultural land uses of Blewitt Springs and McLaren Flat, where vineyards, remnant woodlands, and belts of mature trees create a defined character and visual amenity. To the north, the Onkaparinga River National Park forms an enclosed visual edge.

5.1.3 The existing topography of the subject land and locality creates a fragmented and enclosed visual character, which is reinforced by the surrounding established native vegetation. The visual effect of the proposed development will be mainly experienced from two key locations when in close proximity to the subject land along Whitings Road adjacent to the subject land and directly south-east of the subject land.

5.1.4 There will be limited visual effect experienced from the proposed development in the broader area due to local topographical variations and existing established vegetation, which will screen the subject land from many locations in the wider area.

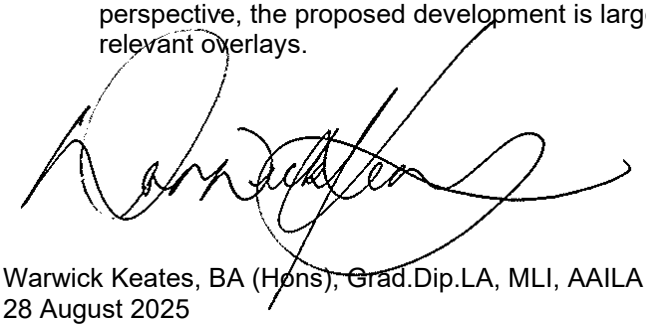
5.1.5 The visual effect will be a result of the modification of the existing undulating topography and agricultural land-use to the constructed dam wall profiles and vegetated land cover. Engineering requirements limit the extent and type of vegetation that can be established. With this in mind, the landscape concept plan has been strategic with the placement of new trees and shrubs to fragment the potential visual effects of the proposed development.

5.1.6 The introduction of native grasses, shrubs along the dam walls and tree planting to the site boundaries, the development will provide a contextual landscape setting to the existing vineyards, remnant vegetation, and properties that exist in the locality. These treatments will not only reduce the visibility of the embankments but also reinforce the natural character of the area by complementing the adjacent National Park and increasing biodiversity.

5.1.7 The proposed development includes a series of compacted rubble access tracks as well as a 1.8 meter high chain and link fence around the site perimeter. The design and material of these elements are consistent with the agricultural character of the wider locality.

5.1.8 In this way, while the dams will alter the immediate appearance of the site, their long-term establishment will complement and enhance the locality's existing patterns of vegetation and landform, ensuring that the overall visual effect remains compatible with the landscape character of the locality.

On review of the proposed development against the Desired Outcomes and Performance Outcomes in the Planning and Design Code from a landscape and visual amenity perspective, the proposed development is largely consistent with the intent of the zone and relevant overlays.



Warwick Keates, BA (Hons), Grad.Dip.LA, MLI, AAILA
28 August 2025

Appendix A

Appendix A: Photomontages

The photomontages illustrate the visual effect of the proposed development ‘post-construction’ and ‘five years after implementation’.

EXISTING VIEW FROM WHITINGS ROAD LOOKING NORTH

VIEW OF DAM PROJECT POST CONSTRUCTION (1 YEAR)

VIEW OF DAM PROJECT 5 YEARS AFTER CONSTRUCTION

EXISTING VIEW FROM WHITINGS ROAD LOOKING SOUTH

VIEW OF DAM PROJECT POST CONSTRUCTION (1 YEAR)

VIEW OF DAM PROJECT 5 YEARS AFTER CONSTRUCTION

Appendix B

Appendix B: Proposed plant species

BLEWITT SPRINGS
INDICATIVE PLANT LIST

Project No. 25BSP Date of Issue 06.08.25

Trees

Acacia pycnantha

Width x height: 6m x 6m
Density/Spacing: Specimen
Supply size: Tube

Description: fast growing shrub or small tree, which can be grown on recharge sites and a wide range of shallow soils

Allocasuarina verticillata

Width x height: 6m x 8m
Density/Spacing: Specimen
Supply size: 45L

Description: A tree that can be grown on a range of sites. It is considered to have moderate growth rates and is a useful windbreak or shelter-belt species.

Bursaria spinosa

Width x height: 3m x 4m
Density/Spacing: Specimen
Supply size: 140mm

Description: Once established Bursaria spinosa are extremely hardy and will last 30-50 years.

Callitris gracilis

Width x height: 8m x 20m
Density/Spacing: Specimen
Supply size: 45L

Description: The native pine can be used as a shelter tree, for shade or a windbreak, for stabilisation of dune country or as an excellent feature tree for large gardens or parks.

Dodonaea viscosa

Width x height: 3m x 4m
Density/Spacing: 1 per m2
Supply size: 140mm

Description: A relatively fast growing shrub with an ability to pioneer degraded sites. Many of the subspecies are extremely frost and drought tolerant and are also considered a valuable source of pollen.

Eucalyptus microcarpa

Width x height: 10m x 15m
Density/Spacing: Specimen
Supply size: 45L

Description: A long lived single-trunked tree which is frost and drought resistant. Provides excellent habitat for wildlife

BLEWITT SPRINGS
INDICATIVE PLANT LIST

Project No. 25BSP Date of Issue 06.08.25

WAX DESIGN

Trees

Eucalyptus porosa

Width x height: 12m x 14m
Density/Spacing: Specimen
Supply size: 45L

Description: A robust, dark-barked mallee which can grow into an impressive single-trunked tree.

Pittosporum angustifolium

Width x height: 5m x 10m
Density/Spacing: Specimen
Supply size: 140mm

Description: Usually attains about 6 m in height but is reported to grow up to 10 m tall. It grows across a wide range of habitats, often on sandy soils.

Melaleuca lanceolata

Width x height: 5m x 8m
Density/Spacing: Specimen
Supply size: 200mm

Description: A relatively fast growing species. Has a dense canopy. Natural stands provide a particularly useful shelter as a windbreak on windy, near coastal sites.

Shrubs

Acacia acinacea

Width x height: 4m x 2.5m
Density/Spacing: 1 per m2
Supply size: 140-250mm

Description: A fast growing, frost and drought tolerant, nitrogen-fixing shrub. It is in demand in re-vegetation programs in some parts of it range for its ability to pioneer degraded sites.

Adriana quadripartita

Width x height: 3m x 2m
Density/Spacing: 1 per m2
Supply size: 240-250mm

Description: A shrub species which is endemic to southern Australia.

BLEWITT SPRINGS
INDICATIVE PLANT LIST

Project No. 25BSP Date of Issue 06.08.25

WAX DESIGN

Shrubs

Goodenia albiflora

Width x height: 1m x 1m
Density/Spacing: 3 per m2
Supply size: 140-250mm

Description: A hardy and contrasting foliage plant.

Olearia ramulosa

Width x height: 1m x 1.5m
Density/Spacing: 2 per m2
Supply size: 140-250mm

Description: A dense, formal, rounded, aromatic shrub with small white daily flowers in late autumn.

Rhagodia candolleana

Width x height: 2m x 1m
Density/Spacing: 2 per m2
Supply size: 140-250mm

Description: Can be used as a background shrub in mixed planting, suitable for coastal locations as a wind-break and soil control.

Rhagodia parabolica

Width x height: 5m x 3m
Density/Spacing: 1 per m2
Supply size: 140-250mm

Description: A pale, grey-green, densely foliaged spreading shrub with wide upright branches.

Atriplex semibaccata

Width x height: 3m x 0.3m
Density/Spacing: 2 per m2
Supply size: 140-250mm

Description: Soil and erosion control. Effective weed control.

Enchylaena tomentosa

Width x height: 1.5m x 1m
Density/Spacing: 3 per m2
Supply size: 140-250mm

Description: Extremely hardy low shrub or ground cover for areas of neglect, particularly tolerant of coastal locations and calcareous soils.

BLEWITT SPRINGS
INDICATIVE PLANT LIST

Project No. 25BSP Date of Issue 06.08.25

WAX DESIGN

Groundcovers

Myoporum parvifolium

Width x height: 2m x 0.2m
Density/Spacing: 1 per m2
Supply size: 140-250mm

Description: Extremely hardy weed-suppressing ground cover for embankments, verges, streetscapes and high traffic areas. Acts as a living mulch and weed suppressor.

Grasses

Austrostipa elegantissima

Width x height: 1m x 1m
Density/Spacing: Hydroseed

Description: Perennial grass for landscaping with silvery seed heads in spring. Refuge and habitat for small fauna.

Austrostipa blackii

Width x height: 1m x 1m
Density/Spacing: Hydroseed

Description: Tufted perennial grass with rusty coloured seed heads in spring. Refuge and habitat for small fauna.

Chloris truncata

Width x height: 0.5m x 0.5m
Density/Spacing: Hydroseed

Description: Perennial low evergreen grass with distinctive large windmill shaped seed heads from spring to summer. Refuge and habitat for small fauna.

Cymbopogon ambiguus

Width x height: 0.5m x 1m
Density/Spacing: Hydroseed

Description: Long lived grass with blue-green leaves with lemon scent. Tall flower heads in spring and summer. Insect attracting. Can be cut back to promote new growth.

BLEWITT SPRINGS
INDICATIVE PLANT LIST

Project No. 25BSP Date of Issue 06.08.25

WAX DESIGN

Grasses

Dichanthium sericeum

Width x height: 0.4m x 0.8m
Density/Spacing: Hydroseed

Description: Hardy native grass with blue-green leaves. Brown flowers in spring and winter. Can be cut back in winter to promote new growth.

Enneapogon nigricans

Width x height: 0.5m x 0.5m
Density/Spacing: Hydroseed

Description: Hardy, small, tufted grass with flowers in spring and summer.

Microlaena stipoides var, stipoides

Width x height: 0.5m x 0.6m
Density/Spacing: Hydroseed

Description: A slender spreading perennial grass which will tolerate foot traffic. Good for erosion control.

Poa labillardieri spp.

Width x height: 0.7m x 1m
Density/Spacing: Hydroseed

Description: Extremely hardy, long lived, tussock forming grass often used in landscape. Can be cut back in winter to promote new growth.

Rytidosperma spp. (Austrodanthonia spp.)

Width x height: 1m x 0.8m
Density/Spacing: Hydroseed

Description: Clumping perennial grasses. There are 15 species native to Adelaide. Important plant for soil stablisation and habitat.

