

Attachment 4 (RSD) -Appendix B

Preliminary Acid Sulfate Soils and
Dewatering Management Plan

Proposed Wind Farm in Scott River

Preliminary Acid Sulfate Soils and Dewatering Management Plan

Synergy Renewable Energy Diversion

PTG/01489 | Rev E
10 September 2025

Report Details

Unique Document Identification	
Document Title	Proposed Wind Farm in Scott River - Preliminary Acid Sulfate Soils and Dewatering Management Plan
Project Number	PTG/01489
Document ID	PTG_01489_EN_RP_001_Scott River WF Prelim ASSDMP_RevE_FINAL
Client	Synergy Renewable Energy Developments Pty Ltd
Client Contact	Wilson Mandisodza

Revision No.	Date	Document	Author	Reviewer
A	11/06/2025	Internal Draft	AF	RD
B	12/06/2025	Client Review	AF	RD
C	22/07/2025	Revised Client Review	AF	RD
D	08/08/2025	Final	AF	RD
E	10/09/2025	Revised Final	AF	RD

Contents

- Executive Summary..... 1
- 1. Introduction 6
 - 1.1 Background 6
 - 1.2 Acid Sulfate Soils – Definition 8
 - 1.3 Scope and Objectives 8
 - 1.4 Relevant Guidelines 8
 - 1.5 Standards of Assessment and Limitations 8
- 2 Site Description and Environmental Setting 10
 - 2.1 Site Identification 10
 - 2.2 Site Layout and Surrounding Land Uses 11
 - 2.3 Environmental Setting 11
 - 2.4 Sensitive Environmental Receptors 16
 - 2.5 Contaminated Sites 19
 - 2.6 Cultural Heritage 19
- 3 Proposed Development Works 20
- 4 Site Investigations 21
 - 4.1 Soil 21
 - 4.2 Groundwater 21
 - 4.2.1 Scope and Sampling Locations 21
 - 4.2.2 Sampling Method and Analytical Suite 21
 - 4.2.3 Groundwater Bore Installation Details 22
 - 4.3 Surface Water 23
 - 4.3.1 Scope and Sampling Locations 23
 - 4.3.2 Sampling Method and Analytical Suite 23
- 5 Assessment Criteria 24
 - 5.1 Soil 24
 - 5.2 Groundwater and Surface Water 24
- 6 Results 26
 - 6.1 Soils 26
 - 6.1.1 Description 26
 - 6.1.2 ASS Findings 26
 - 6.1.3 Summary 30
 - 6.2 Groundwater 31
 - 6.2.1 Groundwater Elevation and Flow 31
 - 6.2.2 Groundwater Quality Findings 31
 - 6.2.3 Summary 36
 - 6.3 Surface Water 36
 - 6.3.1 Surface Water Quality Findings 36

6.3.2	Summary	39
7	Groundwater Modelling	40
7.1	Approach.....	40
7.2	Drawdown Modelling Assumptions	40
7.2.1	General Model Inputs.....	40
7.2.2	Time-Variant Inflow.....	40
7.2.3	Steady-State Inflow & Distance-Drawdown	40
7.3	Results.....	41
7.3.1	Drawdown.....	41
7.3.2	Time-Variant Pumping (Cooper-Jacob model)	45
7.3.3	Steady-State Pumping (Marinelli & Niccoli; Dupuit-Thiem models)	45
7.4	Summary	46
8	Potential Environmental Impacts.....	47
9	Management Objectives.....	44
10	Dewatering and Groundwater Management	45
10.1	Administrative Requirements	45
10.2	Management Principles.....	45
10.3	Dewatering Treatment and Disposal	45
10.3.1	Dewatering Treatment Method and Materials	46
10.3.2	Dewatering Disposal Assessment.....	46
10.3.3	Dewatering Treatment Setup	47
10.3.4	Dewatering Recharge/Infiltration Basins.....	47
10.4	Contact Details	47
10.5	Roles and Responsibilities.....	48
10.6	Management Guidance	49
10.6.1	Dewatering Effluent	49
10.7	Dewatering Effluent and Groundwater Monitoring.....	50
10.7.1	Dewatering Effluent	50
10.7.2	Groundwater	52
10.8	Dewatering Effluent and Groundwater Water Quality Reference and Trigger Criteria	53
10.8.1	Groundwater	53
10.8.2	Dewatering Effluent	54
10.9	Surface Water Monitoring and Water Quality Triggers and Criteria.....	54
10.9.1	Monitoring Regime and Responsibilities.....	54
10.9.2	Water Quality Reference and Trigger Criteria	56
10.10	Contingency Responses	57
10.10.1	Groundwater	57
10.10.2	Dewatering Effluent.....	57
10.10.3	Surface Water	58
11	ASS Management	59

11.1	Soil Excavation and Handling	59
11.1.1	Overview	59
11.1.2	Management Principles	59
11.2	Liming Rate and Material	60
11.2.1	Lime Material	60
11.2.2	Liming Rates	60
11.3	Validation Sampling	61
11.3.1	Sampling Protocol	61
11.3.2	Validation Criteria	61
11.3.3	Quality Control and Assurance	61
11.3.4	Contingency measures	62
11.4	Accumulated Sediments within Dewater Effluent Storage Infrastructure	62
11.4.1	Sampling Protocol	62
11.4.2	Validation Criteria	62
11.4.3	Quality Control and Assurance	62
12	ASS Environmental Reporting	63
12.1	Overview	63
12.2	Closure (Construction Activities Close-out) Report	63
12.3	Post Construction Monitoring Closure Report	63
13	References	64

List of Tables

Table 0-1: Earthworks Program	2
Table 0-2: ASS Management Summary	4
Table 0-3: Monitoring Program and Responsibilities	4
Table 2-1: Site Identification Details	10
Table 2-2: Surrounding Land Uses	11
Table 2-3: Environmental Setting	11
Table 2-4: Sensitive Environmental Receptors	16
Table 3-1: Summary of Development Works	20
Table 4-1: Bore Construction Details	22
Table 4-2: Surface Water Sampling Summary	23
Table 5-1: DWER Indicative pH Assessment Criteria for ASS.....	24
Table 5-2: DWER ASS Management Action Criteria.....	24
Table 6-1: Soil Profile	26
Table 6-2: pH _F and pH _{FOX} Summary.....	26
Table 6-3: ASS Summary.....	28
Table 6-4: ASS Key Results Summary – Geological Units.....	29
Table 6-5: ASS Key Results Summary – Depth.....	29
Table 6-6: Depth to Water and Static Water Levels	31
Table 6-7: Groundwater Physical Parameters Summary.....	32
Table 6-8: Groundwater Analytical Results Summary – Leederville Aquifer.....	33
Table 6-9: Groundwater Analytical Results Summary – Superficial Aquifer	34
Table 6-10: Surface Water Physical Parameters Summary	36
Table 6-11: Surface Water Analytical Results Summary – Creekline Discharge	37
Table 6-12: Surface Water Analytical Results Summary – Wetland	38
Table 7-1: Predicted Drawdown Distances.....	41
Table 7-2: Summary of Time-Variant Discharge Rates, Per Location.....	45
Table 7-3: Summary of Steady-State Discharge Rates.....	46
Table 7-4: Summary of Pumping Rates and Estimated Volume, Per Location.....	46
Table 8-1: Potential Environmental Impacts	47
Table 10-1: Dewatering Treatment Method and Materials.....	46
Table 10-2: Dewatering Disposal Options Assessment.....	46
Table 10-3: Contact Details.....	47
Table 10-4: Monitoring Program and Responsibilities	48
Table 10-5: Dewatering Management Guidance	49
Table 10-6: Dewatering Effluent Monitoring Program and Responsibilities	50
Table 10-7: Dewatering Effluent Monitoring Matrix	51
Table 10-8: Dewatering Effluent Sampling Requirements and Analytical Suite	51
Table 10-9: Groundwater Monitoring Program and Responsibilities.....	52

Table 10-10: Groundwater Sampling Requirements and Analytical Suite52

Table 10-11: Dewatering Treatment and Discharge Reference Criteria..... 54

Table 10-12: Surface Water Monitoring Program and Responsibilities55

Table 10-13: Surface Water Sampling Requirements and Analytical Suite55

Table 11-1: ASS Management Summary.....59

Table 11-2: Liming Rates 60

Table 11-3: Soil Validation Sampling Numbers..... 61

Table 11-4: Treated Soil Validation Criteria 61

List of Figures

Figure 1-1: Indicative Project Layout 7

Figure 2-1: Superficial Aquifer Inferred Groundwater Flow Direction (Shallow Bores) (Stantec, August 2025) 14

Figure 2-2: Leederville Aquifer Inferred Groundwater Flow Direction (Deep Bores) (Stantec, August 2025)15

Figure 2-3: Confirmed and Potential Groundwater Dependent Values within the site (Stantec, August 2025) 18

Figure 7-1: Predicted Groundwater Drawdown (Stantec, August 2025) 42

Figure 7-2: Predicted Groundwater Drawdown – GDEs (Stantec, August 2025) 43

Figure 7-3: Predicted Groundwater Drawdown – Social Receptors (Stantec, August 2025) 44

Appendices

- Appendix A – Figures
- Appendix B – Database Search Results
- Appendix C – Sampling and Groundwater Bore Construction Logs
- Appendix D – Tables
- Appendix E – Laboratory Documentation

Acronyms and Abbreviations

Abbreviations	Full Name
~	Approximately
>	Greater than
<	Less than
%	Per cent
%S	Percentage sulfur
μS/cm	Micro Siemens per centimetre
AASS	Actual acid sulfate soils
AHD	Australian Height Datum
ANC	Acid neutralising capacity
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Guideline
AS/NZS	Australian Standard/New Zealand Standard
ASS	Acid sulfate soils
ASSDMP	Acid Sulfate Soils and Dewatering Management Plan
ASLP	Australian Standard Leaching Procedure
ATT	Attention
BSR	Basic summary of records
CaCO ₃	Calcium carbonate
CF	Conversion Factor
Cl ⁻	Chloride
cm	Centimetre
CO ₃ ²⁻	Carbonate
DBCA	Department of Biodiversity, Conservation and Attractions
DO	Dissolved oxygen
DoH	Department of Health
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EC	Electrical conductivity
EIL	Ecological Investigation Level
ENV	Effective neutralising value
EPBC Act	<i>Environmental Protection, Biodiversity and Conservation Act 1999</i>
FWG	Freshwater Guidelines
GDA	Geocentric Datum of Australia
GDE	Groundwater Dependent Ecosystem
H ⁺ /tonne	Hydrogen per tonne

Abbreviations	Full Name
HCO ₃ ⁻	Bicarbonate
HIL-A	Health Investigation Levels for residential
kL	Kilolitres
km	Kilometres
km ²	Square kilometres
L/s	Litres per second
LDWG	Livestock Drinking Water Guidelines
LIWG	Long-term Irrigation Water Guidelines
LOR	Limit of reporting
m	Metres
m ³	Cubic metres
m/d	Metres per day
m ³ /d	Cubic metres per day
mbgl	Metres below ground level
mg/L	Milligrams per litre
MGA	Map Grid of Australia
mm	Millimetres
mol H ⁺ /tonne	Moles of hydrogen per tonne
MW	MegaWatt
NASS	Non-acid Sulfate Soils
NATA	National Associated of Testing Authorities
NO _x -N	Nitrates and nitrites as nitrogen
NPUG	Non-potable Drinking Water Guidelines
PASS	Potential Acid Sulfate Soils
pH _F	Field pH
pH _{FOX}	Field peroxide pH
pH _{KCl}	Potassium chloride pH
pH _{OX}	Peroxide oxidised pH
PTG	PTG Consulting Pty Ltd
Pty Ltd	Proprietary Limited
PVC	Polyvinyl chloride
QAQC	Quality Assurance and Quality Control
Redox	Oxidation and reduction potential
RP	Reactive phosphorus
RPD	Relative percentage difference
SF	Safety factor
S _{NAS}	Sulfur - Net Acid Soluble

Abbreviations	Full Name
SO ₄ ²⁻	Sulfate
SPOS	Sulfur - Peroxide Oxidisable Sulfur
SynergyRED	Synergy Renewable Energy Developments Pty Ltd
TA	Total alkalinity
TAA	Titrateable actual acidity
TDS	total dissolved solids
TEC	Threatened Ecological Community
TKN	Total Kjeldahl nitrogen
TP	Total phosphorus
TSS	Total suspended solids
tonne/m ³	Tonne per cubic metre
the project	Proposed wind farm in Scott River
the site	Project area for the proposed wind farm in Scott River
TPA	Titrateable peroxide acidity
TTA	Titrateable total acidity
USEPA	United States Environmental Protection Agency
V	Volts
VEPA	Victorian Environmental Protection Agency

EXECUTIVE SUMMARY

Introduction

Synergy Renewable Energy Developments Pty Ltd (SynergyRED) engaged PTG Consulting Pty Ltd (PTG) to support environmental approvals and management, with respect to Acid Sulfate Soils (ASS), for the proposed 100 MW wind farm (the “project”) on the Scott River Plain, ~15 km northeast of Augusta, Western Australia (Figure 1, Appendix A).