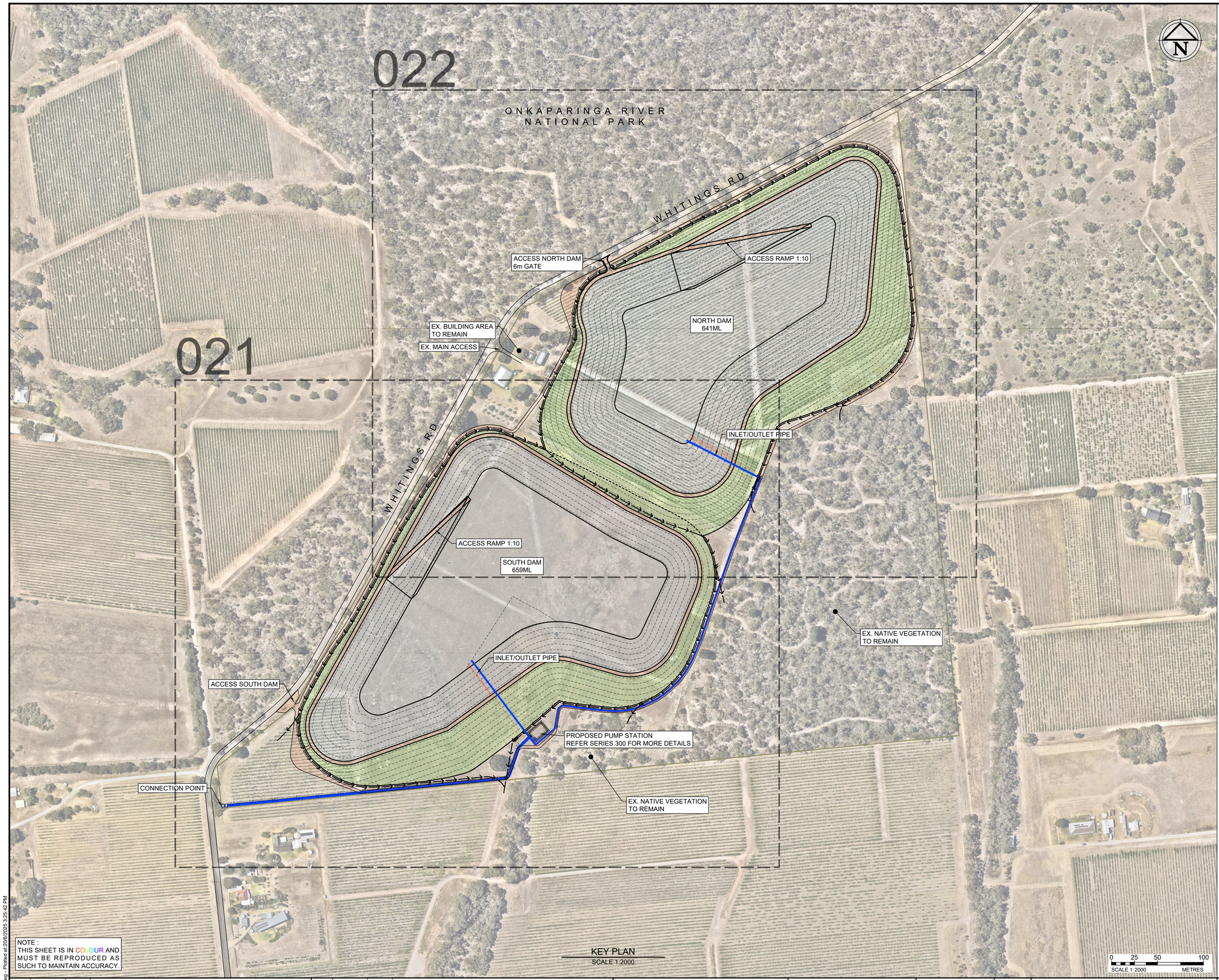
Themeda triandra

Width x height: 0.8m x 1m
Density/Spacing: Hydroseed

Description: Ornamental warm season perennial grass. Habitat and food source for fauna. Deemed low flammability by SA Country Fire Service (when managed and irrigated). Can be cut back in winter to promote new growth.

Appendix C

Appendix C: Concept Design prepared by Pinion Advisory



KEY PLAN
SCALE 1:2000

LOCATION PLAN
SCALE 1:150,000

LEGEND

- PROPOSED DAM OUTLINE
- PROPOSED WATER PIPE
- PROPOSED SWALE
- PROPERTY BOUNDARY
- EXISTING CONTOUR (5m)
- EXISTING FENCE
- EXISTING BUILDING

DRAFT

REV	DATE	DRAFT	DESCRIPTION
A	20/06/25	JT	PRELIMINARY - FOR INFORMATION

STATUS: **PRELIMINARY** NOT FOR CONSTRUCTION

DRAFTER: J. TERZIC		SCALE: 1:2000	SHEET SIZE: A1
DESIGNER: J. TERZIC		UNITS: ALL UNITS ARE IN METRES U.N.O.	
CHECKED: M. ALLEN	DATE: 20/06/25	COORDINATE SYSTEM: MGA ZONE 54 , GDA 94	
APPROVED: M. ALLEN	DATE: 20/06/25	ALL LEVELS ARE TO AHD	
		REF MARK:	

pinion ADVISORY
1300 746 466
pinionadvisory.com
hello@pinionadvisory.com

CLIENT:	WILLUNGA BASIN WATER
PROJECT:	BLEWITT SPRINGS STORAGE WXPANSION
SHEET TITLE:	OVERALL PLANS LOCATION & KEY PLAN
PROJECT REF: 17639	SHEET No.: 211
REV: A	

Drawing file: 17639-200[0]-DAM.dwg - Plotted at 20/6/2025 3:26:42 PM

Appendix D

Appendix D: Curriculum Vitea of Warwick Keates

WAX DESIGN

WARWICK KEATES

/ DIRECTOR

PROFILE

Warwick Keates is a director of WAX Design and has over 25 years of experience in Landscape Architecture practising in Australia, the Middle East and the United Kingdom. During this period of time, Warwick has prepared numerous visual impact and landscape assessments for Planning Appeals, Expert Witness Statements and Environmental Impact Assessments.

Warwick has provided evidence for a variety of developments, including major road corridors, telecommunication towers, residential developments, significant trees, wind farms and mine expansions. During the course of his employment, he has appeared as an expert witness before the Environment, Resources and Development Court of South Australia, and appeared before the Development Assessment Commission on numerous occasions in Victoria and South Australia.

QUALIFICATIONS

Graduate Diploma in Landscape Architecture, Leeds Polytechnic (United Kingdom) 1990

Bachelor of Arts (Hons) in Landscape Architecture, Leeds Polytechnic (UK) 1988

PROFESSIONAL AFFILIATIONS

Fellow of the Australian Institute of Landscape Architects

Chartered Member of the Landscape Institute (UK) 1995

SPECIALIST EXPERTISE

Reserve and Play Space Design

Urban Design and Planning

Open Space Assessment and Planning

Large Scale Master Planning

Visual Impact Assessment

Global Information Systems (GIS)

Computer Aided Design and 3D Modelling

Consultation and Facilitation

OTHER APPOINTMENTS

AILA Connection to Country Committee

Kadaltilla / Adelaide Park Lands Authority Board Member

PREVIOUS EXPERIENCE

Twin Creeks Wind Farm, SA

Watta Wella Renewable Energy Project, VIC

Palmer Wind Farm, SA

Keyneton Wind Farm, SA

Yadnarie Solar Farm, SA

Allendale Wind Farm Planning Appeal, SA

Nonowie Renewable Energy Park, SA

Port Augusta Energy Park, SA

Mt Bryan Wind Farm Planning Appeal, SA

Waubra Wind Farm, VIC

Carmody's Hill Wind Farm Assessment, SA

Stony Gap/Robertstown Wind Farm, SA

Sisters Wind Farm Assessment, VIC

Drysdale Wind Farm Assessment, VIC

Woolsthorpe Wind Farm Assessment, VIC

Berrimal Wind Farm, VIC

Taralga Wind Farm Peer Review, NSW

Naroghid Wind Farm Assessment, VIC

Waitpinga Wind Farm Visual Impact Assessment, SA

Myponga Wind Farm Visual Impact Assessment, SA

Project Bulla Gas Turbine Power Station Visual Assessment

Kanmantoo Mine Expansion Visual Impact Assessment

Olympic Dam Mine Expansion Visual Impact Assessment, SA

Telstra Telephone Tower Visual Impact Assessment, SA

Hutchinson 3G Phone Tower Visual Impact Assessment, SA

T 08 8215 0144 / E warwick@waxdesign.com.au / **waxdesign.com.au**

Appendix E

Appendix E: Landscape Masterplan

BLEWITT SPRINGS | LANDSCAPE PLAN

ISSUE 26.08.2025

LANDSCAPE PLAN

LEGEND

- MIXED SHRUBS AND TREES (GB01)
- NATIVE GRASS MIX (GB02)
- PLANTING ON ROAD VERGE (SHRUBS)
- DAM
- ACCESS TRACK
- EXISTING TREES RETAINED
- NEW TREES

NOTES

General

- Final location of plants to be confirmed on site.
- Plant species should be supplied from an approved nursery. All plants should be true to the required species and type, and free from diseases, pests and weeds at the time of delivery.
- All trees and shrubs to be planted in natural appearance in groups of 3,5,7
- All landscape areas to comply with the relevant Australian Standards, Building Code, and CFS guidelines for landscape in bushfire prone areas.

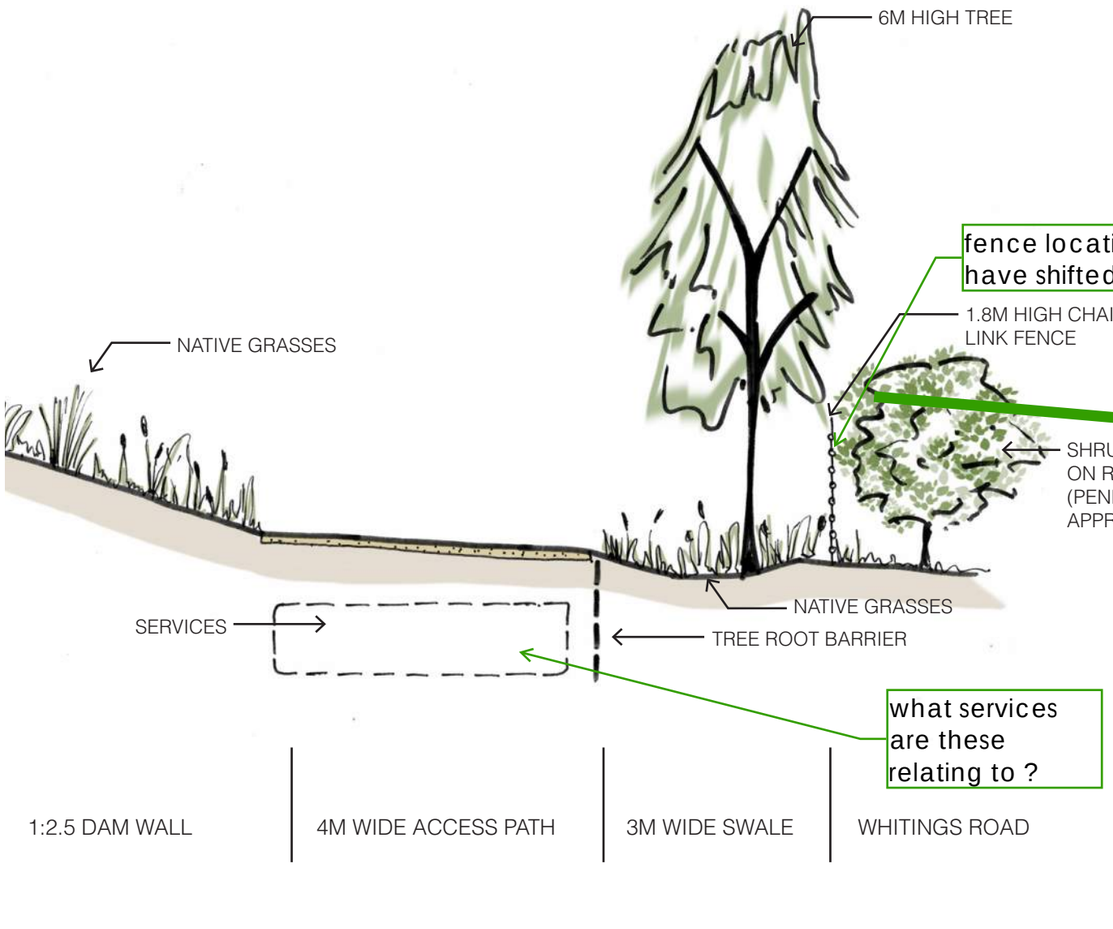
0 100m

Not to Scale

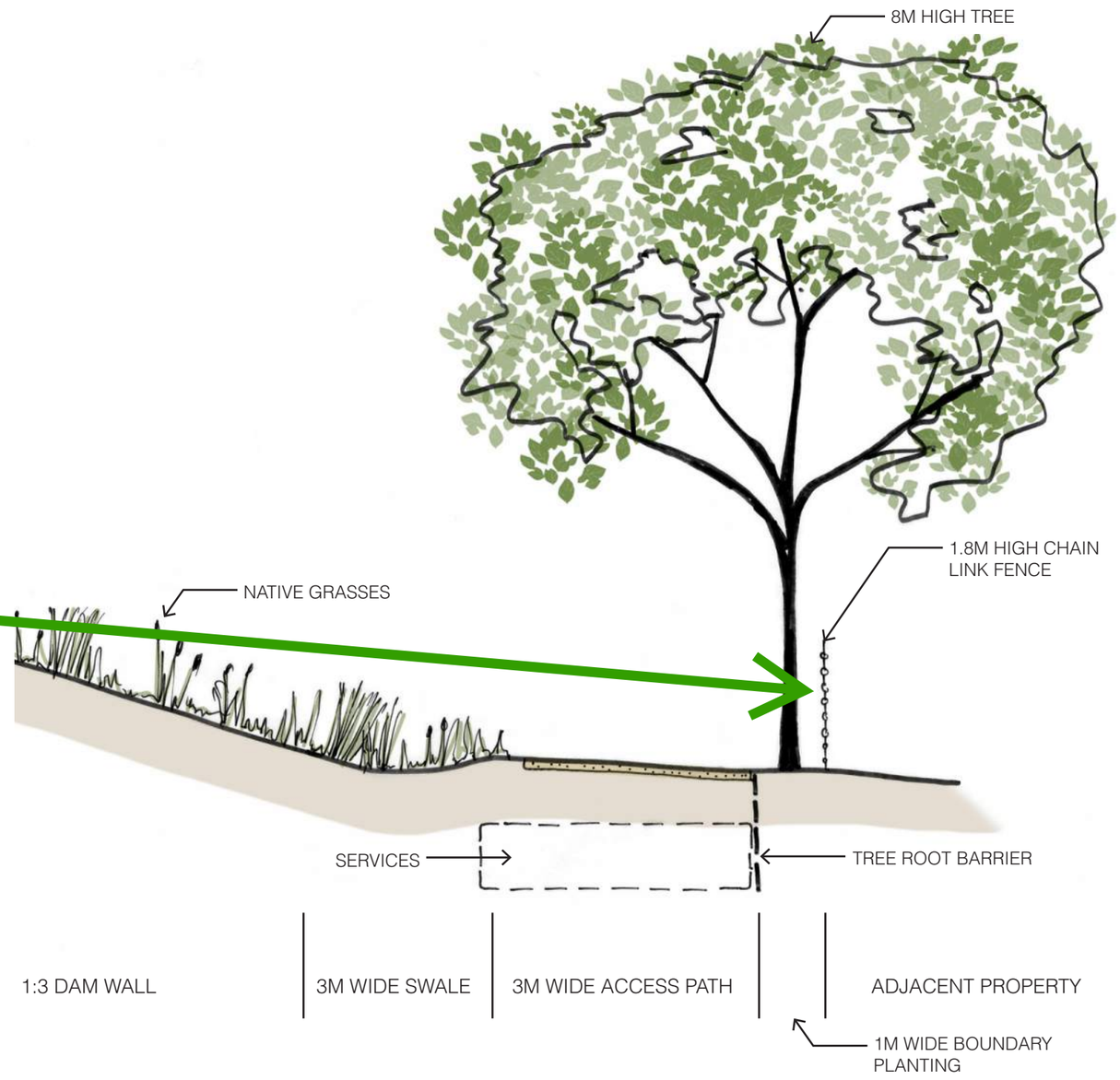
BLEWITT SPRINGS | LANDSCAPE PLAN

ISSUE 26.08.2025

CROSS SECTIONS



A WHITINGS ROAD PLANTING SECTION



B SOUTHERN BOUNDARY PLANTING SECTION

BLEWITT SPRINGS | LANDSCAPE PLAN

ISSUE 26.08.2025

MIXED SHRUBS AND TREES (GB01)


Callitris gracilis


Eucalyptus microcarpa


Eucalyptus porosa


Pittosporum angustifolium


Allocasuarina verticillata


Acacia pycnantha


Bursaria spinosa


Dodonaea viscosa


Melaleuca lanceolata


Acacia acinacea


Adriana quadripartita


Goodenia albiflora

Botanic Name	Height (m)	Width (m)	Plant Density
Callitris gracilis	20.0	8.0	Specimen
Eucalyptus microcarpa	15.0	10.0	Specimen
Eucalyptus porosa	14.0	12.0	Specimen
Pittosporum angustifolium	10.0	5.0	Specimen
Allocasuarina verticillata	8.0	6.0	Specimen
Acacia pycnantha	6.0	6.0	Specimen
Melaleuca lanceolata	8.0	5.0	Specimen
Bursaria spinosa	4.0	3.0	1 per m2
Dodonaea viscosa	4.0	3.0	1 per m2
Acacia acinacea	2.5	4.0	1 per m2
Adriana quadripartita	2.0	3.0	1 per m2
Goodenia albiflora	1.0	1.0	2 per m2

BLEWITT SPRINGS | LANDSCAPE PLAN

ISSUE 26.08.2025

MIXED SHRUBS AND TREES (GB01)


Olearia ramulosa


Rhagodia candolleana


Rhagodia parabolica


Atriplex semibaccata


Enchylaena tomentosa


Myoporum parvifolium

Botanic Name	Height (m)	Width (m)	Plant Density
Olearia ramulosa	1.5	1.0	2 per m2
Rhagodia candolleana	1.0	2.0	2 per m2
Rhagodia parabolica	3.0	5.0	1 per m2
Atriplex semibaccata	0.3	3.0	2 per m2
Enchylaena tomentosa	1.0	1.5	3 per m2
Myoporum parvifolium	0.2	2.0	1 per m2

BLEWITT SPRINGS | LANDSCAPE PLAN

ISSUE 26.08.2025

GRASS MIX (GB02)


Austrostipa elegantissima


Austrostipa blackii


Chloris truncata


Cymbopogon ambiguus


Dichanthium sericeum


Enneapogon nigricans


Microlaena stipoides var, stipoides


Poa labillardieri spp.


Rytidosperma spp. (Austrodanthonia spp.)


Themeda triandra

Botanic Name	Height (m)	Width (m)	Plant Density
Austrostipa elegantissima	1.0	1.0	Hydroseed
Austrostipa blackii	1.0	1.0	Hydroseed
Chloris truncata	0.5	0.5	Hydroseed
Cymbopogon ambiguus	1.0	0.5	Hydroseed
Dichanthium sericeum	0.8	0.4	Hydroseed
Enneapogon nigricans	0.5	0.5	Hydroseed
Microlaena stipoides var, stipoides	0.6	0.5	Hydroseed
Poa labillardieri spp.	1.0	0.7	Hydroseed
Rytidosperma spp. (Austrodanthonia spp.)	0.8	1.0	Hydroseed
Themeda triandra	1.0	0.8	Hydroseed

APPENDIX 8

Native Vegetation Data Report

Native Vegetation Clearance Data Report: 260 Whitings Rd, Blewitt Springs

for

Willunga Basin Water Co

Clearance under the *Native Vegetation Regulations 2017*

March 2026

Prepared by Jeremy Ross-Carter

Document Control:

Project: Native Vegetation Clearance Assessment Data Report: 260 Whitings Rd, Blewitt Springs

Client: Willunga Basin Water Co

Document Number: WBWC_002

Version: 1.0

Issue: Final

Assessor and Author: Jeremy Ross-Carter

Table of contents

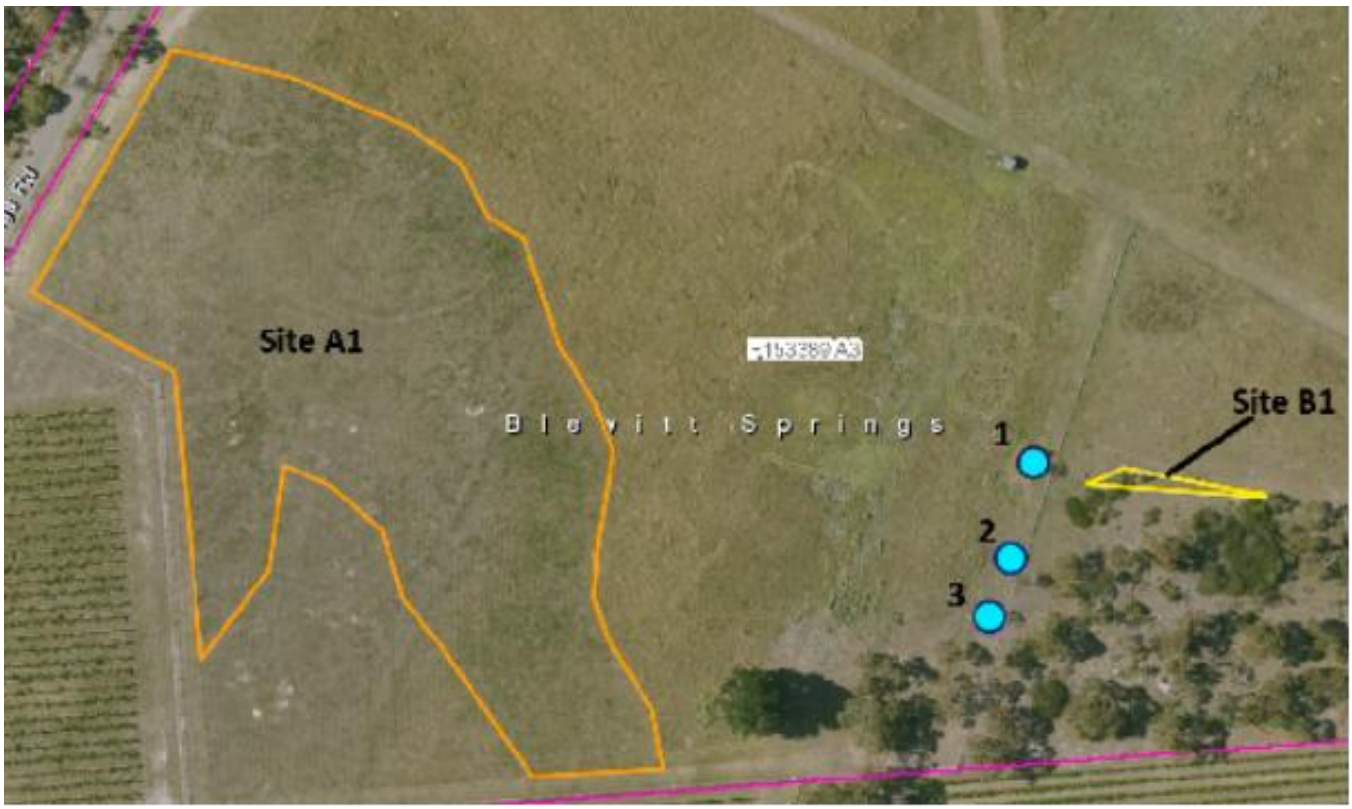
1. Application information 4
2. Purpose of clearance 5
3. Method 6
4. Assessment Outcomes 7
5. Clearance summary 18
6. Significant Environmental Benefit 18
7. Appendices 20

1. Application information

Application Details

Applicant:	Willunga Basin Water Co		
Key contact:	Eddie McGarry. Ph: 0426 367 690; Email: emcgarry@conexa.com		
Landowner:	Willunga Basin Water Co		
Site Address:	260 Whitings Road, Blewitt Springs		
Local Government Area:	City of Onkaparinga	Hundred:	Willunga
Title ID:	CT/5667/407	Parcel ID	F153389 A3

Summary of proposed clearance

Purpose of clearance	Clearance required for the construction of two water storage dams.
Native Vegetation Regulations	Regulation 12(34) - Infrastructure
Description of the vegetation under application	• Three scattered *Acacia pycnantha* • 1.48ha of a degraded area dominated by introduced pasture with scattered native flora, mainly *Pteridium esculentum ssp. esculentum* (Bracken Fern) • 0.012 of *Eucalyptus fasciculosa* (Pink Gum) woodland understorey
Total proposed clearance -	• Three scattered trees • 1.492 hectares of native vegetation
Level of clearance	Level 3
Map of proposed clearance area	
Mitigation hierarchy	During the planning and design stage of the project Willunga Basin Water Co. engaged an accredited consultant (Jeremy Ross-Carter) to identify native vegetation on the property and provide advice on vegetation that the NVC would consider high value. As a result, the proposed water storage dams and

	associated infrastructure will avoid approx. 10ha of intact *Eucalyptus fasciculosa* (Pink Gum) woodland, seven medium *Eucalyptus fasciculosa* (Pink Gum) and one medium *Eucalyptus camaldulensis var camaldulensis* (River Red Gum) that are growing on the subject property. The following design mitigations were employed to avoid impacts to native vegetation: • Position the pump shed more than 10m from native vegetation to be retained. • Positioning security fencing along the inner edge of all existing and proposed access tracks to maintain a 5m buffer from native vegetation. • Realign a section of fence to avoid native vegetation adjacent to the property's eastern boundary. • Utilise existing access tracks adjacent to native vegetation where possible to avoid potential impacts to tree root systems. To protect and minimise impacts to remaining native vegetation the following will be implemented during construction: • Physical delineation of native vegetation with exclusion flagging; • Strict use of designated access tracks and egress points; • regular dust mitigation to avoid impacting adjacent native vegetation; and • Addressing native vegetation protection measures via site inductions and/or toolbox meetings.
SEB Offset proposal	Payment of $8,475.44

2. Purpose of clearance

2.1 Introduction

Jeremy Ross-Carter was commissioned by Willunga Basin Water Co to conduct a native vegetation clearance assessment for the construction of two water storage dams at 260 Whitings Road, Blewitt Springs (Map 1) and to assess the potential impacts against the requirements of the *Native Vegetation Act 1991*.