The project site (Figure 1, Appendix A) occupies an area of ~3,596.8 hectares (ha) and comprises agricultural properties bound by Dennis Road to the east and Scott River Road to the west. The northern end is bordered by a fence line approximately 1.5 km south of the Brockman Highway, and the southern boundary extends approximately 1.5 km south of Governor Broome Road (the ‘site’).

The infrastructure for the project has not been finalised however the proposed works for the project are anticipated to include excavation of soil and potentially dewatering for the following:

- Construction of up to 20 wind turbine generators, up to 250 m in height, with two primary foundations being explored:
 - primary concrete foundations up to 0.8-1.2 metres below ground level (mbgl), supported by a series of concrete piles.
 - primary concrete foundations at the surface, supported by a series of concrete piles.
 - traditional below ground foundations up to 6 mbgl, whilst considered unlikely, may be considered where no dewatering is required and the ASS risk is considered low.
- Construction of a network of access roads for required infrastructure.
- Construction/installation of associated infrastructure including:
 - Electrical substation(s) and switchyard.
 - Operations and maintenance building and workshop.
 - Meteorological mast(s) and transmission poles and or towers and connecting power lines on foundations installed to depths ranging from 0.25-1.5 mbgl.
 - Buried electrical cabling connecting the turbines to substation(s).
- Construction of gravel borrow pits and extraction of associated material.

Proposed locations for the various project infrastructure are presented on Figure 1, Appendix A.

The site is mapped by the Department of Water and Environmental Regulation (DWER) as having a “high to moderate risk of ASS occurring within 3 m of natural soil surface” (NationalMap, 2025a). The site is mapped as being underlain by alluvium (Qpd), a known ASS and reflected in the ASS risk mapping for the site. Preliminary investigations have identified alluvium across the site throughout the investigated soil profile, with a maximum net acidity of 2.1%S. Layers of ferricrete are also present on the site (Stantec, July 2024).

Due to the presence of ASS and estimated dewatering requirements being potentially high impact activities, i.e. risk to groundwater quality and groundwater dependent ecosystems (GDEs) (Stantec, August 2025), and subsequent development, an Acid Sulfate Soils and Dewatering Management Plan (ASSDMP) is required to identify and manage the potential risks associated with construction in accordance with guidelines developed by the DWER. The ASSDMP has also been prepared to support environmental approvals for the project under the *Environmental Protection Act 1986*.

As the proposed infrastructure and layout for the project has not been finalised, this Preliminary ASSDMP presents the findings of a Preliminary ASS Assessment and details the proposed management framework, controls and monitoring procedures within which soil excavation, dewatering and discharge activities will be undertaken during construction, in-line with current Department of Water and Environmental Regulation (DWER) guidelines.

Upon completion of detailed engineering design, this Preliminary ASSDMP will be revised to reflect the final proposed design and detail additional investigation(s) completed to support the project.

This version of the Preliminary ASSDMP relates specifically to the construction of the project.

The major components of the earthworks and dewatering program are outlined in Table O-1, providing context for the subsequent sections detailing ASS and groundwater management. This ASSDMP contains Management Strategies specific to the construction of the project.

Table 0-1: Earthworks Program

Component	Description
Turbine Construction	<p>Up to 20 wind turbines, up to 250 m in height, will be constructed onsite. The works will involve the excavation and dewatering of in-situ soils. There are currently two primary foundation options being explored:</p> <p>Option 1 – Partially above ground foundation: would require foundations (~30 x 30 m in area) to be installed to depth of between 0.8-1.2 mbgl. The main gravity foundation would be supported by a series of concrete piles, which would be installed via concrete injected down augers to displace soils. Minimal soil from depth may be recovered when the auger is being removed as concrete is injected. Dewatering requirements would vary depending on the time of year and location of the turbine on-site. There may be up to -1 m of dewatering required in summer, with up to -2 m required in winter for a 3-4-week duration at each foundation.</p> <p>Option 2 – Fully above ground foundation: is similar to option 1 except the gravity foundation will be installed at the ground surface. As such there would be minimal excavation and no dewatering requirement.</p> <p>A third option, a traditional below ground foundation: is similar to option 1 except the gravity foundation will be installed completely below the ground surface. While considered unlikely at this stage, this option may be utilised, where it is confirmed prior to construction, through detailed site investigation and further modelling, that the proposed turbine location would not require dewatering that would present any risk to groundwater dependent values (i.e., drawdown greater than natural seasonal variation), and the potential risk associated with disturbance of ASS is considered low.</p>
Underground services (e.g., cabling)	A network of underground electrical cabling will be required to be installed from each wind turbine to the substation(s). The electrical cabling will be installed at a depth of ~1.2 mbgl and require the excavation and potentially dewatering of in-situ soils.
Wind monitoring and communication towers	Foundations for wind monitoring and communication towers will involve the excavation and dewatering of in-situ soils similar to turbine construction but limited to depth of between 0.25-1.5 mbgl. Dewatering requirements would vary depending on the time of year, location and maximum depth of the foundation. There may be up to -1 m of dewatering required in summer, with up to -2 m required in winter for a 3-4-week duration at each foundation.
Transmission Poles and Towers	Western Power will be responsible for the installation of transmission poles and towers across the site. Foundations for the pole and towers will be concrete caisson (bored concrete) foundations, with displaced soil managed via the ASSDMP. No dewatering is required for these foundations however displaced water from the injection of concrete will be managed as per dewatering effluent in the ASSDMP.
Substation and Operations and maintenance area	Construction of support infrastructure may require the disturbance of insitu soils, and potentially dewatering for foundations and associated underground infrastructure, e.g. cabling, services.
Other supporting infrastructure (e.g., roads, temporary construction facilities)	<p>A number of other supporting infrastructure will be required in support of the project, including, construction of site entrances and access roads, water storage infrastructure, public viewing area, and temporary construction facilities (e.g., site offices, laydown areas, and concrete batching plant).</p> <p>Minimal disturbance of insitu soils is anticipated in support of these components</p>
Borrow pits	Local sourcing of gravel from borrow pits, should detailed geotechnical investigations confirm suitable source/s. Borrow pits will be excavated above the groundwater table and therefore no dewatering will be required.

Construction works will attempt to be scheduled for summer months where possible.

Findings

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands extending to depth. Exceedances of the net acidity management criteria were observed in all soil types, and across all depths, except pale grey sands.

Based upon the available information all soils, except shallow pale grey and white sands (<1 mbgl), will require active management and lime-neutralisation during construction where excavated.

Groundwater is slightly acidic and acidic to slightly acidic within the Leederville and Superficial Aquifers respectively and contain low concentrations of acid buffering capacity. Concentrations for dissolved aluminium (Superficial only), iron, manganese and zinc commonly exceed adopted guideline values, with concentrations of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Dissolved metal concentrations are typically higher in the Superficial than Leederville Aquifer. Total nitrogen, total ammonia and total phosphorous concentrations reported in the Superficial Aquifer commonly exceeded adopted guidelines, with lower concentrations, which are predominately below adopted guidelines, observed in the Leederville Aquifer.

Based upon a review of the water quality results compared against the DWER ASS guidance, there is some evidence of acidification, i.e. low pH, especially in the Superficial Aquifer. The groundwater is recognised as being susceptible to further acidification should soils and dewatering not be managed appropriately during construction.

Surface water is slightly acidic to neutral (7.8 pH units) and contains measurable levels of acid buffering capacity. Concentrations for dissolved aluminium and iron commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Total nitrogen, reactive phosphorous and total phosphorous concentrations reported in both wetland and creekline discharge samples commonly exceeded adopted guidelines, with isolated exceedances on total ammonia and oxidised nitrogen species.

Based upon a review of the surface water quality results compared against the DWER ASS guidance, there is minimal evidence of acidification. It is recognised however that surface water is at risk from impacts from acidification, should soils and dewatering effluent not be managed appropriately during construction.

Management

The outcomes of the preliminary ASS investigations have been assessed and preliminary management plans prepared for groundwater, surface water, dewatering effluent and soils (described herein) for the construction of the project.

Dewatering, Groundwater and Surface Water

Dewatering works will potentially be required during construction to support any excavation activities with the potential to interact with the water table, including the installation of foundations (i.e., wind turbines, wind monitoring and communication towers), and underground cabling, the proposed electrical substation, and operations and maintenance area. Dewatering requirements for other infrastructure is currently unknown. Transmission poles/towers to be installed by Western Power are unlikely to require dewatering however groundwater will be displaced by concrete during the pouring of piles. The potential/volume of dewatering effluent is dependent on the time of year of construction and water levels at the time of construction.

Any dewatering effluent will likely require treatment in accordance with DWER guidelines (DWER, 2015b). Dewatering effluent would be required to be stored on-site after initial lime treatment (if required) prior to being recharged into the superficial aquifer. Where treatment is required, effluent will be pumped through an automated lime-dosing unit utilising calcium-based neutralising agent, i.e., hydrated lime, and discharged into a limestone lined settlement basin. The settlement basin will then overflow into unlined recharge areas/trenches. Infiltration basins/trenches will be positioned between the area under abstraction and any sensitive receptor(s) to limit potential impacts to receptors.

Monitoring works for groundwater, surface water¹, and dewatering effluent during and after construction have been detailed in accordance with the relevant DWER guidelines. Reporting provisions are also detailed.

Soils

Based upon the current proposed excavation depths, natural soils, except pale grey and white sands, exceed relevant DWER management criteria and will therefore require management and lime neutralisation upon disturbance. A summary of the management requirements, based upon the current proposed construction methodology and available information at the time of reporting, with respect to ASS is presented below in Table O-2.

¹ Where groundwater decreases are observed >10 cm, 100 m from dewatering activities in the vicinity of surface water bodies

Table 0-2: ASS Management Summary

Soils Requiring Management	Depth* (mbgl)	Management Requirements
Sand - Dark grey/brown/black	All	Lime treatment and reuse onsite where possible
Sandy clay - Pale and dark grey	>1.75	Geotechnically unsuitable material to go for off-site disposal at licensed soil treatment facility and or used as non-structural fill.
Ferricrete	0.5-3.5	

Management Principles

The following management principles are to be promoted to limit the potential impact of oxidation and acid leaching for on-site soils.

1. The majority of the infrastructure for the wind farm will be installed into in-situ soils via open excavation and trenches. Soils requiring treatment will be:
 - a. stockpiled prior to treatment on limestone pads. There are likely to be multiple treatment and stockpile locations given the area of development envelope, and distance between excavations.
 - i. Where required, limestone pads will be constructed with crushed compacted² limestone, in accordance with DWER guidelines (2015b); i.e. ~300 mm thickness, with perimeter bunds (minimum 150 mm high)
 - ii. The pad should be graded to a corner such that any leachate generated is contained/captured within the pad.
 - iii. Where treatment on a limestone pad occurs, all soils are to be treated within 18 hours. Stockpiles must be <2 m in height;
 - b. treated upon excavation (i.e. lime incorporated during excavation) and placed adjacent to the excavation, where possible;
2. Aglime will be incorporated into the material at the prescribed liming rate. Treated soils will either be reinterred, reused on-site.
3. In areas requiring soil management and treatment, soils at the base of excavations will be covered with a thin layer of aglime (~20 mm) as a precautionary measure to provide buffering capacity against minor releases of acidity.
4. Geotechnically unsuitable ASS material, where it cannot be used as non-structural fill onsite, will be disposed of offsite at a licensed soil treatment facility. All trucking and disposal documents must be kept and made available to SynergyRED at the end of works
5. During the works all material excavated and stockpiled, and or material imported to site, is to be stored an adequate distance away from waterways (creek/drainage lines) and wetlands, to minimise the potential for stockpile leachate/runoff entering such water bodies.