2.2 Background

Willunga Basin Water Co currently supplies 7,250ML of recycled water to the McLaren Vale Region per annum, which represents approximately 65% of the region's annual water demand. Groundwater aquifers are used to supply the remaining supply; however, groundwater depletion and climate impacts are seeing the aquifers become increasingly saline and unsuitable for high-quality grape production.

A feasibility study showed that integration of dam storage into the network as being feasible to support network expansion as well as beneficial to existing users. The study examined the addition of 1,300 ML of water storage to expand the current network toward Blewitt Springs. The study included consideration of the ability to fill storage dams and distribute through the network.

A suitable site for water storage was identified at 260 Whitings Road, Blewitt Springs. The property is approximately 35ha of which approximately 12.6ha is vineyard, 11.5ha grazing, 10ha of native bushland and 1.2ha surround a house sheds and gardens.

The subject property is located within the Aldinga IBRA Associations of South Australia.

The landform in the Aldinga IBRA Association is described as fans merging into a gently undulating plain with open parklands with sown pasture, horticultural plantings and croplands. Approximately 3% of the Aldinga IBRA Association is mapped as remnant native vegetation, of which 44% is protected.

According to NatureMaps Generalised Land Use layer (2025), the subject property is zoned for horticultural purposes. Adjoining allotments are described as horticultural and rural residential.

2.3 Details of the proposal

The proposed development will include the construction of two new water storage dams, pump station, stormwater infrastructure, access tracks, security fencing and associated pipe works.

For further details of the proposed development refer to Appendix 1.

2.4 Approvals **required** ***or*** **obtained**

- *Native Vegetation Act 1991*: Consent to clear native vegetation under the *Native Vegetation Act 1991* is subject to this application and data report.
- *Planning, Development and Infrastructure Act 2016*: Development Application yet to be submitted.

2.5 Native Vegetation Regulations

Regulation 12(34) - Infrastructure

3. Method

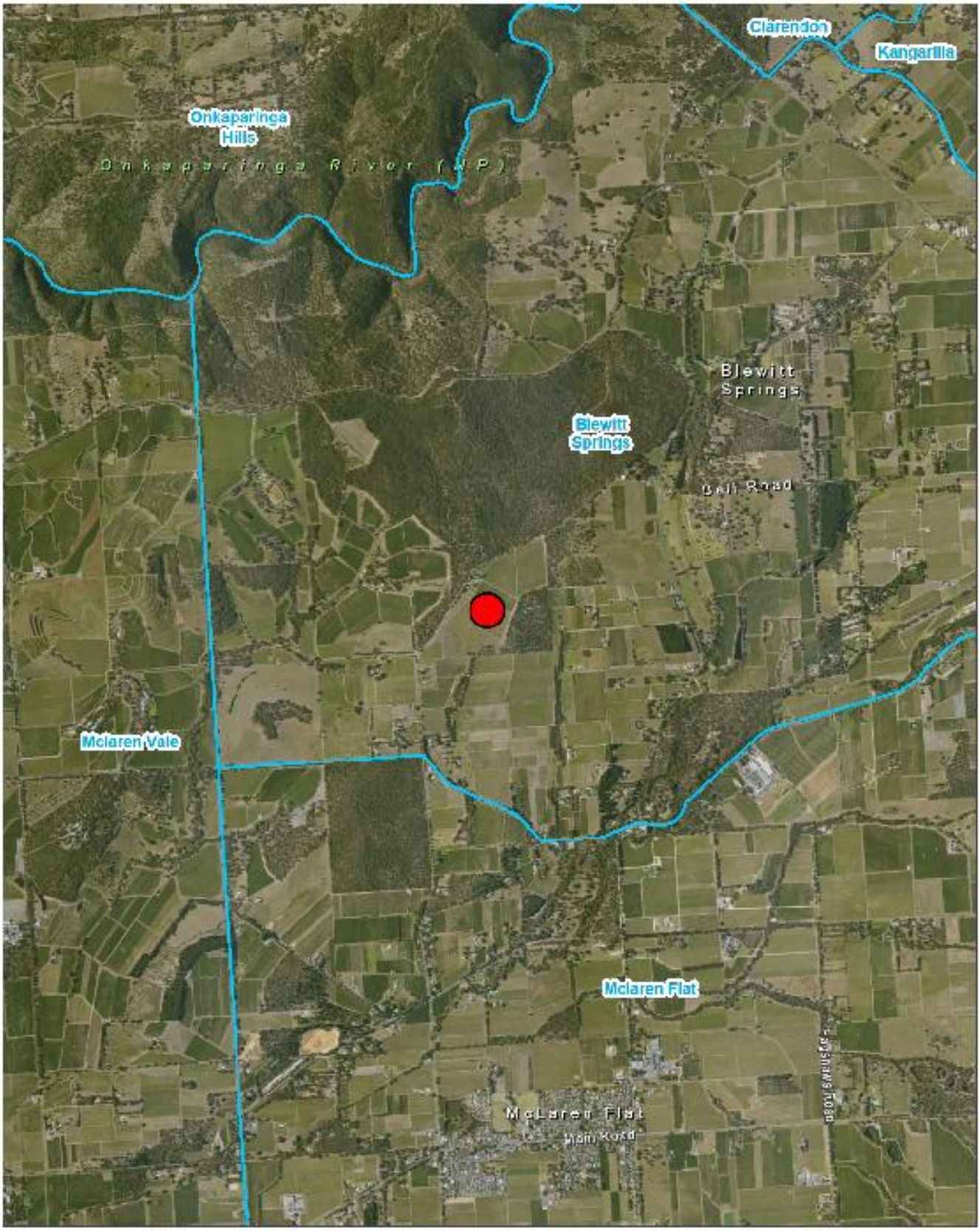
Prior to the site survey the following desktop assessments were conducted:

- Review of the Atlas of Living Australia and EPBC Act 1999 Protected Matter search tools within 5km of the site to determine the likelihood of any National and State listed fauna species that may utilise the vegetation under application.
- Review of the Atlas of Living Australia and EPBC Act 1999 Protected Matter search tools within 5km of the site to determine the likelihood of any National and State listed flora species and/or habitats of conservation significance that may be present on the subject land.

The subject property was surveyed on 21 June 2025. The survey was undertaken in accordance with the Native Vegetation Council (NVC) Bushland and Scattered Assessment Manual 2024. The aim of the site survey was to:

- record the vegetation association and flora species present;
- record the condition of the vegetation present;
- record the attributes of the native trees present;
- record any threatened flora species, if present;
- record any opportunistic fauna sightings;
- to assess the proposed clearance against the requirements of the *Native Vegetation Act 1991*.

Map 1. Location of 260 Whitings Road, Blewitt Springs



Map data is compiled from a variety of sources and hence its accuracy is variable.

0 1,481 Kms

Compiled: 29-Jun-2025
Generated at: www.naturemaps.sa.gov.au
Datum: Geocentric Datum of Australia, 2020
Projection: Web Mercator (Auxiliary Sphere)

4. Assessment Outcomes

4.1 Vegetation Assessment

General description of the vegetation, the site and matters of significance

The property currently contains vineyards and open paddocks for grazing purposes. A homestead and several sheds are located on the western side of the property with the driveway entering from Whitings Road. The southeast section of the property contains a remnant block of native vegetation approximately 10 hectares in size.

The land type of the region is described as rises and plains with mainly neutral to alkaline, sandy texture contrast soil with calcareous subsoil. The subject land soil is mapped as thick sand over clay and bleached sand over sandy clay loam. The vegetation under application is approximately 140m south of the Onkaparinga River National Park.

Details of the scattered trees proposed to be impacted (Map 2)

Note: Refer to Appendix 1 for the satellite image overlaid with proposed development and Tree 1-3.

Tree 1 *Acacia pycnantha* Number of trees – 1 Height (m) – 4 Hollows – Nil Diameter (cm) – 19 Canopy dieback (%) – 60 Total Biodiversity Score – 0.30	
Medium *Acacia pycnantha* (Golden Wattle) in poor health with 60% die-back of canopy. Tree 1 has no hollows. Tree 1 provides suitable habitat for the Elegant Parrot (*Neophema elegans elegans*) which is listed as rare under the *National Parks and Wildlife Act 1972*.	

Tree 2 *Acacia pycnantha* Number of trees – 1 Height (m) – 4 Hollows – Nil Diameter (cm) – 12 Canopy dieback (%) – 15 Total Biodiversity Score – 0.50	
Medium *Acacia pycnantha* (Golden Wattle) in good health with 15% die-back of canopy. Tree 2 has no hollows. Tree 2 provides suitable habitat for the Elegant Parrot (*Neophema elegans elegans*) which is listed as rare under the *National Parks and Wildlife Act 1972*.	

Tree 3 *Acacia pycnantha* Number of trees – 1 Height (m) – 6 Hollows – Nil Diameter (cm) – 14 Canopy dieback (%) – 30 Total Biodiversity Score – 0.61	
Large *Acacia pycnantha* (Golden Wattle) in moderate health with 30% die-back of canopy. Tree 3 has no hollows. Tree 3 provides suitable habitat for the Elegant Parrot (*Neophema elegans elegans*) which is listed as rare under the *National Parks and Wildlife Act 1972*.	

Details of vegetation proposed to be impacted (Map 2)

Site A1

Notes:

- Refer to Appendix 1 for the satellite image overlaid with the proposed development and Site A1.
- Graham Carpenter from the Native Vegetation Branch advised to benchmark Site A1 as a former woodland community with an open sclerophyll shrub understorey.

Vegetation Association	Degraded area dominated by introduced pasture with scattered native flora, mainly *Pteridium esculentum ssp. esculentum* (Bracken Fern)				
					
General description	Site A1 contains a degraded area dominated by introduced pasture with scattered native flora including *Pteridium esculentum ssp. esculentum* (Bracken Fern), *Hibbertia virgata* (Twiggy Guinea-Flower), *Melaleuca decussata* (Totem-poles), *Acacia myrtifolia* (Myrle Wattle) and *Xanthorrhoea semiplana ssp. semiplana* (Yacca). The area is regularly mowed and grazed by cattle which would inhibit the growth and regeneration of native flora. The native vegetation is dominated by *Pteridium esculentum ssp. esculentum* (Bracken Fern) which covers approximately 20-30% of the area. The other native species recorded are limited in cover and represent less than 1% of the area. The area is regularly grazed by cattle and slashed to maintain fire fuel loads.				
Threatened species	Site A1 provides suitable habitat for the Elegant Parrot (*Neophema elegans elegans*) which is listed as rare under the *National Parks and Wildlife Act 1972*.				
Landscape context score	1.13	Vegetation Condition Score	2.70	Conservation significance score	1.02
Unit biodiversity Score	3.11	Area (ha)	1.48	Total biodiversity Score	4.60

Site B1

Note: Refer to Appendix 1 for the satellite image with the proposed development and Site B1 overlay.

Vegetation Association	Removal of understorey species on the edge of a *Eucalyptus fasciculosa* (Pink Gum) woodland with an open sclerophyll shrub understorey

General description	The broader are of the vegetation block containing Site B1 includes a *Eucalyptus fasciculosa* (Pink Gum) woodland over *Acacia pycnantha* (Golden Wattle), *Acacia paradoxa* (Kangaroo Thorn), *Acacia acinacea* (Wreath Wattle), *Acacia myrtifolia* (Myrle Wattle), *Hibbertia virgata* (Twiggy Guinea-flower), *Xanthorrhoea semiplana ssp. semiplana* (Yacca), *Lomandra fibrata* (Mount Lofty Mat-rush) and *Rytidosperma caespitosum* (Common Wallaby-grass). The overstorey canopy contains *Amyema miquelii* (Box Mistletoe). Introduced flora species include *Crataegus monogyna* (Hawthorn), *Rhamnus alaternus* (Blowfly Bush), *Olea europaea* (Olive), *Pinus radiata* (Radiata Pine), *Gomphocarpus cancellatus* (Broad-leaf Cotton-bush), *Sonchus oleraceus* (Common Sow-thistle), *Sixalix atropurpurea* (Pincushion), *Plantago lanceolata* (Ribwort), *Hypericum perforatum ssp. veronense* (St John's Wort), *Trifolium arvense var. arvense* (Hare's-foot Clover), *Trifolium cherleri* (Cupped Clover), *Trifolium scabrum* (Rough Clover), *Bromus madritensis* (Compact Brome) and *Avena barbata* (Wild Oat). , *Asparagus asparagoides* (Bridal Creeper), *Chrysanthemoides monilifera* (Boneseed) and *Olea europaea* (Olive) are declared plant species listed under the *Landscape South Australia Act 2019.* The vegetation block is currently grazed by cattle. No regeneration of native flora was observed. The area contains patchy leaf litter with numerous branch and trunk sized logs. The percentage of native and introduced understorey biomass is approximately 50% each. Trees are in good health with no hollows observed. *Eucalyptus fasciculosa* (Pink Gum) is listed as a rare plant species within South Australia. However, no Pink Gums are proposed to be impacted as only a small section along the northern edge is under application. Native species to be impacted includes *Acacia paradoxa* (Kangaroo Thorn), *Acacia acinacea* (Wreath Wattle), *Acacia myrtifolia* (Myrle Wattle), *Hibbertia virgata* (Twiggy Guinea-flower), *Lomandra fibrata* (Mount Lofty Mat-rush) and *Rytidosperma caespitosum* (Common Wallaby-grass).				
Threatened species	Site B1 provides suitable habitat for the Elegant Parrot (*Neophema elegans elegans*) which is listed as rare under the *National Parks and Wildlife Act 1972*.				
Landscape context score	1.13	Vegetation Condition Score	25.12	Conservation significance score	1.06
Unit biodiversity Score	30.09	Area (ha)	0.012	Total biodiversity Score	0.36

4.2 Threatened Species assessment

Graham Carpenter (personnel communication: 3 March 2026) from the Native Vegetation Branch advised that the vegetation under application would provide suitable habitat for the fauna species listed in Table 1.

Table 1: Threatened bird species likely to use vegetation under application as suitable habitat.

Species (common name)	NP&W Act	EPBC Act
Elegant Parrot (*Neophema elegans elegans*)	Rare	-

4.3 Cumulative impact

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

Direct Impacts

The direct impacts to native vegetation of the proposed development are discussed above in Section 4.1.

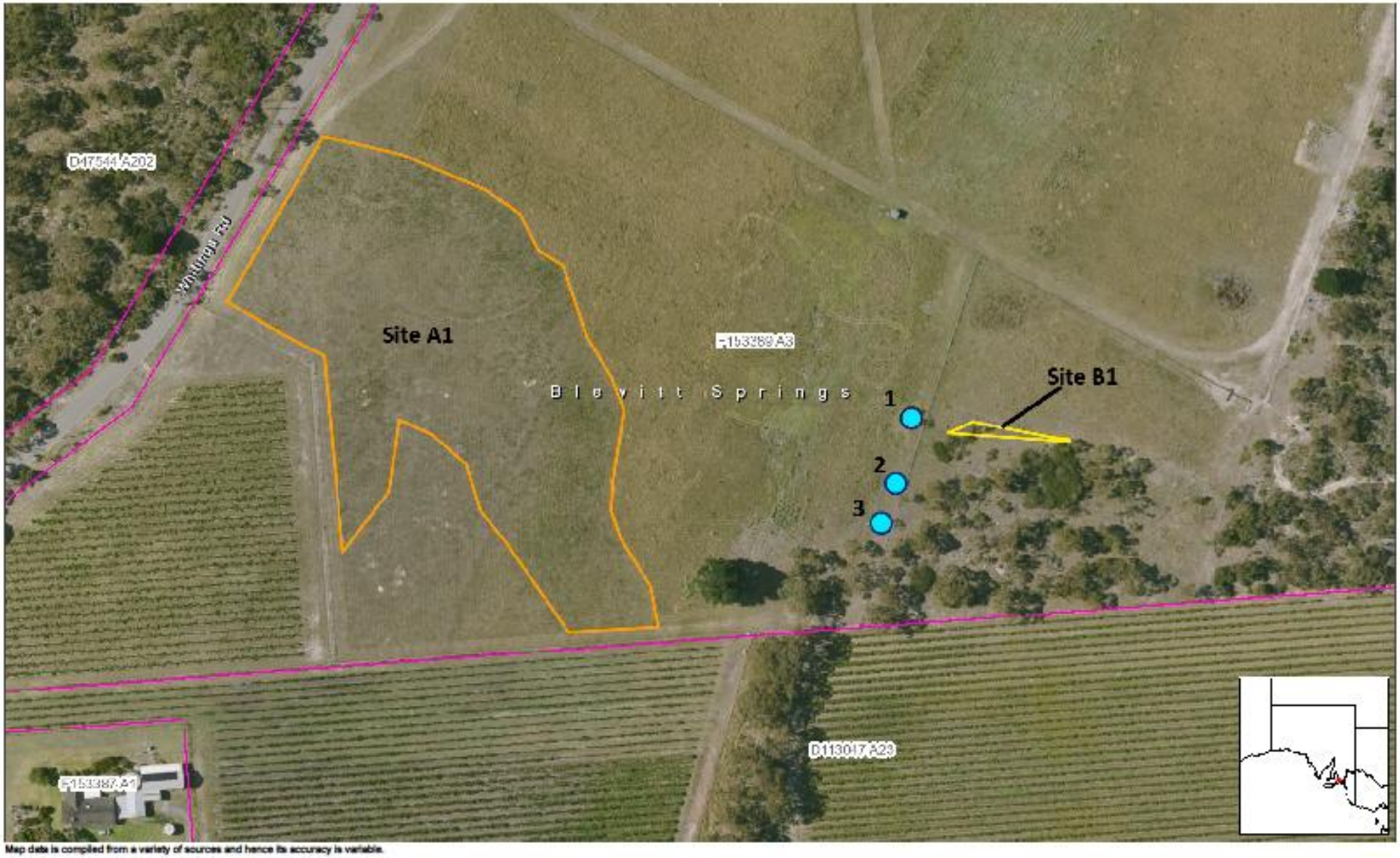
Indirect Impacts

No indirect impacts are foreseen for the proposed development.

Cumulative Impacts

No cumulative impacts are foreseen for the proposed development.

Map 2. Vegetation under Application



Map data is compiled from a variety of sources and hence its accuracy is variable.

0 90 Metres

Compiled: 2-Mar-2026
Generated at: www.naturemaps.sa.gov.au
Datum: Geocentric Datum of Australia, 2020
Projection: Web Mercator (Auxiliary Sphere)

Government of South Australia
Department for Environment

4.4 Address the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NP&W Act.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

During the planning and design stage of the project Willunga Basin Water Co. engaged an accredited consultant (Jeremy Ross-Carter) to identify native vegetation on the property and provide advice on vegetation that the NVC would consider high value. As a result, the proposed water storage dams and associated infrastructure will avoid approx. 10ha of intact *Eucalyptus fasciculosa* (Pink Gum) woodland, seven medium *Eucalyptus fasciculosa* (Pink Gum) and one medium *Eucalyptus camaldulensis var camaldulensis* (River Red Gum) that are growing on the subject property.

The following design mitigations were employed to avoid impacts to native vegetation:

- Position the pump shed more than 10m from native vegetation to be retained.
- Positioning security fencing along the inner edge of all existing and proposed access tracks to maintain a 5m buffer from native vegetation.
- Realign a section of fence to avoid native vegetation adjacent to the property's eastern boundary.
- Utilise existing access tracks adjacent to native vegetation where possible to avoid potential impacts to tree root systems.

Refer to Map 3 for further details of native vegetation to be avoided.

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).

To protect and minimise impacts to remaining native vegetation the following will be implemented during construction:

- Physical delineation of native vegetation with exclusion flagging;
- Strict use of designated access tracks and egress points;
- regular dust mitigation to avoid impacting adjacent native vegetation; and
- Addressing native vegetation protection measures via site inductions and/or toolbox meetings.

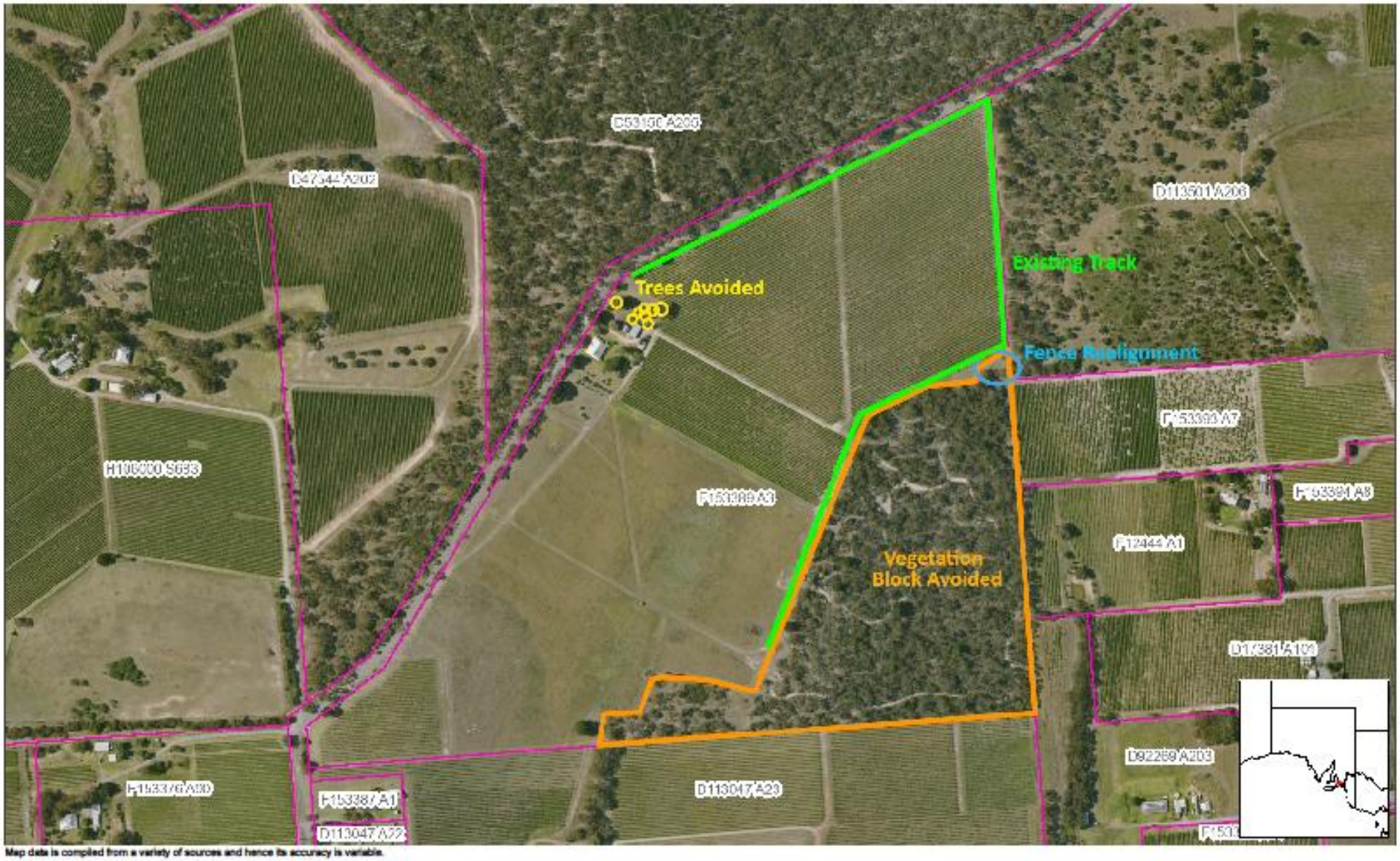
c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

Not applicable.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

As stated below in Section 6, the applicant has requested preference to provide the Significant Environmental Benefit (SEB) through payment into the NVC Fund.