Responsibilities and Monitoring Schedule

The monitoring frequency and requirements for groundwater, dewater effluent, surface water, lime-treated soils and accumulated sediments are summarised in Table 0-3.

Table 0-3: Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Dewatering Monitoring		
Daily	Field analysis: pH, EC, total titratable acidity (TTA), total alkalinity (TA) Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	

² The level of compaction used should produce an appropriately low permeability to prevent infiltration of leachate (DWER, 2015b)

Monitoring Activity	Parameters	Responsibility
Fortnightly	Laboratory: <ul style="list-style-type: none"> DWER Full Analytical Suite¹ 	
Groundwater Monitoring		
Pre Construction Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	Civil Contractor/ Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	
Immediately After Dewatering		
Post-Construction		Site Environment representative/ Specialist consultant
Surface Water Monitoring		
Pre Construction Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: <ul style="list-style-type: none"> DWER Full Analytical Suite¹ Turbidity 	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 1²		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2³		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor/ Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: <ul style="list-style-type: none"> DWER Full Analytical Suite¹ Turbidity 	
Immediately After Dewatering		
Post-Construction ⁴		Site Environment representative/ Specialist consultant
Validation of Treated PASS Soils		
Collection of soil samples upon notification from site contractor	Laboratory: pH _F and pH _{FOX} , and SPOCAS ⁵	Site Environment representative/ Specialist consultant
Accumulated Sediments		
Upon completion of dewatering, use of each settlement/recharge basin	Heavy metals	Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. 2. Groundwater levels (at 100 m): >0.1 m at 100 m (outside natural decreases). 3. Groundwater decrease (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland. 4. Only if Level 2 monitoring is undertaken. 5. Suspension Peroxide Oxidation Combined Acidity and Sulfur. [^] Within four weeks prior of dewatering commencing.

1. INTRODUCTION

1.1 Background

Synergy Renewable Energy Developments Pty Ltd (SynergyRED) engaged PTG Consulting Pty Ltd (PTG) to support environmental approvals and management, with respect to Acid Sulfate Soils (ASS), for the proposed 100 MW wind farm (the “project”) on the Scott River Plain, ~15 km northeast of Augusta, Western Australia (Figure 1, Appendix A).

The project (Figure 1, Appendix A) occupies an area of ~3,596.8 hectares (ha) and comprises agricultural properties bound by Dennis Road to the east and Scott River Road to the west. The northern end is bordered by a fence line approximately 1.5 km south of the Brockman Highway, and the southern boundary extends approximately 1.5 km south of Governor Broome Road (the “site”).

The infrastructure for the project has not been finalised however the proposed to works for the project are anticipated to include excavation of soil and potentially dewatering for the following:

- Construction of up to 20 wind turbine generators, up to 250 m in height, with two primary foundations being explored:
 - primary concrete foundations up to 0.8-1.2 metres below ground level (mbgl), supported by a series of concrete piles.
 - primary concrete foundations at the surface, supported by a series of concrete piles.
 - traditional below ground foundations up to 6 mbgl, whilst considered unlikely, may be considered where no dewatering is required and the ASS risk is considered low.
- Construction of a network of access roads to required infrastructure.
- Construction/installation of associated infrastructure including:
 - Electrical substation(s) and switchyard.
 - Operations and maintenance building and workshop.
 - Meteorological mast(s) and transmission poles and or towers and connecting power lines on foundations installed to depths ranging from 0.25-1.5 mbgl.
 - Buried electrical cabling connecting the turbines to substation(s).
- Construction of gravel borrow pits and extraction of associated material.

Proposed locations for the various project infrastructure are presented Figure 1-1 and Figure 1, Appendix A.

The site is mapped by the Department of Water and Environmental Regulation (DWER) as having a “high to moderate risk of ASS occurring within 3 m of natural soil surface” (NationalMap, 2025a). The site is mapped as being underlain by alluvium (Qpd), a known ASS and reflected in the ASS risk mapping for the site. Preliminary investigations have identified alluvium across the site throughout the investigated soil profile, with a maximum net acidity of 2.1%S. Layers of ferricrete are also present on the site (Stantec, July 2024).

Due to the presence of ASS and estimated dewatering requirements being potentially high impact activities, i.e. risk to groundwater quality and groundwater dependent ecosystems (GDEs) (Stantec, August 2025), and subsequent development, an Acid Sulfate Soils and Dewatering Management Plan (ASSDMP) is required to identify and manage the potential risks associated with construction in accordance with guidelines developed by the DWER. The ASSDMP has also been prepared to support environmental approvals for the project under the *Environmental Protection Act 1986*.

As the proposed infrastructure and layout for the project has not been finalised, this Preliminary ASSDMP presents the findings of the Preliminary ASS Assessment and details the proposed management framework, controls and monitoring procedures within which soil excavation, dewatering and discharge activities will be undertaken during construction, in-line with current DWER guidelines.

Upon completion of detailed engineering design, this ASSDMP will be revised to reflect the final proposed design and detail additional investigation(s) completed to support the project.

This version of the Preliminary ASSDMP relates specifically to the construction of the project.

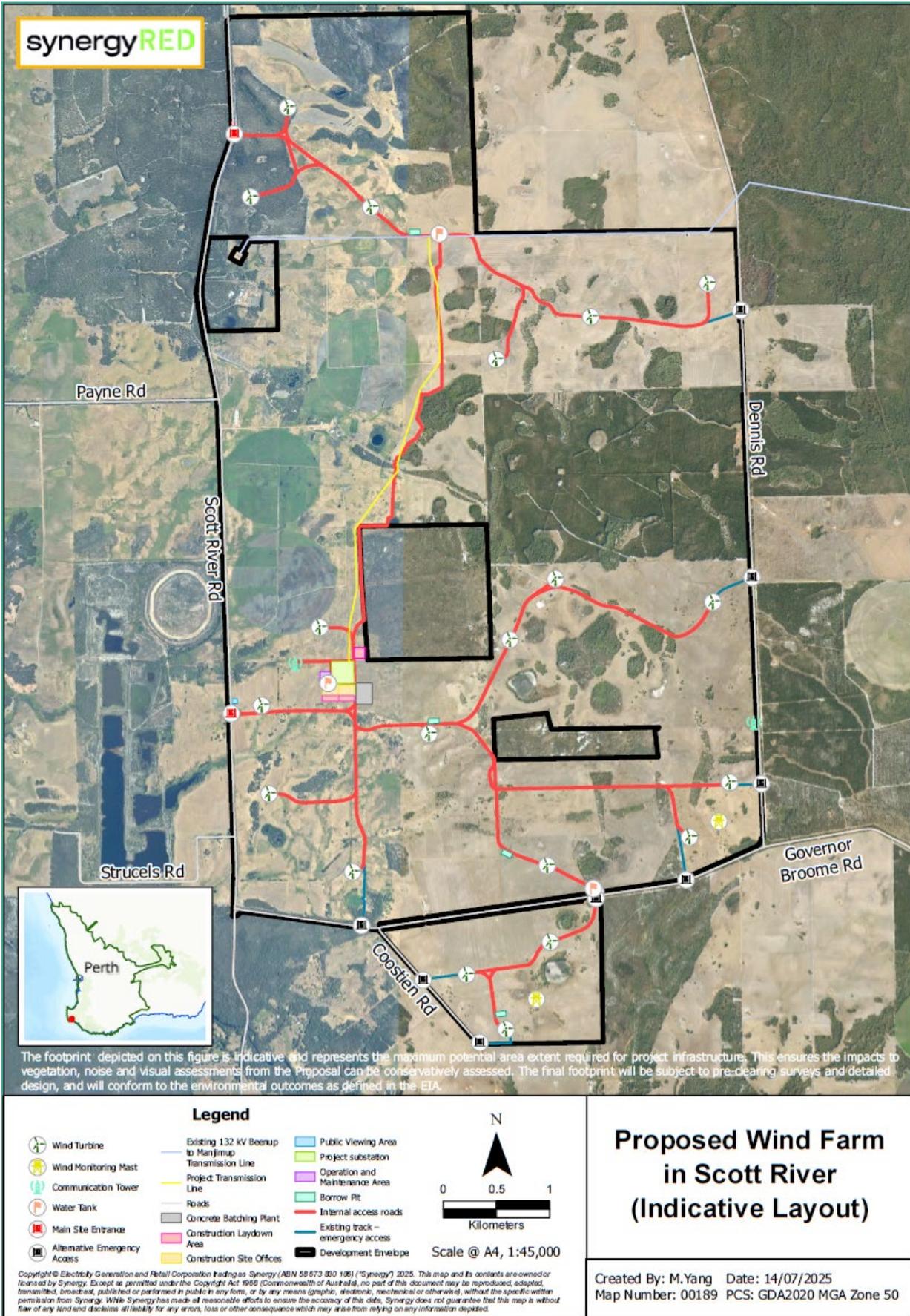


Figure 1-1: Indicative Project Layout

1.2 Acid Sulfate Soils – Definition

ASS are formed naturally under waterlogged, iron and sulfate-rich conditions, being typical of coastal lowlands where the land has been subject to inundation by sea water. These soils contain iron sulfide minerals (most commonly pyrite) or their oxidation products and remain stable under anaerobic conditions. Upon exposure to air however, they may be oxidised, with the result being the formation of sulfuric acid and the subsequent release of iron, aluminium and other heavy metals and nutrients from soils into surface water bodies and groundwater.

ASS as described above are the most commonly occurring form of acid generating soils encountered in Western Australia; however, a range of other acid generating soils that do not fit the traditional description of ASS may also be encountered during site investigations and can release a significant amount of acidity and/or iron when disturbed (DWER, 2015a).

Development of land containing ASS thereby introduces a risk of environmental harm that requires management. Earthmoving, dewatering and drainage works can result in exposure of these soils to oxidation either directly or indirectly through the lowering of the water table.

1.3 Scope and Objectives

The principal objectives for the Preliminary ASSDMP are to;

1. Present relevant soils, groundwater and surface water quality baseline data.
2. Detail the proposed soil and dewatering management programs to be adopted during construction.

Works undertaken for the Preliminary ASSDMP included:

- Detail findings of initial investigations.
- Estimate the potential dewatering rates and volumes based upon empirical groundwater modelling.
- Assess potential environmental impacts from proposed construction works that may result due to disturbing ASS (directly or indirectly) during excavation and or groundwater abstraction or disposal (dewatering effluent).
- Outline ASS and Dewatering Management Strategies for the construction works which detail:
 - Soil excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS.
 - Treated soil validation testing programs.
 - Management of dewatering .
 - Soil, groundwater, surface water and dewatering monitoring programs.
 - Potential contingency measures and appropriate responses that may be implemented to rectify any breaches of nominated triggers and management measures.

1.4 Relevant Guidelines

The proposed scope of work was undertaken in accordance with applicable industry standards and guidelines to the extent relevant to an assessment of this type, and have been formulated in reference to the following (not limited to):

- *Assessment and management of contaminated sites – Contaminated Sites Guidelines* (DWER, 2021)
- *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* (DWER, June 2015a)
- *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER, June 2015b)

1.5 Standards of Assessment and Limitations

This assessment has been undertaken in general accordance with the current industry standards for the purpose, objectives and scope identified in this report.

The agreed scope of this assessment/management plan has been limited for the current purposes of SynergyRED. Conclusions and recommendations presented in this report are derived only from observations and results provided to PTG. Quality Assurance or Quality Control is limited to PTG data. This assessment report is not any of the following:

- A Preliminary Site Investigation (PSI) or Detailed Site Investigation (DSI) for contamination.
- A Voluntary Audit Report (VAR) or Mandatory Audit Report (MAR).

- A Geotechnical Report, and the bore logs or test pit logs may not be suitable as the basis for geotechnical advice.
- A detailed hydrogeological modelling assessment.
- An assessment of groundwater contamination potentially arising from other sources or sites nearby.
- A Remediation Action Plan (RAP) or Site Remediation and Validation (SRV) report.
- A Site Management Plan (SMP).

2 SITE DESCRIPTION AND ENVIRONMENTAL SETTING

2.1 Site Identification

A summary of the site identification details is provided in Table 2-1, with the site layout and location presented on Figure 1, Appendix A.

Table 2-1: Site Identification Details

Element	Details			
Address	Lot (Number)	Plan	Street	Suburb
	4265 (598)	208480	Dennis Rd	Scott River
	4260 (119)	208478	Governor Broome Rd	
	1 (399)	D69685		
	4261	208478		
	4154	207769		
	4263	208478		
	100	38071		
	4152 (599)	207770	Scott River Rd	Courtenay
	6 (527)	33923	Scott River Rd	
	4266	208480		
	4269	209300		Scott River
	2	D90280	Scott River Rd	
Certificate of Title	Lot	Volume	Folio	
	4265 (598)	1581	567	
	4260 (119)	1824	96	
	1 (399)	1924	610	
	4261	1726	538	
	4154	1930	228	
	4263	1930	516	
	100	2555	699	
	4152 (599)	2027	165	
	6 (527)	2543	911	
	4266	1818	129	
	4269	1981	387	
	2	2082	107	
Site Boundary Coordinates (Map Grid of Australia (MGA), Geocentric Datum of Australia (GDA) 2020, Zone 50)	Location	Easting	Northing	
	Northwest	340,574	6,217,219	
	Southwest	340,531	6,208,580	
	Northeast	345,393	6,215,205	
	Southeast	345,653	6,209,332	

Element	Details
Site Area	~3,596.8 hectares (ha)
Traditional Owners	Bibulmun and Wardandi Noongar
Local Government Authority	Shire of Augusta-Margaret River
Current Zoning	General agriculture ¹

1. Shire of Augusta-Margaret River Local Planning Scheme 1 (Department of Planning, Lands and Heritage, 2024)

2.2 Site Layout and Surrounding Land Uses

The site predominantly consists of cleared agricultural land and blue gum plantation, with areas of remnant vegetation. Surrounding land uses are presented below in Table 2-2 with the areas presented on Figure 1, Appendix A.

Table 2-2: Surrounding Land Uses

Direction	Land Use
North	General agricultural land (including remnant native vegetation), South Blackwood State Forest and Blackwood River National Park
South	General agricultural land, (including remnant native vegetation), Scott River, native vegetation.
East	General agricultural land (including remnant native vegetation), Blue gum plantation, Chester and Pagett Nature Reserves and South Blackwood State Forest
West	BHP Beenup Mineral Sands mine, general agricultural land (including remnant and native vegetation), Scott National Park, Blackwood River

2.3 Environmental Setting

The key details for the environmental setting, modified from Stantec, November 2024, of the site are summarised in Table 2-3.

Table 2-3: Environmental Setting

Setting	Description
Climate	<p>The climate of the site is described as moderate Mediterranean, with mild wet winters and hot summers (Stantec, Nov 2024). The mean annual rainfall (1974-2024) from DWER rainfall gauge at Breenans Ford, ~1.6 km south of the site on the Scott River, is 949.6 mm (DWER, 2025b), with the majority of rainfall falling between April and September.</p> <p>The nearest Bureau of Meteorology (BoM) (BoM, 2025) weather station is located at Cape Leeuwin (station 9518), ~18.6 km southwest of the site, indicates a mean temperature range (1897 to 2025) of between 14.2 and 19.8°C with an annual mean rainfall (1897 to 2025) of 947.5 mm.</p>
Topography	<p>Locally across the site, there is a gradual increase in elevation from the southwest (as little as 9 m Australian Height Datum (mAHD) to the northeast (as great as 38 mAHD). There is a poorly defined drainage divide that runs approximately through the centre of the site, segregating the Blackwood and Scott River headwater catchments.</p> <p>There is an average slope from north to south of approximately 2.5 m/km and less than 1 m/km from east to west (Stantec, August 2025) (Figure 2, Appendix A)</p>
Geology	<p>The Geological Survey of Western Australia (1967) 1:250,000 scale; Busselton and Augusta map sheet indicate that the site is primarily underlain by Quaternary alluvium, comprising quartz-rich sand dunes and Cainozoic laterite. The Scott Coastal Plain is comprised of alluvial, lake, swamp, estuarine, and shoreline deposits unconformably overlying Mesozoic sediments (Leederville Formation of the Warnbro Group) and basalt flows or marine sediments of the Eocene.</p> <p>The nearby 1:50,000 scale Karridale - Tooker map sheet (The Geological Survey of Western Australia, 2002) suggests that the Leederville Formation, comprising interbedded sedimentary rock and associated units derived via weathering may be encountered during excavation, underlying the dune deposits and</p>

Setting	Description
	<p>laterite (ferricrete) across the site. The Leederville Formation is the only one of the three formations that comprise the Lower Cretaceous Warnbro Group to occur beneath the Scott Coastal Plain (Chan 2011). The Warnbro group was defined by BHP (1998, 2015) as a series of distinct lithological units comprising the Strucel Beds and Beenup Beds, which likely make up the Leederville Formation (Quindalup and Mowen Members) (Figure 2, Appendix A).</p> <p>Geology across the site comprises siliceous dune sands deposited unconformably on the Leederville Formation. Within the dune sands localised diagenetic features comprise organic stained siliceous sands, bleached siliceous sands, and shallow sands overlying ferricrete (also referred to as coffee rock). The main geological stratigraphic units encountered at the site are the Quaternary alluvium, lake and swamp deposits, the Early Cretaceous Leederville Formation and Triassic Lesueur Sandstone (Stantec, Nov 2024).</p>
<p>Acid Sulfate Soil Mapping and Conditions</p>	<p>Based on the DWER regional Acid Sulfate Soil (ASS) risk mapping (NationalMap, 2025a), the site is mapped “high risk of ASS occurring within 3 m of the natural soil surface” (Figure 3, Appendix A)¹.</p> <p>Investigations by BHP for the adjacent Beenup Mine identified grey/dark grey sands/silts as containing pyrite (only sulfide mineral present) and mainly present as very fine-grained framboidal form, from below ~18 mAHD. Total sulfur concentrations ranged between 0.15 to 6%, with ~70% of samples >1%S, with the majority in the top few metres of the grey/dark grey sands/silts. Minerals effective in neutralising any acidity generated were not present in the grey/dark grey sands/silts (Environmental Geochemistry International Pty Ltd, 1993).</p>
<p>Hydrology</p>	<p>The site intersects the Lower Blackwood, Beenup and Scott Surface Water Management Areas which are known to be influenced by natural groundwater flows, supporting environmental values (DoW, 2016).</p> <p>Key surface water features in the region consist of historically modified catchments with artificial drains to facilitate the agricultural and plantation activities. These drains have not been built in a coordinated way and intersect with roads and natural drainage lines, resulting in several areas of localised ponding due to catchment modification.</p> <p>The site has a poorly defined ridgeline that runs approximately through the centre of the site, segregating 11 Blackwood and Scott River headwater catchments that discharge from the site. Sheet flow occurs across cleared land areas, concentrating into more defined streamflow paths towards the site boundary.</p> <p>There are several areas of natural ponding following rainfall events in areas designated as wetlands and in depressions formed by historical anthropogenic activities. The roads on almost every boundary of the site act as an impediment to flow paths and cause localised upstream ponding, apart from the southernmost catchment which sheet flows across agricultural land (Stantec, November 2024).</p>
<p>Hydrogeology</p>	<p>The regional Study Area is defined by three distinct hydrostratigraphic units within the Vasse Shelf; the Superficial, Leederville and Lesueur aquifers (Diamond, 2000) (Baddock, 1992, BHP, 1998, Schafer et. Al., 2008, Chan, 2011, BHP, 2015). The Superficial and Leederville Aquifer were encountered within the top 25 m of the site (Stantec, August 2025), with the Lesueur Sandstone aquifer a deeper confined aquifer generally ranging from between 50 metres below ground level (mbgl) to 420 mbgl.</p> <p>Regionally, a confining layer known as the Mowen aquitard separates the Superficial Aquifer from the underlying Leederville Aquifer. Excluding the coastal dunes, the Superficial Formation typically has a saturated thickness of less than 10 meters; however, across the western sections of the broader coastal plains, it is only a few meters thick (Diamond, 2000). The occurrence of the Superficial Aquifer is localised, including perched groundwater above impermeable beds of the Leederville Formation, and local confinement zones of low permeability in the laterite (ferricrete) profile (DoW, 2009).</p> <p>Regionally the Leederville Aquifer on the Vasse Shelf (between Busselton and Dunsborough faults) is confined and lies beneath the Superficial Formation of the coastal plains. It can be found at the surface in certain areas of the Blackwood Plateau, where it has been weathered and lateritised. The Mowen Aquitard is composed of the Quindalup and Mowen members, which are primarily made up of clay and silty clay units. As a combined unit, these members effectively integrate into the Leederville Aquifer, as a multi-layered aquifer, comprising discontinuous interbedded sequences of sand and clay, typically up to 100 m thick, and up to 200 m in some places. (DoW 2009).</p>
<p>Groundwater Level and Flow</p>	<p>Regional groundwater flow is generally from north to south, ultimately discharging downwards into the underlying formations, surface-water features such as the Scott River, and into the Southern Ocean (Chan, 2011). Groundwater monitoring undertaken by Stantec (Stantec, April 2025) between April 2024 and January 2025, with groundwater levels in the Superficial Aquifer (shallow bores) ranging from 0.56 m below top of collar (mbtoc) to 3.75 mbtoc (elevation ranged between 26.25 mAHD and 35.32 mAHD).</p>

Setting	Description
	<p>Groundwater level in the Leederville Aquifer (deep bores) ranged from 0.72 mbtoc to 2.94 mbtoc (elevation ranged between 28.03 mAHD and 35.52 mAHD). Groundwater levels recorded in the aquifers suggests a generally south-westerly to southerly flow in the Superficial Aquifer (Figure 2-1) and southern direction of flow in the Leederville Aquifer (Figure 2-2).</p> <p>Groundwater levels recorded in the bores fluctuated by 2 m to 3 m across all bores in response rainfall (Stantec, April 2025).</p>
Groundwater Management Zone	<p>The site intersects the Beenup Groundwater Management Subarea, and is also defined within the Blackwood Groundwater Management Area, Beenup Subarea of the South-West Groundwater Allocation Plan (Blackwood GMA Beenup Subarea). It also intersects with Groundwater Management Zone 7 which is defined as a “buffer zone area defined by acid sulfate soil plume from Beenup mine site” (DoW, 2009).</p> <p>The Beenup Mine has been subject to extensive management, remediation, and rehabilitation as a result of the formation of an acid rock drainage plume, caused by waste rock generating acidic groundwater. In addition, the Leederville Aquifer is now artificially connected to the Lesueur Sandstone formation throughout the Beenup Titanium Mine site as a result of mining activities. The contaminated groundwater flows south towards the Scott River and Hardy Inlet (DoW, 2009).</p> <p>As a consequence of the implementation of Groundwater Management Zone 7, water use from the Superficial, Leederville and Lesueur aquifers is restricted, meaning that no new water allocation and no new bores or excavations are permitted to be constructed in the Superficial or Leederville aquifers, within the management zone boundary, other than for exempt use, replacement of existing bores, monitoring purposes, or remediation (DoW, 2009) (Stantec, August 2025).</p>
Groundwater Bores and License	<p>Two groundwater abstraction licenses are present on the site, both located Lesueur Sandstone south aquifer and across the western lots of the site, with licenses for 1,650,00 kL and 66,300 kL (DWER, 2025d).</p> <p>There are 24 registered groundwater bores on, or within 500 m, of the site. Of these, 11 are registered as being subject to monitoring, one is registered for water supply, one is registered for stock and domestic use, and 11 are registered as Unknown (Stantec, August 2025).</p>
Drinking Water Source Areas	<p>The site is not situated within a public drinking water source area. The closest public drinking water source area is the Fisher Road Wellfield ~8.5 km west of the site which supplies the town of Augusta. Groundwater from the Fisher Road Wellfield is abstracted from the Lesueur Sandstone aquifer (DoW, 2007) The next closest is the Margaret River Catchment Area ~27 km north of the site.</p>
Waterways	<p>There are several ephemeral waterways located within the site primarily flowing from northeast to southwest towards the Blackwood River, located ~3.8 km to the west of the site, with a smaller proportion flowing in a southeasterly direction towards the Scott River located ~1 km south of the site (Figure 4, Appendix A). The Blackwood and Scott River flow into the Hardy Estuary at Augusta, which has a catchment of 23,000 km² and has the highest volume of discharge to the ocean of all the south-west estuaries. The majority of the volume comes from the Blackwood (Lower) and Scott Rivers (DWER, 2025b).</p>
Wetlands	<p>The site was historically a widespread wetland environment and was predominantly palusplain (seasonally waterlogged flats), characterised by a series of damplands and sumplands in varying condition (Phoenix in prep.-b; V & C Semeniuk Research Group 1997). Geomorphic wetlands in the site are also designated as an Environmentally Sensitive Area, gazetted under the <i>Environmental Protection (Environmentally Sensitive Areas) Notice 2005</i> (Stantec, August 2025).</p>

1. The most northern portion of the site is outside the DWER mapping area however given the consistent geological units, the area would be considered to have a moderate to high ASS risk.