Map 3. Native Vegetation to be Avoided



Map data is compiled from a variety of sources and hence its accuracy is variable.

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Compiled: 4-Mar-2026
Generated at: www.naturemaps.sa.gov.au
Datum: Geocentric Datum of Australia, 2020
Projection: Web Mercator (Auxiliary Sphere)

Government of South Australia
Department for Environment and Water

4.5 Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Principle of clearance	Considerations
Principle 1a - it comprises a high level of diversity of plant species	Relevant information • Site A1 contains 5 native species and 12 introduced species. • Site B1 contains 7 native species and 10 introduced species. Bushland Plant Diversity Score – • Site A1: 4 • Site B1: 9
	Assessment against the principles **Not at Variance**
Principle 1b - significance as a habitat for wildlife	Relevant information Site A1, B1 and Tree 1-3 would provide suitable habitat for the threatened fauna species listed above in Table 1. Threatened Fauna Score – • Site A1 and B1: 0.02 • Tree 1-3: 1 Unit biodiversity Score – • Site A1: 3.11 • Site B1: 30.09
	Assessment against the principles **At Variance** – Site A1, B1and Tree 1-3
Principle 1c - plants of a rare, vulnerable or endangered species	Relevant information Site B1 contains *Eucalyptus fasciculosa* (Pink Gum) which is listed as a rare plant species within South Australia. However, no Pink Gums are proposed to be impacted. Threatened Flora Scores - 0
	Assessment against the principles **Not at Variance**
Principle 1d - the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or	Relevant information No threatened plant communities are under application.
	Assessment against the principles **Not at Variance**

***endangered*:**	
Principle 1e - it is significant as a remnant of vegetation in an area which has been extensively cleared.	Relevant information Remnancy Figures • Aldinga IBRA Association: 3% • Mt Lofty Ranges IBRA Subregion: 15% Total Biodiversity Score – 6.37
	Assessment against the principles **Seriously at Variance** for the Aldinga IBRA Association
	Moderating factors that may be considered by the NVC Due to the low overall vegetation score, reduced native species cover, grazing pressure and degraded nature of Site A1, the vegetation is considered to be in poor condition and is likely to continue to degrade over the long term (next 20 to 50 years). In addition, Site B1 is on the edge of a *Eucalyptus fasciculosa* (Pink Gum) woodland with reduced native species cover and high risk of further weed encroachment. Combined with the existing pressure from cattle grazing, the condition of Site B1 is also likely to continue to degrade over the long term (next 20 to 50 years). Therefore, the NVC may consider reducing this Principle to 'At Variance'.
Principle 1f - it is growing in, or in association with, a wetland environment.	Relevant information Site A1 and B1 are not growing in a wetland environment.
	Assessment against the principles **Not at Variance**

4.6 Risk Assessment

Total clearance	No. of trees	3
	Area (ha)	1.492
	Total biodiversity Score	6.37
Seriously at variance with principle 1(b), 1(c) or 1 (d)		-
Risk assessment outcome		Level 3

5. Clearance summary

Clearance Area(s) Summary table

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	1		1	0	0.04	3.11	1.48	4.60	1	-	-	5.06	$5,803.77	$319.21
B	1	9	1	0.02	0.04	30.09	0.012	0.36	0.8	-	-	0.32	$415.42	$22.85
						Total	**1.492**	**4.96**				**5.38**	**$6,219.19**	**$342.06**

Scattered Trees Summary table

Tree or Cluster ID	Number of trees	Fauna Habitat score	Threatened flora score	Biodiversity score	Loss factor	SEB Points required	SEB Payment	Admin Fee
1	1	1	0	0.30	1	0.33	$386.29	$21.25
2	1	1	0	0.50	1	0.55	$643.82	$35.41
3	1	1	0	0.61	1	0.67	$784.29	$43.14
Total	**3**			**1.41**		**1.55**	**$1,814.40**	**$99.79**

Totals Summary Table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	6.37	6.93	$8,033.59	$441.85	$8,475.44

Economies of Scale Factor	0.5
Rainfall (mm)	632-654

6. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☐ Establish a new SEB Area on land owned by the proponent.
☐ Use SEB Credit that the proponent has established.
☐ Apply to have SEB Credit assigned from another person or body.
☐ Apply to have an SEB to be delivered by a Third Party.
☒ Pay into the Native Vegetation Fund.

PAYMENT SEB

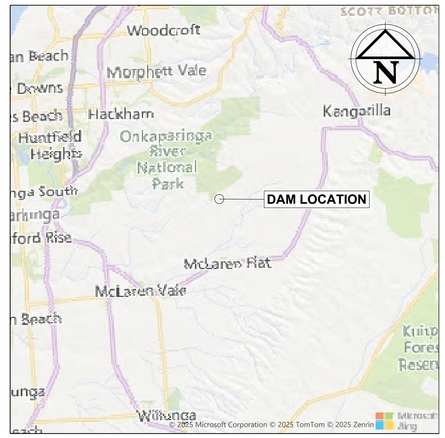
If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

- Total Payment amount required (including admin. fee): $8,475.44

7. Appendices

Appendix 1. Willunga Basin Water Co Blewitt Springs Plan

PLAN
SCALE 1:1000



LOCATION PLAN
SCALE ##########

LEGEND

- PROPERTY BOUNDARY
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED DAM DESIGN OUTLINES
- PROPOSED SWALE
- PROPOSED TRACK
- EXISTING TRACK
- VEGETATION AREA OUTLINE
- EX. SINGLE TREE AND REF No.
- EX. GROUP OF TREES AND REF No.

PROJECT STAGES	
STAGE 1	
STAGE 2	

TREE REMOVAL LIST

TREE No.	REMOVAL REQUIRED	TREE NAME
1	R	Acacia pycanantha
2	R	Acacia pycanantha
3	R	Acacia pycanantha
CONIFER 1	P	-
SITE A1	R	Eucalyptus fasciculosa (Pink Gum) woodland
SITE B1	R	Introduced pasture with scattered native flora

NOTES:

R = TO BE **REMOVED**
P = TO BE **PRESERVED**

0 10 25 50
SCALE 1:1000 METRES

NOTE :
THIS SHEET IS IN COLOUR AND MUST BE REPRODUCED AS SUCH TO MAINTAIN ACCURACY.

REV	DATE	DRAFT	DESCRIPTION
C	18/03/26	MG	FOR INFORMATION
B	10/02/26	JT	FOR INFORMATION
A	05/02/26	JT	FOR INFORMATION

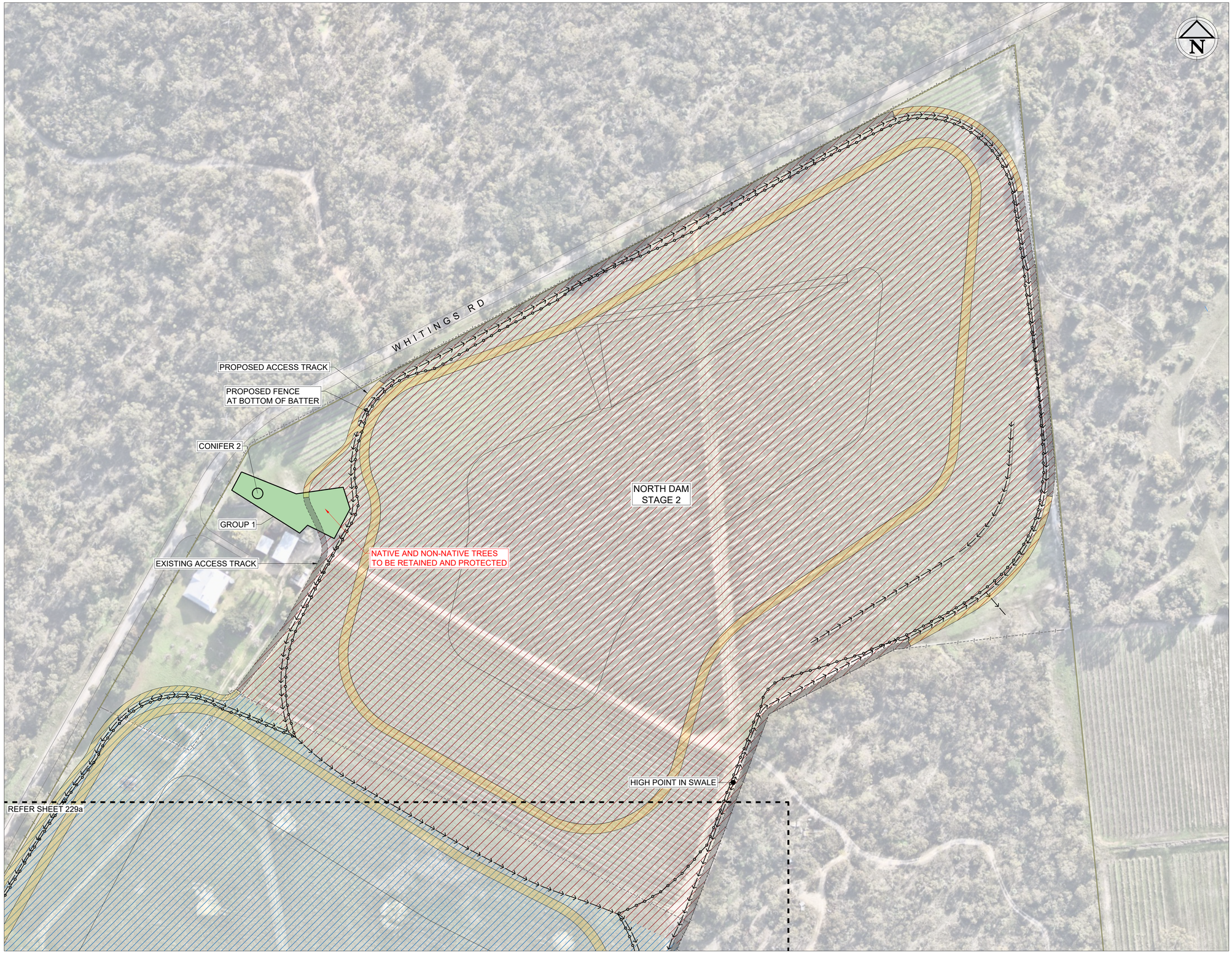
STATUS: **PRELIMINARY** NOT FOR CONSTRUCTION

DRAFTER: J. TERZIC		SCALE: 1:1000	SHEET SIZE: A1
DESIGNER: J. TERZIC		UNITS: ALL UNITS ARE IN METRES U.N.O.	
CHECKED: M. ALLEN	DATE: 05/02/26	COORDINATE SYSTEM: MGA ZONE 54 , GDA 94	
APPROVED: M. ALLEN	DATE: 05/02/26	ALL LEVELS ARE TO AHD	
		REF MARK:	

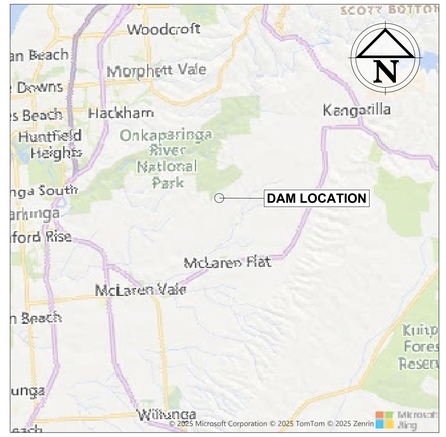
pinion ADVISORY
1300 746 466
pinionadvisory.com
hello@pinionadvisory.com

CLIENT:	WILLUNGA BASIN WATER
PROJECT:	BLEWITT SPRINGS STORAGE EXPANSION
SHEET TITLE:	DETAILED PLAN NATIVE VEG MAP - SOUTH
PROJECT REF: 17639	SHEET No.: 229a REV: C

Drawing file: 17639-200[E]-TWO DAMS.dwg - Plotted at 18/3/2026 1:33:16 PM



PLAN
SCALE 1:1000



LOCATION PLAN
SCALE 1:150,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED DAM DESIGN OUTLINES
- PROPOSED SWALE
- PROPOSED TRACK
- EXISTING TRACK
- VEGETATION AREA OUTLINE
- EX. SINGLE TREE AND REF No.
- EX. GROUP OF TREES AND REF No.