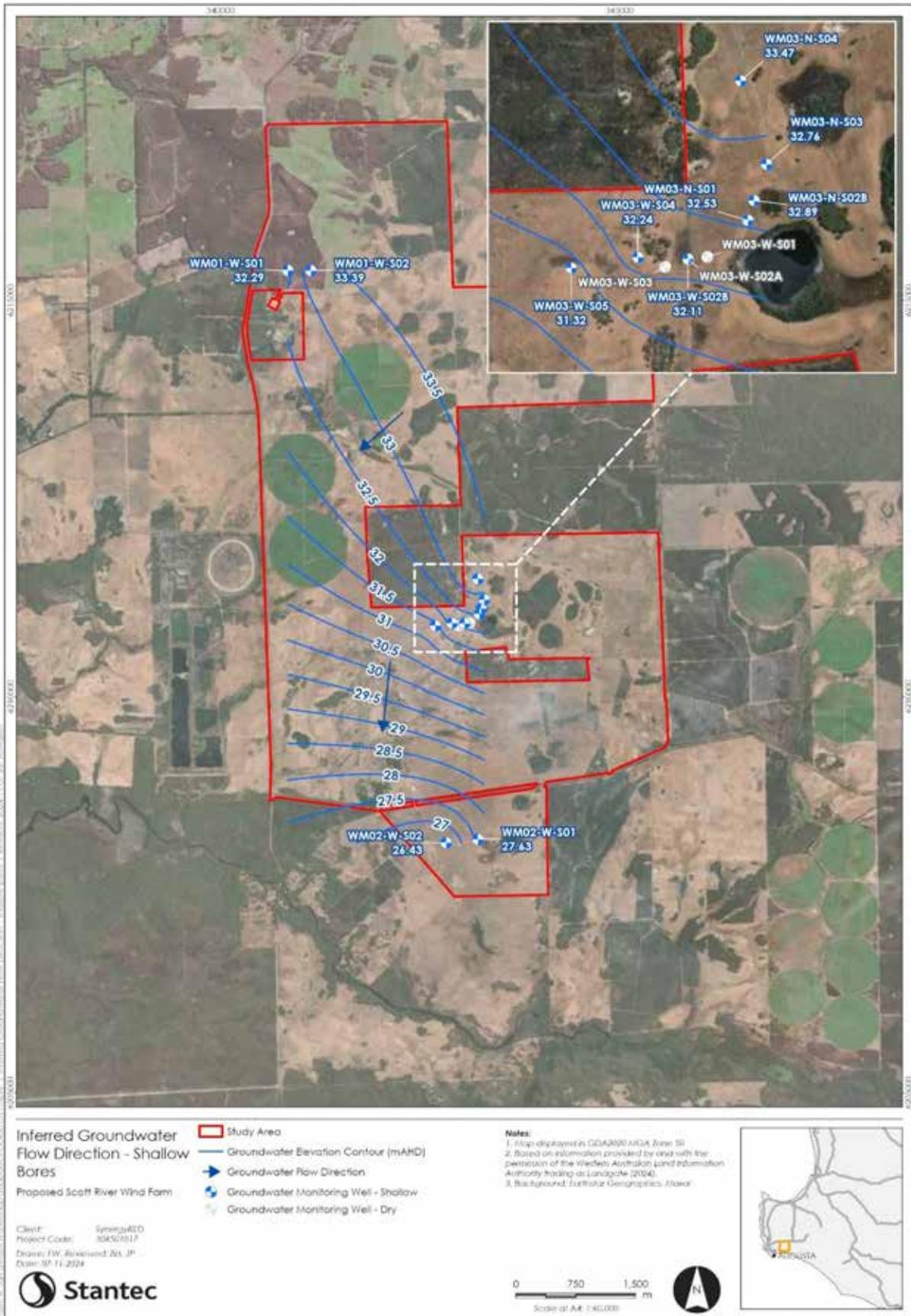


Figure 2-1: Superficial Aquifer Inferred Groundwater Flow Direction (Shallow Bores) (Stantec, August 2025)

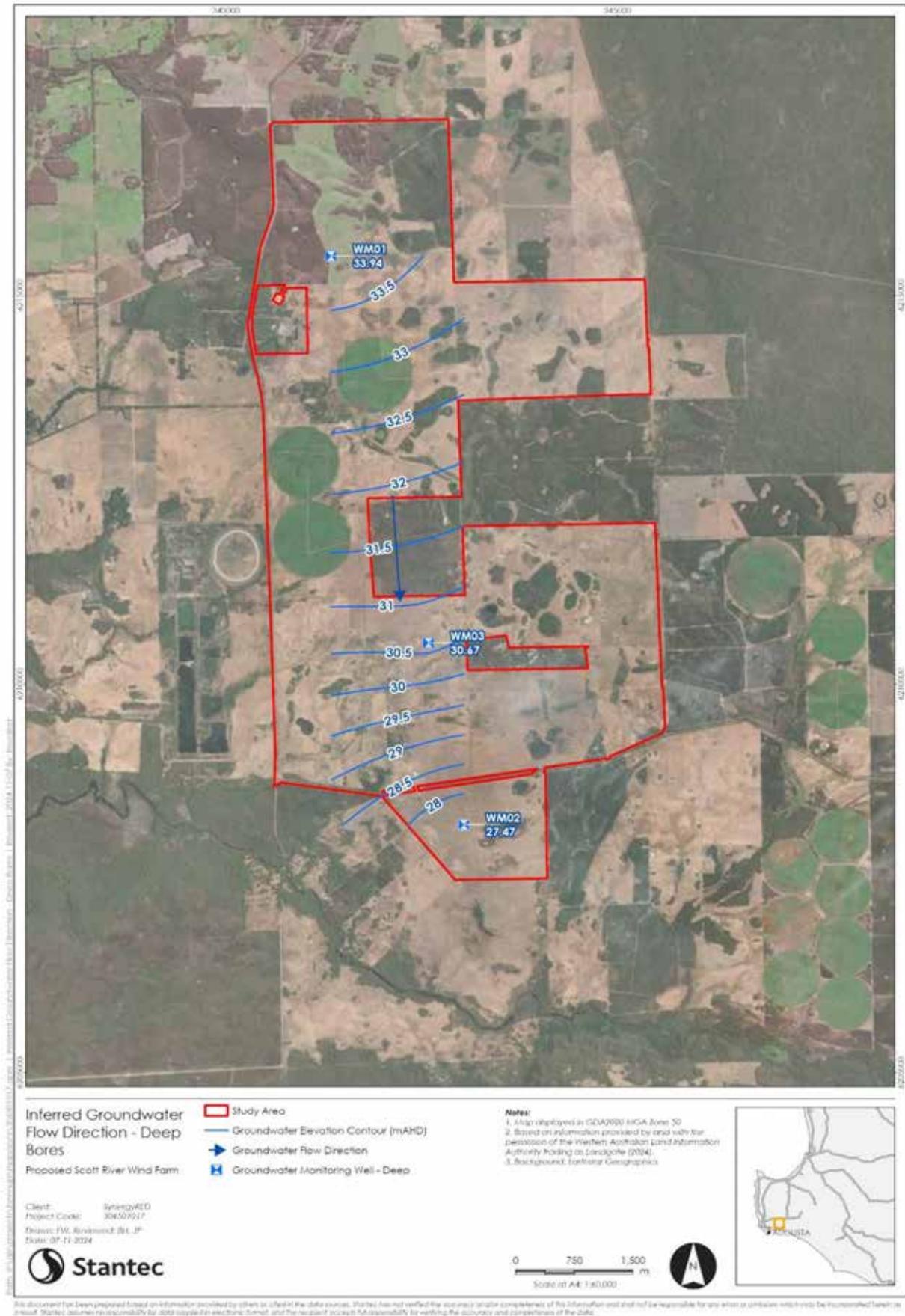


Figure 2-2: Leederville Aquifer Inferred Groundwater Flow Direction (Deep Bores) (Stantec, August 2025)

2.4 Sensitive Environmental Receptors

Table 2-4 below presents the sensitive environmental receptors within and surrounding the site and presented on Figure 2-3.

Table 2-4: Sensitive Environmental Receptors

Setting	Description
Surface Water Bodies	Refer Table 3-3 above for details on wetlands and waterways.
Groundwater Dependent Ecosystems (GDEs)	<p>There are several known or potential GDEs (Figure 2-3), within the site (Stantec, August 2025) including:</p> <ul style="list-style-type: none"> ▪ Four vegetation types recorded in the site are classified as, or analogous to, Scott River Threatened Ecological Community (TEC) (listed as Endangered), a 'known' obligate GDE (DBCA, 2023). This TEC occurs on red clay to clay loam soils and is seasonally inundated (DBCA, 2023). Vegetation generally includes heaths, shrublands and thickets, with representatives from the <i>Melaleuca</i>, <i>Hakea</i> and <i>Kunzea</i> genera dominant, and has a diverse annual flora community that comprises several endemic and restricted taxa. This "Scott River Ironstone Association" community is listed as a critically endangered ecological community under the <i>Biodiversity Conservation Act 2016</i> with the TEC are declared environmentally sensitive areas under the <i>Environmental Protection Act 1986</i>. Nationally the community is listed as endangered under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (DBCA, 2023). ▪ Another three vegetation types recorded within the site have been classified as 'potential' facultative GDE as they were dominated by <i>Melaleuca preissiana</i> and <i>Melaleuca raphiophylla</i>, species considered to be facultative phreatophytes. ▪ The four confirmed and three potential groundwater-dependent vegetation types above, provide habitat for eleven flora taxa listed as either Threatened and Endangered, or Priority 1, Priority 3 or Priority 4. ▪ Several occurrences of another seven vegetation types within the site were recorded with incidental or non-dominant groundwater dependent flora species and where these species occur may have the potential to represent GDE. ▪ Most of the above known and potential groundwater dependent vegetation has been mapped growing in association with wetlands, although the remaining wetlands may also potentially be groundwater-dependent. The degree of connectivity between these wetlands and the shallow aquifer is currently unknown (Stantec, August 2025).
Flora and Fauna	<p>A detailed flora study (Phoenix, 2025) was undertaken on-site. The survey identified 20 vegetation types, comprising of 18 native and 2 non-native vegetation types. Native vegetation covered 20.3% (790 ha) of the site, occurring as remnant patches mainly within farmland, and roadside vegetation corridors.</p> <p>Fifteen of the 18 native vegetation types were designated to have local or regional significance. Significant vegetation within this survey was classified under 4 categories: representative of a Threatened Ecological Community (TEC) (regionally significant), restricted vegetation types (locally significant), habitat for significant flora species types (locally significant) and groundwater dependent ecosystems (GDEs; locally significant).</p> <p>Four vegetation types were identified as analogous to the Scott River Ironstone TEC. Three vegetation types were identified as 'restricted'. Twelve vegetation types were identified as habitat for significant flora species. Seven vegetation types were identified as known or potential GDEs.</p> <p>In terms of vegetation condition, a very large proportion of the study area (79.4%) was classified as Completely Degraded, representing cleared areas and plantations. Native vegetation in the study area was in varying states of condition, with 279.1 ha (7.2% of the study area) containing remnant vegetation in Pristine or Excellent condition, and the rest being impacted by grazing or invasive species (with Very Good to Degraded condition ratings).</p> <p>A target fauna survey was undertaken on site (Phoenix in prep.-a). The fauna survey found that the site comprises mostly cleared areas interspersed with native wetland and woodland habitat remnants of varying size, condition and contribution to fauna values. The larger habitat patches are typically better quality and of higher value for vertebrate fauna than the smaller, more isolated remnants. Key habitat values in the site mainly relate to significant species such as the 3 Threatened black cockatoo species and Western Ringtail Possum, with one main habitat Marri-Jarrah-Peppermint woodland providing the highest value to these species. Even these values are relatively low compared with those likely to be present in the expansive, intact conservation reserves immediately north-east and south-west of the study area.</p>

Setting	Description
	<p>Observed use of the study area by black cockatoos was limited to foraging, with no evidence of breeding or night roosting recorded. Foraging habitat in the study area probably represents supplementary resources to the abundant habitats adjacent to the study area.</p> <p>Use of the site by Western Ringtail Possum appeared to be restricted to Marri-Jarrah-Peppermint woodland near its boundaries, where such habitat is contiguous with, or occurs near, larger intact remnants outside the site.</p> <p>The value of the wetlands in the study area to Migratory shorebirds is low relative to the higher value shorebird habitat elsewhere in the region, such as at the Hardy Inlet. Most wetland habitats in the study area are only of foraging value to Migratory shorebirds in spring and early summer, between their arrival in the Southwest and the drying out of most of the wetlands.</p>

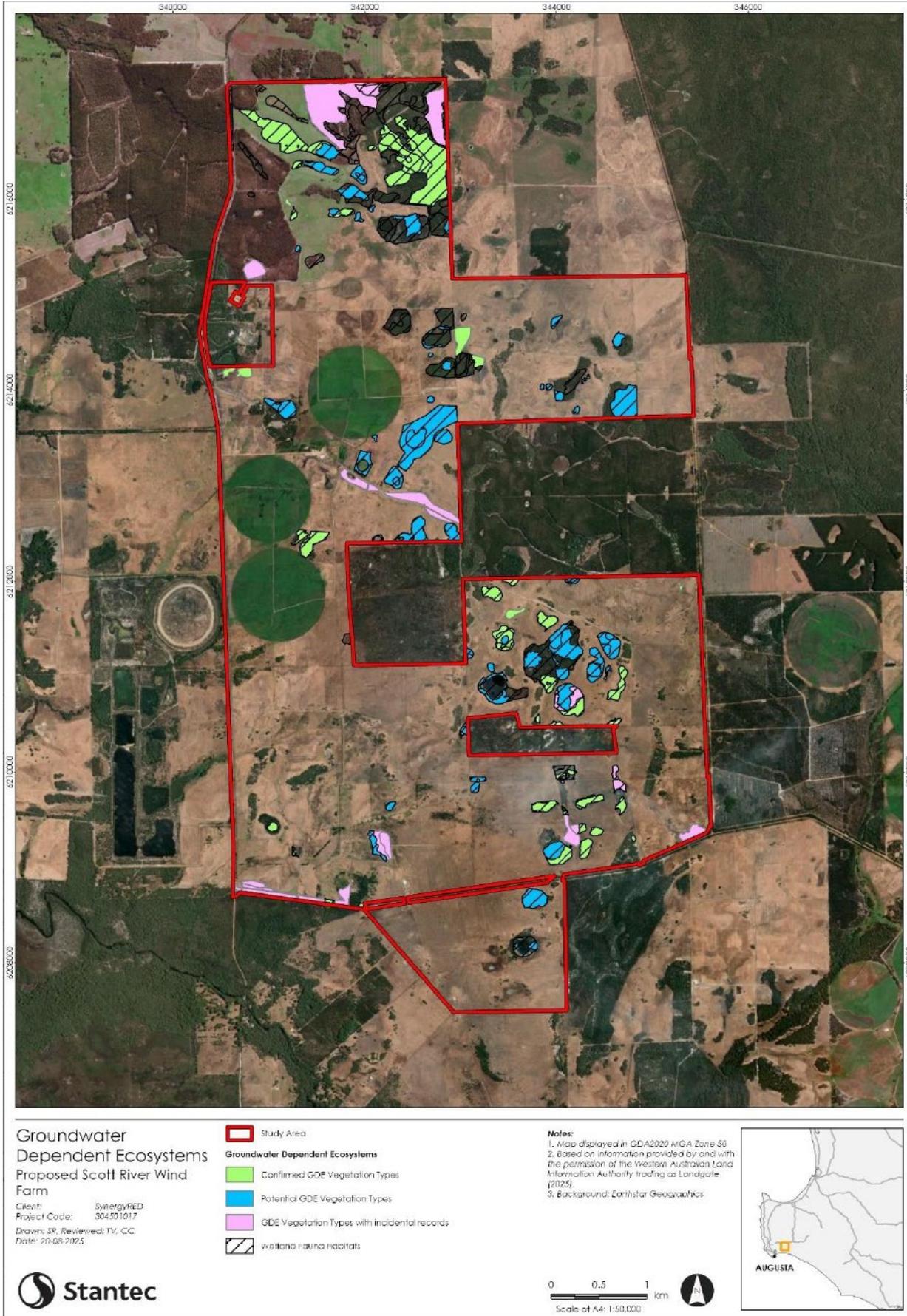


Figure 2-3: Confirmed and Potential Groundwater Dependent Values within the site (Stantec, August 2025)

2.5 Contaminated Sites

A review of the online DWER Contaminated Sites Database (DWER, 2025a) indicated the presence of contaminated sites at 886 (Lot 200 on Plan 36387) and 4254 (Lot 4254 on Plan 208478), Scott River Rd, Scott River, adjacent to the western side boundary (Figure 1, Appendix A). Note, the online Contaminated Sites Database only provides information on sites classified:

- contaminated - remediation required.
- contaminated - restricted use.
- remediated for restricted use.

Both contaminated sites are related to BHP's historic mining of heavy mineral sands at the Beenup Titanium mine, which is located to the west and hydraulically downgradient of the site. The DWER basic summary of records (BSR) (classified August 2018) indicates that the two lots are classified as "remediated for restricted use" due to the presence of elevated levels of acidity, sulphate and aluminium present in groundwater beneath the site.

Works involved the excavation of heavy mineral sands via dredging methods, and subsequent wet mineral separation and concentration, which disturbed PASS material. Remedial works associated with PASS were completed between 2000 and 2001, including treatment of the unsaturated zone with lime sand and addition of sand to materials returned to the dredge pond.

Groundwater and surface water assessments at the mine have identified metal and acidity-impacted groundwater generated by the disturbance of ASS at the site above freshwater and long-term irrigation guidelines at the time of classification. Fate and transport modelling of groundwater contaminants and a risk assessment indicate that groundwater concentrations do not pose an unacceptable risk to the environment, including downgradient receptors (Scott and Blackwood Rivers) or human health.

It is noted that other than for analytical testing or remediation, and except for groundwater abstraction from the existing licensed production bores on the northern boundary of Lot 4254 on Plan 208478, further groundwater abstraction is not permitted at 886 (Lot 200 on Plan 36387) Scott River Rd, Scott River.

2.6 Cultural Heritage

A search of the Department of Planning, Lands and Heritage (DPLH) Aboriginal Cultural Heritage Inquiry System (DPLH, 2025) identified that the Blackwood and Scott Rivers and associated tributaries are listed as a Registered Site and Lodged Heritage place respectively under the *Aboriginal Heritage Act 1972* (Appendix B).

3 PROPOSED DEVELOPMENT WORKS

The major development components are outlined in Table 3-1 and depicted in Figure 1-1, providing context for the subsequent sections detailing ASS and groundwater management. These works have been identified and detailed in consultation with SynergyRED. This preliminary ASSDMP contains Preliminary Operating Strategies specific to the proposed Scott River Wind Farm.

Table 3-1: Summary of Development Works

Component	Description
Turbine Construction	<p>Up to 20 wind turbines, up to 250 m in height, will be constructed onsite. The works will involve the excavation and dewatering of in-situ soils. There are currently two primary foundation options being explored:</p> <p>Option 1 - Partially above ground foundation: would require foundations (~30 x 30 m in area) to be installed to depth of between 0.8-1.2 mbgl. The main gravity foundation would be supported by a series of concrete piles, which would be installed via concrete injected down augers to displace soils. Minimal soil from depth may be recovered when the auger is being removed as concrete is injected. Dewatering requirements would vary depending on the time of year and location of the turbine on-site. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3-4-week duration at each foundation.</p> <p>Option 2 - Fully above ground foundation: is similar to option 1 except the gravity foundation will be installed at the ground surface. As such there would be minimal excavation and no dewatering requirement.</p> <p>A third option, a traditional below ground foundation: is similar to option 1 except the gravity foundation will be installed completely below the ground surface. While considered unlikely at this stage, this option may be utilised, where it is confirmed prior to construction, through detailed site investigation and further modelling, that the proposed turbine location would not require dewatering that would present any risk to groundwater dependent values (i.e., drawdown greater than natural seasonal variation), and the potential risk associated with disturbance of ASS is considered low.</p>
Underground services (e.g., cabling)	A network of underground electrical cabling will be required to be installed from each wind turbine to the substation(s). The electrical cabling will be installed at a depth of ~1.2 mbgl and require the excavation and potentially dewatering of in-situ soils.
Wind monitoring and communication towers	Foundations for wind monitoring and communication towers will involve the excavation and dewatering of in-situ soils similar to turbine construction but limited to depth of between 0.25-1.5 mbgl. Dewatering requirements would vary depending on the time of year, location and maximum depth of the foundation. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3-4-week duration at each foundation.
Transmission Poles and Towers	Western Power will be responsible for the installation of transmission poles and towers across the site. Foundations for the pole and towers will be concrete caisson (bored concrete) foundations, with displaced soil managed via the ASSDMP. No dewatering is required for these foundations however displaced water from the injection of concrete will be managed as per dewatering effluent in the ASSDMP.
Substation and Operations and maintenance area	Construction of support infrastructure may require the disturbance of insitu soils, and potentially dewatering for foundations and associated underground infrastructure, e.g. cabling, services.
Other supporting infrastructure (e.g., roads, temporary construction facilities)	<p>A number of other supporting infrastructure will be required in support of the project, including, construction of site entrances and access roads, water storage infrastructure, public viewing area, and temporary construction facilities (e.g., site offices, laydown areas, and concrete batching plant).</p> <p>Minimal disturbance of insitu soils is anticipated in support of these components</p>
Borrow pits	Local sourcing of gravel from borrow pits, should detailed geotechnical investigations confirm suitable source/s. Borrow pits will be excavated above the groundwater table and therefore no dewatering will be required.

Construction works will attempt to be scheduled for summer months where possible.

4 SITE INVESTIGATIONS

4.1 Soil

A preliminary ASS investigation was undertaken in February/March 2024 by Stantec as part of geotechnical investigations for the site (Stantec, July 2024). The scope of work completed whilst undertaking the soil investigation was:

- A soil sampling program comprising visual/olfactory inspection and laboratory analysis of soil samples taken from:
 - 20 test pit locations (TP01 to TP20) to a depth maximum depth of 2.1 mbgl
 - three deep boreholes (WM01 to WM03) to a maximum sampling depth of 10 mbgl.
- A total of 206 samples were collected from the 23 locations. All samples collected were subjected to “field measurements” of pH in water (pH_F) and field oxidised pH (pH_{F_{OX}}), equivalent to one sample being field tested for every ~0.25 vertical metres investigated which is in line with DWER guidance (DWER, June 2015a)
- Comparison of field data results with applicable DWER indicator assessment criteria.
- Conducted selective laboratory analysis of 70 samples via the Suspension Peroxide Oxidation Combined Acidity and Sulfate (SPOCAS) suite method.

Soil sampling locations are provided in Figure 3, Appendix A, with sampling logs presented in Appendix C.