PROJECT STAGES	
STAGE 1	
STAGE 2	

TREE REMOVAL LIST		
TREE No.	REMOVAL REQUIRED	TREE NAME
GROUP 1	P	-
CONIFER 2	P	-

NOTES:

R	= TO BE **REMOVED**
P	= TO BE **PRESERVED**

0 10 25 50
SCALE 1:1000 METRES

NOTE :
THIS SHEET IS IN COLOUR AND MUST BE REPRODUCED AS SUCH TO MAINTAIN ACCURACY.

REV	DATE	DRAFT	DESCRIPTION
C	18/03/26	MG	FOR INFORMATION
B	10/02/26	JT	FOR INFORMATION
A	05/02/26	JT	FOR INFORMATION

STATUS: **PRELIMINARY**
NOT FOR CONSTRUCTION

DRAFTER: J. TERZIC
DESIGNER: J. TERZIC
CHECKED: M. ALLEN — DATE: 05/02/26
APPROVED: M. ALLEN — DATE: 05/02/26
SCALE: 1:1000 — SHEET SIZE: A1
UNITS: ALL UNITS ARE IN METRES U.N.O.
COORDINATE SYSTEM: MGA ZONE 54 , GDA 94
ALL LEVELS ARE TO AHD
REF MARK:

pinion ADVISORY
1300 746 466
pinionadvisory.com
hello@pinionadvisory.com

CLIENT: WILLUNGA BASIN WATER
PROJECT: BLEWITT SPRINGS STORAGE EXPANSION
SHEET TITLE: DETAILED PLAN
NATIVE VEG MAP - NORTH
PROJECT REF: 17639
SHEET No.: 229b
REV: C

Appendix 2. 260 Whitings Rd, Blewitt Springs Assessment Scoresheet

SEB Required for Scattered Trees

(SEB Policy 1 September 2024; File Update 9 Sept 2025)

Landscapes Region	**H&F**
Mean Annual Rainfall (mm)	**645**
Economies of Scale Factor	**0.5**
Management Cost Factor	$25,408
SEB Uplift Factor	1.10
SEB Points of Gain/ha Factor	7

IBRA Association	**Aldinga**

Total Biodiversity Score	1.41
Total SEB Points required	1.55
Payment $ (GST exclusive)	$1,814.40
Admin fee (GST inclusive)	$99.79
Total SEB $ required	**$1,914.19**

Surveyors	Jeremy Ross-Carter
Survey Date	21/06/2025
Datum	GDA20

Tree Species	Number of Trees (total)	Number of trees (proposed removed)	Number of trees (proposed pruning)	Total SEB Points required	Payment in NV Fund (GST Exclusive)	Administration fee (GST Inclusive)	Total
Acacia pycnantha	3	3	0	1.55	$1,814.40	$99.79	$1,914.19
0	0	0	0	0.00	$0.00	$0.00	$0.00

Tree No.	Species name (plus form and location description)	Number of trees in a clump (enter 1 for individual trees)	Height (m)	Diameter at 1m above ground level (cm)	Dieback %	Number of Hollows			Suitability for fauna threatened species				Threatened sp.	Remnancy	Loss Factor	Species	Fauna habitat Score	Threatened flora score	Biodiversity score (Max 15) (Score per tree)	Total biodiversity score	SEB Points Req.	Total SEB Payment ($)
									Number of species													
						Small	Medim	Large	Uncommon	NP&W Act - Rare	NP&W Act - Endangered or Vulnerable (exclude EBPC Listed spp.		Tree species is; R = Rare V = Vulnerable E = Endangered	IBRA Assoc. % veg remaining								
1	*Acacia pycnantha*	1	4.0	19	60					1				3	1.0	Acacia pycnantha	**1.00**	**0.00**	0.30	0.30	0.33	$407.54
2	*Acacia pycnantha*	1	4.0	12	15					1				3	1.0	Acacia pycnantha	**1.00**	**0.00**	0.50	0.50	0.55	$679.23
3	*Acacia pycnantha*	1	6.0	14	30					1				3	1.0	Acacia pycnantha	**1.00**	**0.00**	0.61	0.61	0.67	$827.43

Bushland Assessment Scoresheet

(SEB Policy 1 Sept 2024; Scoresheet updated 9 Sept 2025)

Block	A
Size of Block (Ha)	1.5
Landscapes Region	Hills and Fleurieu
BCM Region	Southern Mount Lofty Ranges
IBRA Association	Aldinga
IBRA Subregion	Mount Lofty Ranges

ASSESSOR(S) (Insert Full Name/s)	Jeremy Ross-Carter
DATE OF ASSESSMENT	21/06/2025

Map of the Block (Including the Sites)

Insert Map

Landscape Context Scores

% native veg. remaining in IBRA Assoc.	3
% native veg. remaining in IBRA subregion	15
0 - 10% = 0.05 pts; >10-20% = 0.04 pts; >20-30% = 0.03 pts; >30-60% = 0.02 pts; > 60 = 0 pts — **Score**	0.09

Score received for both IBRA assoc. and subregion then summed

Percent Vegetation Cover (5km radius) (%)	11
0-5% = 0 pts; >5-10% = 0.02 pts; >10-25% = 0.04 pts; >25-50% = 0.06 pts; >50-75% = 0.03 pt; >75-100% = 0 pts — **Score**	0.04

% native veg. protected IBRA Assoc.	44
0-10% = 0.03 pts; >10-20% = 0.02 pts; >20-40% = 0.01 pt; >40% = 0 — **Score**	0

Block Shape Cleared perimeter:Area (km/km2)	
Cleared Perimeter (m) =	630
Cleared Perimeter to area ratio	42.00
<6 = 0.03 pts; 6 to <12 = 0.02 pts; 12 to <18 = 0.01 pt — **Score**	0

Wetland or Riparian Habitat present	
Riparian zone present (Yes/No) = 0.02 pt	No
Swamp/wetland present (Yes/No) = 0.03 pts	No
(Swamp/wetland may be +/- riparian zone) — **Score**	0

Note; Blocks will score a minimum Landscape Context Score of 1

LANDSCAPE CONTEXT SCORE (max 1.25)	**1.13**

Plant Species Recorded (Native and Introduced)		Listed Species			Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Not in quadrat**	**Regen**	**Annual Herbs** Spring survey	**Introduced Species**
Pteridium esculentum ssp. esculentum	Bracken Fern						
Hibbertia virgata	Twiggy Guinea-flower						
Acacia myrtifolia	Myrtle Wattle						
Xanthorrhoea semiplana ssp. semiplana	Yacca						
Acacia myrtifolia	Myrtle Wattle						
Arctotheca calendula	Cape Weed						*
Oxalis pes-caprae	Soursob						*
Trifolium sp.	Clover						*
Ehrharta longiflora	Annual Veldt Grass						*
Romulea sp.	Onion-grass						*
Cynodon dactylon var. dactylon	Couch						*
Avena barbata	Bearded Oat						*
Plantago bellardii	Hairy Plantain						*
Olea europaea ssp.	Olive						*
Hypochaeris sp.	Cat's Ear						*
Lagurus ovatus	Hare's Tail Grass						*
Pentameris pallida	Pussy Tail						*

Threatened or Introduced Fauna Species Recorded or Observed (Native and Introduced)		Threatened Species				Introduced Species
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	
Neophema elegans elegans	Elegant Parrot		R			

Vegetation Condition Scores

SITE:	A1
BCM COMMUNITY	SMLR 2 Forests and Woodlands with an Open Sclerophyll Shrub Understorey
VEGETATION ASSOCIATION DESCRIPTION	*Degraded area dominated by introduced pasture with scattered native fl*
SIZE OF SITE (Ha)	1.48

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	5
Native Plant Species Diversity Score (max 30) from benchmark score *weighted by a factor of 2*	**4.0**
Number of regenerating native species	0
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5	**0**

Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Oxalis pes-caprae	3	4	12
Avena barbata	3	2	6
Ehrharta longiflora	4	2	8
Cynodon dactylon var. dactylon	3	2	6
Pentameris pallida	2	3	6
	Cover x Threat		38
Weed Score (max 15) from benchmark community			**3**

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	
Trees < 5m	
Mallee > 5m	
Mallee < 5m	
Shrubs > 2m	
Shrubs 0.5 - 2m	
Shrubs <0.5m	1
Forbs	
Mat Plants	
Grasses > 0.2m	
Grasses < 0.2m	
Sedges > 1m	
Sedges < 1m	
Hummock grasses	
Vines, scramblers	
Mistletoe	
Ferns	3
Grass-tree	1
Total	5

Native Plant Life Forms (max 20) from benchmark score *weighted by a factor of 2* **2.0**

Non-Benchmarked Attributes
(Scores determined from direct field observations)

Native:exotic Understorey biomass Score (max 5)	**2**

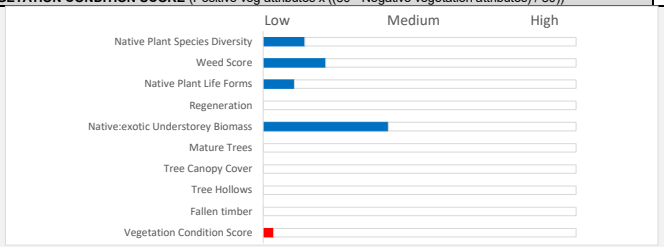
Is the community naturally treeless?	☐
Fallen Timber/Debris (max 5)	
Hollow-bearing trees Score (max 5)	
Mature Tree Score (max 8)	
Tree Canopy Cover Score (max 5)	

Vegetation Condition Score calculation

Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms
Fallen timber/debris + Hollow-bearing trees
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.24
- If the community is naturally treeless this score is multiplied by 1.29 6.00

Negative Vegetation Attributes Score = (15 - Weeds) + ((10 - Biomass score - Tree Canopy Cover Score)exp2/2) 44.00

VEGETATION CONDITION SCORE (Positive veg attributes x ((80 - Negative vegetation attributes) / 80)) **2.70**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.1 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (0.2 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (0.3 pts)	☐
Nationally (EPBC Act) **Vulnerable** community (0.35 pts)	☐
Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (0.4 pts)	☐

Note; all sites will score a minimum Conservation Significance Score of 1 **Threatened Community Score** **1**