4.2 Groundwater

4.2.1 Scope and Sampling Locations

A total of 17 groundwater bores have been installed on-site by Stantec and form a monitoring network for the site (Figure 4, Appendix A) to assess groundwater quality and levels across the site, with the investigations primarily for understanding hydrogeological and hydrology on-site and not specifically for ASS. The on-site investigations entailed groundwater levels measurements from all 17 bores across the site and sampling of the following nine bores:

- Leederville Aquifer
 - WM01
 - WM02
 - WM03
- Superficial Aquifer
 - WM01-W-S01
 - WM01-W-S02
 - WM02-W-S01
 - WM02-W-S02
 - WM03-N-S03
 - WM03-W-S02B

4.2.2 Sampling Method and Analytical Suite

All bores have been measured for static water levels over four events (April, July and September 2024 and January 2025), with nine bores sampled (Section 5.2.1), via low-flow methods, i.e. peristaltic pump, and analysed in the field and at the laboratory for the following parameters³ relative to ASS:

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc
- Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential
- Major cations: calcium (Ca²⁺), magnesium (Mg²⁺), potassium (K⁺) and sodium (Na⁺)

³ Not all parameters were analysed in all events

- Major anions: sulfate (SO_4^{2-}), chloride (Cl^-), alkalinity ((carbonate (CO_3^{2-}), bicarbonate (HCO_3^-) and hydroxide (OH^-))
- Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN), total ammonia-N ($\text{NH}_3 + \text{NH}_4\text{-N}$), nitrates and nitrites ($\text{NO}_x\text{-N}$)
- Total dissolved solids (TDS).

Certain parameters (total iron and aluminium and acidity) from the nominated DWER groundwater suite (2015b) were not analysed, however this has not affected the overall assessment and sufficient to inform the ASSDMP. Ongoing baseline monitoring at a series of groundwater bores across the site is proposed for the nominated DWER groundwater suite (2015b) to provide a baseline data set prior to the commencement of works.

4.2.3 Groundwater Bore Installation Details

During the soil sampling program three deep groundwater monitoring bores (WM01-WM03) were installed by Stantec, with a further 14 shallow bores installed during a subsequent program (Figure 4, Appendix A).

Groundwater bores appear to have been installed in general accordance with the Minimum Construction Requirements for Water Bores in Australia (NUDLC, 2020) and the Water Quality Protection Note – Groundwater Monitoring Bores (DoW, 2006).

The screening intervals were placed at varying depths depending on the targeted geology, with the base of screens ranging from between 1.0 and 24.5 mbgl. The bores were screened using slotted 50 mm Class 18 PVC fitted with an end cap. The screen was packed with gravel and a bentonite seal placed above the screen. The soil profiles and bore construction details were logged during construction (Stantec, July 2024 and August 2025). Groundwater construction logs for the installed bores are presented in Appendix C and the locations provided in Figure 4, Appendix A, with a summary of the installation details presented below in Table 4-1, with the noted aquifer defined per the hydrogeological report (Stantec, August 2025).

Table 4-1: Bore Construction Details

Bore	Coordinates*		Top of Collar (mAHD)	Surface level (mAHD)	Depth (mbgl)	Screened interval (mbgl)	Aquifer
	Easting	Northing					
WM01	341,346	6,215,506	36.73	36.04	24.95	18.50 – 24.5	Leederville
WM01-W-S01	340,845	6,215,379	35.60	35.14	7.00	2.5 – 5.5	Superficial
WM01-W-S02	341,131	6,215,376	36.95	36.35	7.00	4.0 – 7.0	
WM02	343,044	6,208,189	29.22	28.57	24.95	12.50 – 24.5	Leederville
WM02-W-S01	343,227	6,208,201	29.52	28.92	4.50	1.5 – 4.0	Superficial
WM02-W-S02	342,828	6,208,156	28.09	27.45	6.0	3.0 – 6.0	
WM03	342,583	6,210,534	33.06	32.43	24.95	18.50 – 24.5	Leederville
WM03-N-S01	343,247	6,211,040	34.53	33.84	2.0	1.0 – 2.0	Superficial
WM03-N-S02B	343,266	6,211,102	34.38	33.71	1.00	0.5 – 1.0	
WM03-N-S03	343,304	6,211,217	34.65	34.00	3.0	1.5 – 3.0	
WM03-N-S04	343,224	6,211,480	35.39	34.79	1.90	0.9 – 1.9	
WM03-W-S01	343,119	6,210,924	34.37	33.67	1.00	0.4 – 1.0	
WM03-W-S02A	343,059	6,210,916	34.06	33.34	1.00	0.1 – 1.0	
WM03-W-S02B	343,059	6,210,918	34.02	33.35	3.00	1.0 – 3.0	
WM03-W-S03	342,987	6,210,892	34.51	33.87	1.00	0.4 – 1.0	
WM03-W-S04	342,902	6,210,923	33.70	33.14	2.00	1.5 – 2.0	
WM03-W-S05	342,693	6,210,889	33.07	32.50	4.5	1.5 – 4.5	

* GDA 94 MGA Zone 50

4.3 Surface Water

4.3.1 Scope and Sampling Locations

A total of eight surface water locations (Creekline Discharge: SW01-SW05 and wetlands: WM01-WL, WM02-WL and WM03-WL) have been sampled on-site by Stantec and form a monitoring network for the site (Figure 4, Appendix A) to assess surface water quality in several creeks and wetlands across the site, as detailed below, with the investigations primarily for understanding hydrogeological and hydrology on-site .

Sampling at all locations has been attempted during April, July and September 2024 and January 2025, however not all locations contained surface water at the time of sampling (Stantec, April 2025). No sampling logs were available at the time of reporting.

A summary of the sampling program is presented in Table 4-2 below:

Table 4-2: Surface Water Sampling Summary

Id	Location Description	Coordinates*		Water Present/Sampled (✓/✗)			
		Easting	Northing	April 24	July 24	Sept 24	Jan 25
Creekline Discharge							
SW01	Northeast boundary	345,146	6,216,210	✗	✗	✓	✗
SW02	Western boundary	341,226	6,211,909	✓	✓	✓	✓
SW03	Easten boundary	345,580	6,209,394	✗	✓	✓	✗
SW04	Southeast boundary	345,505	6,211,598	✗	✓	✓	✗
SW05	Southwest boundary	341,534	6,208,684	✗	✓	✓	✗
Wetland							
WM01-WL	Wetland near WM01	341,467	6,215,363	✗	✓	✓	✗
WM02-WL	Wetland near WM02	343,671	6,208,174	✗	✓	✓	✓
WM03-WL	Wetland near WM03	343,343	6,210,886	✗	✓	✓	✓

* GDA 94 MGA Zone 50

4.3.2 Sampling Method and Analytical Suite

Surface water has been sampled via grab methods with parameters⁴ analysed in field and laboratory for the following (relevant to ASS):

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc
- Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential
- Major cations: calcium (Ca²⁺), magnesium (Mg²⁺), potassium (K⁺) and sodium (Na⁺)
- Major anions: sulfate (SO₄²⁻), chloride (Cl⁻), carbonate (CO₃²⁻) and bicarbonate (HCO₃⁻)
- Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN) (calculated), total ammonia-N (NH₃+ NH₄-N), nitrates and nitrites (NO_x-N)
- Total dissolved solids (TDS)
- Turbidity.

Certain parameters (total iron and aluminium and acidity) from the nominated DWER surface water suite (2015b) were not analysed, however this has not affected the overall assessment and sufficient to inform the ASSDMP.

Ongoing baseline monitoring is proposed to be undertaken for the project, for the nominated DWER surface water suite (2015b), to provide a baseline data set prior to the commencement of works.

⁴ Not all parameters were analysed in all events

5 ASSESSMENT CRITERIA

5.1 Soil

Assessment criteria for ASS were adopted from the DWER guideline, *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* (DWER, June 2015a) and *Treatment and Management of Soil and Water in Acid Sulfate Soils Landscapes* (DWER, June 2015b).

Table 5-1 below presents the indicative pH assessment criteria for ASS field test results.

Table 5-1: DWER Indicative pH Assessment Criteria for ASS

pH Measurement Type	AASS*	PASS^	Non-ASS (NASS)
pH _F	<4	>4	>4
pH _{Fox}	<4	<4	>4

* Actual ASS, ^ Potential ASS

Table 5-2 below presents the texture-based ASS action criteria for management. For excavation quantities of <1,000 tonnes ASS with ≥ 0.03 %S or ≥ 18 mol H⁺/tonne equivalent acidity a detailed management plan is required.

As further detail has not been provided on the total volume soil requiring excavation for the proposed project the most conservative action criteria have been applied.

Table 5-2: DWER ASS Management Action Criteria

Monitoring Activity		Action criteria (<1,000 tonnes)		Action criteria (>1,000 tonnes)	
		Existing + Potential Acidity		Existing + Potential acidity	
Texture	Approx. clay content	Equivalent sulfur	Equivalent acidity	Equivalent sulfur	Equivalent acidity
	(%<0.002 mm)	(%S)	(H ⁺ /tonne)	(%S)	(H ⁺ /tonne)
Coarse texture (sands to loamy sands)	≤5	0.03	18	0.03	18
Medium texture (sandy loams to light clays)	5-40	0.06	36	0.03	18
Fine texture (medium to heavy clays and silty clays)	≥40	0.10	62	0.03	18

5.2 Groundwater and Surface Water

Guideline levels for water quality were generally sourced from:

- Assessment and management of contaminated sites – Contaminated Sites Guidelines (DWER, 2021)
- Treatment and management of soil and water in acid sulfate soil landscapes (DWER, June 2015b).
- Guidelines for Fresh and Marine Water Quality (ANZG, 2023)

In cases where no guideline is reported, a guideline is sourced from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000).

The guideline levels used for comparison with groundwater based upon ecological receptors and beneficial use are:

- Freshwater Guidelines (FWG) – South-west Australia wetland
- Long-term Irrigation Water Guidelines (LIWG)
- Livestock Drinking Water Guidelines (LDWG) - Cattle
- Acid Sulfate Soil (ASS) Indicator Parameters
- Non-potable Drinking Water Guidelines (NPUG).

Levels below the above stated criteria are generally inferred as safe. Levels that exceed the criteria should be used as a proxy for further investigation and assessment of the risk to humans or the environment, but do not necessarily signify environmental harm or risk of contamination.

6 RESULTS

6.1 Soils

6.1.1 Description

From the test pitting works, soil profiles encountered during the soil sampling exercise across the site may be generalised as; the shallow (<3 m) sub-surface profile generally comprised a thin layer of topsoil, overlying sand (of various silty fines fraction), often overlying iron cemented rock strength material (ferricrete). Where ferricrete was not encountered, further sand was present to termination depth though, some layers of rich organic materials were encountered (Stantec, July 2024).

From the boreholes the geology varied between the north (WM01) and the southern and central portions of the site (WM02 and WM03 respectively) (Figure 4, Appendix A).

A summary of the encountered soil profiles across the site is presented in Table 6-1.

Table 6-1: Soil Profile

Area	Soil Description
Northern	A thin layer of dune sands (< 1.6 m) was present immediately overlying saturated grey and dark grey, interbedded / alternating bands of clayey and sandy soils and frequent pockets of organic and peaty material.
Southern	A thin layer of dune sands (<1.0 m) was present overlying iron-cemented sands (ferricrete). The ferricrete was encountered as a 1.7 m thick, massive rock unit directly overlying weakly cemented organic rich sands. Residual sands and clays likely derived from the Leederville Formation were present underlying this unit.
Central	Similar to the southern area, though ferricrete was present only 0.35 m below surface, underlying topsoil and dune sands, and was encountered as a 2 m thick, massive rock unit. Weakly cemented organic rich sands were present directly beneath ferricrete, extending to 6.2 m before intersecting clayey and sandy soils likely residuals of the Leederville Formation.

Soil profiles for each location are presented in Appendix C.

6.1.2 ASS Findings

ASS results are presented on Table A, Appendix D, with laboratory documentation presented in Appendix E.

6.1.2.1 Field pH Parameters

Conclusions drawn from comparison of the field data with accepted DWER field assessment criteria (as outlined in Table 5-1) are as follows:

Table 6-2: pH_F and pH_{FOX} Summary

Indicative Classification	Number of Samples	Percentage of Total Samples
AASS ($pH_F < 4$)	0	0%
PASS ($pH_{FOX} < 4$)	139	67%
NASS	67	32%

The results show that the lowest reported pH (pH_F) prior to oxidation was 4.5 indicating that AASS were not present within the soils tested.