Number of Threatened Flora Species recorded for the site (within the site)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (1 pt each)	0
State **Vulnerable** species recorded (2.5 pt each)	0
State **Endangered** recorded (5 pts each)	0
Nationally **Vulnerable** species recorded (10 pts each)	0
Nationally **Endangered** or **Critically endangered** species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.04 pts; 2 - <5 = 0.08 pts; 5 - <10 = 0.12 pts; 10 - <20 = 0.16 pts; 20 or > = 0.2 pts	0
Threatened Flora Score	**0**

Potential habitat for Threatened Fauna Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (1 pt each)	1
State **Vulnerable** species observed or locally recorded (2.5 pt each)	0
State **Endangered** species observed or locally recorded (5 pt each)	0
Nationally **Vulnerable** species observed or locally recorded (10 pts each)	0
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	1
Threatened Fauna Score	**0.02**

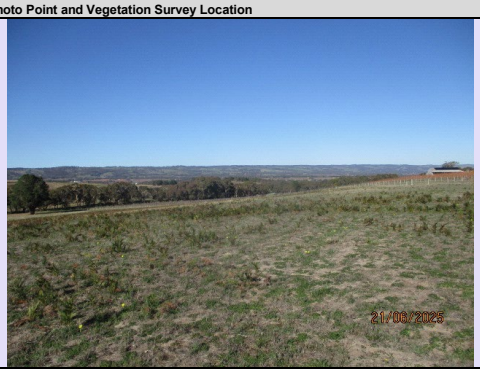
CONSERVATION SIGNIFICANCE SCORE	**1.02**

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	**1.13**
VEGETATION CONDITION SCORE	**2.70**
CONSERVATION SIGNIFICANCE SCORE	**1.02**

Vegetation Condition x Landscape Context x Conservation Significance =	
UNIT BIODIVERSITY SCORE	3.11
Total Biodiversity Score (Biodiversity Score x hectares)	4.60

Photo Point and Vegetation Survey Location



Direction of the Photo	
South	
GPS Reference	
Datum	GDA20
Zone (52, 53 or 54)	54
Easting (6 digits)	279820
Northing (7 digits)	6104330
Description	
Site A1	

SEB Offset Calculations (when a proposed clearance site is assessed)

SEB Points required for offset	
Loss Factor	1.0
Loadings for clearance of protected areas	
Reductions for rehabilitation of impact site	
SEB Uplift Factor	1.10
Total SEB Points Required	**5.06**

SEB - Payment in the Native Vegetation Fund	
SEB Points of Gain/ha Factor	7.0
Approximate SEB hectares required	0.72
Management Cost Factor ($/ha)	$25,408
Economies of Scale Factor	0.5
Mean annual rainfall for the site (mm)	632
Payment into the Fund (GST exclusive)	$5,803.77
Administration fee (GST inclusive)	$319.21
Total Payment Required	**$6,122.98**

Bushland Assessment Scoresheet (Small Sites)

(SEB Policy 1 Sept 2024; File Updated 9 Sept 2025)

Block	B
Size of Block (ha)	0.012
Landscapes Region	Hills and Fleurieu
IBRA Association	Aldinga
IBRA Subregion	Mount Lofty Ranges

ASSESSOR(S)	Jeremy Ross-Carter
Insert FULL name/s	
DATE OF ASSESSMENT	21/06/2025

Map of the Block (Including the Sites)

Insert Map here

Landscape Context Scores

Percent Vegetation Cover (5km radius) (%)	11
0-5% = 0 pts; >5-10% = 0.02 pts; >10-25% = 0.04 pts;	
>25-50% = 0.06 pts; >50-75% = 0.03 pt; >75-100% = 0 pts	
Score	0.04

Block Shape Cleared perimeter:Area (km/km2)	
Cleared Perimeter (m) =	37
Cleared Perimeter to area ratio	308.33
<6 = 0.03 pts; 6 to <12 = 0.02 pts; 12 to <18 = 0.01 pt	
Score	0

Note; Blocks will score a minimum Landscape Context Score of 1

% native veg. remaining in IBRA Assoc.	3
% native veg. remaining in IBRA subregion	15
0 - 10% = 0.05 pts; >10-20% = 0.04 pts; >20-30% = 0.03 pts;	
>30-60% = 0.02 pts; > 60 = 0 pts **Score**	0.09

Score received for both IBRA assoc. and subregion and summed

% native veg. protected IBRA Assoc.	44
0-10% = 0.03 pts; >10-20% = 0.02 pts; >20-40% = 0.01 pt;	
>40% = 0 **Score**	0

Wetland or Riparian Habitat present	
Riparian zone present (Yes/No) = 0.02 pt	No
Swamp/wetland present (Yes/No) = 0.03 pts	No
(Swamp/wetland may be +/- riparian zone)	
Score	0

LANDSCAPE CONTEXT SCORE (max 1.25)	**1.13**

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Introduced Species
Species	Common Name	EPBC	SA	
Eucalyptus fasciculosa	Pink Gum		R	
Amyema miquelii	Box Mistletoe			
Acacia paradoxa	Kangaroo Thorn			
Acacia pycnantha	Golden Wattle			
Acacia myrtifolia	Myrtle Wattle			
Xanthorrhoea semiplana ssp. semiplana	Yacca			
Lomandra fibrata	Mount Lofty Mat-rush			
Hibbertia virgata	Twiggy Guinea-flower			
Acacia acinacea	Wreath Wattle			
Rytidosperma caespitosum	Common Wallaby-grass			
Trifolium sp.	Clover			*
Oxalis pes-caprae	Soursob			*
Ehrharta longiflora	Annual Veldt Grass			*
Avena barbata	Bearded Oat			*
Arctotheca calendula	Cape Weed			*
Phalaris aquatica	Phalaris			*
Hypochaeris sp.	Cat's Ear			*
Chrysanthemoides monilifera ssp. monilifera	Boneseed			*
Olea europaea ssp.	Olive			*
Asparagus asparagoides f.	Bridal Creeper			*

Threatened or Introduced Animal Species Recorded or Observed (Native and Introduced)		Threatened Species				Introduced Species
Species Name	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	
Neophema elegans elegans	Elegant Parrot		R			

Vegetation Condition Scores

SITE:	B1
VEGETATION ASSOCIATION DESCRIPTION	Eucalyptus fasciculosa Woodland with an Open Sclerophyll Shrub Unde
SIZE OF SITE (Ha)	0.012

Native Plant species diversity

Score the diversity of species present in the site as a proportion to what would be expected in a vegetation of that community in very good condition (approaching a pre-European state)

<5% (3 Points)	☐
5-10% (6 Points)	☐
11 - 20% (9 Points)	☑
21 - 30% (12 Points)	☐
31 - 40 % (15 Points)	☐
41 - 50% (18 Points)	☐
51 - 60% (21 Points)	☐
61 - 70% (24 Points)	☐
71 - 80% (27 Points)	☐
>80% (30 Points)	☐
Native Plant species diversity score (max score of 30)	9

Weed Scores

Does the site contain plant species declared under the *Landscape SA Act 2019* (1.5 points)	☑
Cover rating for all declared weeds (max of 6)	3
Does the site contain environmental weeds (introduced plants with the capacity to invade and exclude native species from bushland. This typically includes species with a BCM weed threat rating of 3, 4 or 5). (1 Point)	☑
Cover rating for all environmental weeds (max of 6)	3
Weed Score (max score of 15)	7.5

Is the community naturally treeless?	☐
Mature Tree Score (max 8)	4
Fallen timber/debris (max 5)	3.5
Hollow-bearing trees Score (max 5)	0
Tree Canopy Cover Score (max 5)	4
Native:exotic Understorey biomass score (max 5)	4

Regeneration

No regeneration present (0 Points)	☑
Very low regeneration, consisting of highly scattered juvenile plants of a limited number of species (3 points)	☐
Regeneration present, consisting of multiple individual juvinile plants but a limited number of species (6 points)	☐
Multiple species regenerating, but low numbers of juvenile plants (9 points)	☐
Multiple species regenerating with multiple individual juviniles present with varying age classes (12 points)	☐
Regeneration Score (Max 12)	0

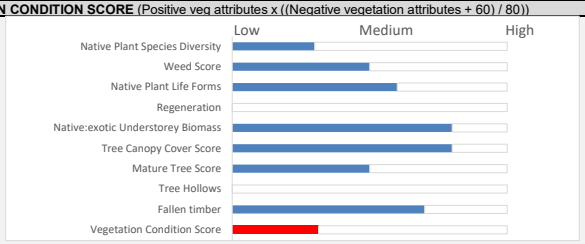
Native Plant life form

All strata of vegetation heavily impacted and native vegetation represented by only scattered plants (4 points)	☐
All strata of vegetation impacted with limited structural diversity, largely uniform age classes and reduced vegetation cover (8 points)	☐
At least one strata of vegetation has been impacted, with reduced structural diversity, elements may be missing (such as plant species that provide specific structural features e.g. sedges or mid layer shrubs) and reduce vegetation cover (12 points)	☑
Limited impacts on native vegetation, with a diversity of structural features and a varied age class, with only a minor loss in structurally diversity, vegetation cover or structural elements (16 points)	☐
All strata of vegetation present, little or no sign of disturbance. A variety of life forms and associated age classes present. Vegetation cover near complete (20 points)	☐
Native Plant life form score (max 20)	12

Vegetation Condition Score calculation

Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Mature Trees + Fallen timber/debris + Hollow-bearing trees

If the community is naturally treeless this score is multiplied by 1.24	28.50
Negative Vegetation Attributes Score = (15 - Weeds) + ((10 - Biomass score - Tree Canopy Cover Score)exp2/2)	9.50
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))	**25.12**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.1 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (0.2 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (0.3 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (0.35 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (0.4 pts)	☐
Note; all sites will score a minimum Conservation Significance Score of 1 **Threatened CommuntiyScore**	1

Number of Threatened Flora Species recorded for the site (within the site)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (1 pt each)	1
State **Vulnerable** species recorded (2.5 pt each)	0
State **Endangered** recorded (5 pts each)	0
Nationally **Vulnerable** species recorded (10 pts each)	0
Nationally **Endangered** or **Critically endangered** species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.04 pts; 2 - <5 = 0.08 pts; 5 - <10 = 0.12 pts; 10 - <20 = 0.16pts; 20 or > = 0.2 pts	**1**
Threatened Flora Score	0.04

Potential habitat for Threatened Fauna Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (1 pt each)	1
State **Vulnerable** species observed or locally recorded (2.5 pt each)	0
State **Endangered** species observed or locally recorded (5 pt each)	0
Nationally **Vulnerable** species observed or locally recorded (10 pts each)	0
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	**1**
Threatened Fauna Score	0.02

CONSERVATION SIGNIFICANCE SCORE	**1.06**

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	1.13
VEGETATION CONDITION SCORE	25.12
CONSERVATION SIGNIFICANCE SCORE	1.06

Vegetation Condition x Landscape Context x Conservation Significance =	
UNIT BIODIVERSITY SCORE	30.09
Total Biodiversity Score (Biodiversity Score x hectares)	0.36

Photo Point and Vegetation Survey Location	**Direction of the Photo**
Insert Photo Here	

GPS Reference	
Datum	
Zone (52, 53 or 54)	
Easting (6 digits)	
Northing (7 digits)	
Description	

SEB Offset Calculations
(when assessing a proposed clearance site)

SEB Points required for offset	
Loss Factor	0.8
Loadings for clearance of protected areas	
Reductions for rehabilitation of impact site	
SEB Uplift Factor	1.10
Total SEB Points Required	**0.32**

SEB - Payment in the Native Vegetation Fund	
SEB Points of Gain/ha Factor	7
Approximate SEB hectares required	0.05
Management Cost Factor ($/ha)	$25,408
Economies of Scale Factor	0.5
Mean Annual rainfall for the site (mm)	654
Payment into the Fund (GST exclusive)	$415.42
Administration fee (GST inclusive)	$22.85
Total Payment Required	**$438.27**