Following oxidation (pH_{FOX}) some pH values decreased to as low as pH 1.9. This suggests that oxidisable sulfur is likely to be present in the corresponding samples (where $pH_{FOX} < 3$).

6.1.2.2 Confirmatory Assessment

Conclusions drawn from the ASS laboratory results (Table A, Appendix D) are summarised below in Table 6-3 to Table 6-5:

Table 6-3: ASS Summary

Analyte	Unit	Management Criteria	Number of Samples	Concentration (%S)			Number of Samples Exceeding Criteria (%)
				Minimum (Sample)	Mean	Maximum (Sample)	
SPOS	%S	>0.03	70	<0.005 (Numerous)	0.17	1.9 (WM02-9.0)	43 (61%)
Net acidity*				<0.02 (Numerous)	0.21	2.1 (WM02-9.0)	51 (73%)
TAA				<0.003 (Numerous)	0.03	0.18 (WM02-9.0)	23 (33%)
TPA				<0.02 (Numerous)	0.25	2.2 (WM02-9.0)	39 (56%)
S _{NAS}			2	<0.005 (WM03-3.50)	0.011	0.02 (WM02-9.0)	0 (0%)
pH _{KCl}	pH Units	Not Defined	70	4.3 (TP13-2.00)	5.3	7.3 (WM02-0.0)	N/A
pH _{ox}	pH Units	Not Defined		1.9 (WM02-9.0)	3.4	6.5 (TP03-0.0)	N/A
ANC	%S	Not Defined	0	Not tested			

* Excluding ANC. **Bold** denotes > criteria

Key findings from the above summary are presented below:

- SPOS was observed throughout the soil profile and the dominant form of acidity on-site.
- The majority of TPA present on-site is in the form of inorganic sulfur species, with elevated concentrations, with respect to SPOS, of acidity associated with organic acids or metal speciated acidity predominately present in the central portion of the site.
- There is no measurable ANC in the samples on-site.
- The calculated mean net acidity (excluding ANC) across all samples is 0.21%S, which exceeds the management criteria of 0.03%S.
- All investigation locations, except TPO3, had at least one positive test results above the management criteria of 0.03%S.

Table 6-4 and Table 6-5 below provide a summary of the analytical data based upon geological units and depth, respectively.

Table 6-4: ASS Key Results Summary – Geological Units

Analyte	Unit	Sand – Pale Grey			Sand – Dark Brown/Grey			Sandy Clay			Ferricrete			Gravelly Sand		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
SPOS	%S	<0.005	0.007	0.014	<0.005	0.21	1.9	0.008	0.28	1.3	0.007	0.02	0.05	0.02	0.02	0.03
Net acidity*		<0.02	<0.02	0.023	<0.02	0.25	2.1	0.022	1.4	0.31	0.02	0.04	0.09	0.02	0.04	0.06
TAA		<0.003	0.007	0.014	<0.003	0.04	0.18	0.01	0.03	0.12	0.005	0.02	0.08	<0.003	0.02	0.028
TPA		<0.02	<0.02	<0.02	<0.02	0.31	2.2	0.03	0.33	1.4	0.02	0.06	0.14	<0.02		
S _{NAS}		-	-	-	<0.005	0.011	0.02	-	-	-	-	-	-	-	-	-
ANC		Not tested														
Number of samples		9			43			10			6			2		
Number of samples exceeding criteria		0			38			10			5			1		

* Excluding ANC. **Bold** denotes > criteria

Table 6-5: ASS Key Results Summary – Depth

Analyte	Unit	0-1 mbgl			1-2 mbgl			2-10 mbgl		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
SPOS	%S	0.005	0.029	0.15	0.012	0.08	0.21	0.008	0.41	1.9
Net acidity*		<0.02	0.05	0.20	0.022	0.13	0.29	0.02	0.45	2.1
TAA		<0.003	0.02	0.08	0.009	0.05	0.17	0.01	0.05	0.18
TPA		<0.02	0.07	1.2	<0.02	0.18	0.49	0.03	0.52	2.20
S _{NAS}		0.006				0.006			<0.005	0.014
ANC	Not tested									
Number of samples		38			6			26		
Number of samples exceeding criteria		22			5			26		

* Excluding ANC. **Bold** denotes > criteria

Key findings from the above summary are presented below:

- SPOS exceeds the management criteria in all the majority of soil units, with the dark grey/brown sands having the highest concentrations onsite.
- The mean net acidity of all soil types exceeded the management criteria, except pale grey sands.
- Soils contained no measurable acid neutralising capacity (ANC).
- Soils in the top 1 m pose a lower risk compared to deeper soils, especially those beyond 2 mbgl.
- The dark brown/grey sands and sandy clays (pale and dark grey) contain the highest concentrations of net acidity and SPOS observed on-site and are predominately located >2 mbgl.

6.1.3 Summary

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands extending to the depth of investigation.

The data supports a conclusion that ASS is present at the site in all the soil profiles, except shallow pale grey/white sands (<1 mbgl), with the dark grey/brown sands and sandy clay >2 mbgl exhibiting, the highest risk soils onsite. All soils exceeding the guidelines, with the exception of the shallow pale grey/white sands (<1 mbgl), will require management and lime-neutralisation during construction to manage the risk of acidification in line with DWER guidelines (2015b).

Whilst all soil types and across all depths, except shallow pale grey/white sands (<1 mbgl), exceeded the relevant DWER action management criteria and will require management and lime-neutralisation should these soils be disturbed, soils predominantly >2 mbgl pose the highest risk on-site, due to elevated concentrations of inorganic sulfur. Under the current proposed design, soils at this depth are unlikely to be disturbed either via excavation and or dewatering, except for minor volumes recovered when the auger is pulled up whilst injecting concrete to construct piles.

6.2 Groundwater

The following presents a summary of the monitoring completed to date relevant to ASS and preparation of this ASSDMP, which entails groundwater levels and flow from across the site and sampling results from nine bores (three deep and six shallow) undertaken by Stantec between April 2024 and January 2025.

6.2.1 Groundwater Elevation and Flow

Groundwater monitoring undertaken by Stantec (Stantec, August 2025) between April 2024 and September 2024, which typically represents the groundwater water level at its lowest and highest, respectively, with groundwater level in the Superficial Aquifer (shallow bores) ranging from 0.23 - 3.15 mbgl (elevation ranged between 26.25 mAHD and 35.32 mAHD). Groundwater level in the Leederville Aquifer (deep bores) ranged from 0.53 - 2.78 mbgl (elevation ranged between 28.03 mAHD and 35.52 mAHD) (Table 6-6). The groundwater flow is in a general southerly direction in the Leederville Aquifer. The groundwater flow in the Superficial Aquifer is generally south-westerly and southerly in the north and central and southern portions of the site, respectively.

Table 6-6: Depth to Water and Static Water Levels

Bore	Top of Collar (mAHD)	Surface level (mAHD)	Apr-24		Sep-24	
			Depth to Water (mbgl)	Groundwater Elevation (mAHD)	Depth to Water (mbgl)	Groundwater Elevation (mAHD)
Leederville Aquifer						
WM01	36.73	36.04	2.25	33.79	0.53	35.51
WM02	29.22	28.57	2.78	25.79	0.72	27.85
WM03	33.06	32.43	1.21	31.22	0.70	31.73
Superficial Aquifer						
WM01-W-S01	35.60	35.14	0.63	34.51	0.74	34.4
WM01-W-S02	36.95	36.35	1.89	34.46	0.62	35.73
WM02-W-S01	29.52	28.92	3.15	25.77	1.04	27.88
WM02-W-S02	28.09	27.45	1.30	26.15	0.63	26.82
WM03-N-S01	34.53	33.84	1.46	32.38	0.61	33.23
WM03-N-S03	34.65	34.00	1.35	32.65	0.30	33.7
WM03-N-S04	35.39	34.79	1.38	33.41	0.58	34.21
WM03-W-S01	34.37	33.67	-	-	0.68	32.99
WM03-W-S03	34.51	33.87	-	-	0.66	33.21
WM03-W-S04	33.70	33.14	0.99	32.15	0.23	32.91
WM03-W-S05	33.07	32.50	1.20	31.3	0.47	32.03

6.2.2 Groundwater Quality Findings

Groundwater conditions were assessed from the nine groundwater monitoring bores sampled (Section 5.2.1), across the site (Figure 4). Groundwater results presented in Table B (Appendix D).

6.2.2.1 Physical Parameters

A summary of field observations from the ongoing baseline investigation are presented in Table 6-7 below.

Table 6-7: Groundwater Physical Parameters Summary

Parameter	Unit	Leederville Aquifer			Superficial Aquifer		
		Min	Mean	Max	Min	Mean	Max
pH	pH units	5.9	6.3	6.8	3.7	5.5	6.6
EC	µS/cm	266	447	633	296	636	2,740
Redox	mV	6	55	169	-161	29	317
DO	mg/L	0.06	0.7	2.9	0.07	0.7	6.6

6.2.2.2 Analytical results

A summary of key ASS parameters and guideline exceedances for the site is provided below in Table 6-8 and Table 6-9 for the Leederville and Superficial Aquifers respectively.

Table 6-8: Groundwater Analytical Results Summary – Leederville Aquifer

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
pH	pH units	5.1 (WM01)	5.8	6.2 (WM03)	ASS (<6), FWG (7.0-8.5)	ASS and FWG – All
EC	µS/cm	266 (WM01)	447	633 (WM02)	-	
TDS	mg/L	178 (WM01)	246	332 (WM02)	N/A	N/A
Alkalinity	mg/L	11 (WM01)	21	34 (WM03)	N/A	N/A
Chloride	mg/L	72 (WM01)	142	207 (WM02)	-	-
Sulfate	mg/L	5 (WM01)	9	15 (WM02)	-	-
Sulfate:Chloride	N/A	0.04 (WM02)	0.07	0.11 (WM03)	-	-
Aluminium	mg/L	<0.01 (All)	0.016	0.05 (WM03)	-	-
Arsenic	mg/L	<0.001 (All)	<0.001	0.002 (WM02)	-	-
Iron	mg/L	<0.05 (WM01, WM02)	4.3	14.9 (WM02)	LIWG (0.2), NPUG (0.3)	LIWG and NPUG – All
Manganese	mg/L	0.06 (WM01)	0.25	0.61 (WM02)	LIWG (0.2)	WM02, WM03
Nickel	mg/L	<0.001 (WM02)	0.004	0.012 (WM03)	FWG (0.011)	WM03
Zinc	mg/L	<0.005 (WM01, WM02)	0.008	0.021 (WM03)	FWG (0.008)	WM01, WM03
Total Phosphorus	mg/L	<0.01 (WM01, WM03)	0.04	0.1 (WM02)	FWG (0.065)	WM02
Total Nitrogen	mg/L	0.2 (WM02)	0.3	0.6 (WM01)	-	-
Total Ammonia	mg/L	<0.01 (WM01)	0.1	0.17 (WM03)	-	-
Nitrate and Nitrite	mg/L	<0.01 (All)	0.06	0.36 (WM03)	FWG (0.1)	WM03

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters; Non-potable Drinking Water Guidelines (NPUG).

Table 6-9: Groundwater Analytical Results Summary – Superficial Aquifer

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
pH	pH units	4.6 (WM01-W-S01)	5.6	6.4 (WM02-W-S02)	ASS (<6), FWG (7.0-8.5)	ASS and FWG – All
EC	µS/cm	296 (WM01-W-S02)	636	2,740 (WM03-W-S02B)	LIWG (2,300)	WM03-W-S02B
TDS	mg/L	173 (WM01-W-S01)	388	822 (WM03-W-S02B)	N/A	N/A
Alkalinity	mg/L	<1 (Numerous)	14	59 (WM03-N-S03)	N/A	N/A
Chloride	mg/L	59 (WM01-W-S01)	153	320 (WM03-W-S02B)	NPUG (250)	WM03-W-S02B
Sulfate	mg/L	3 (WM02-W-S02)	44	109 (WM03-W-S02B)	-	-
Sulfate: Chloride	N/A	0.02 (WM02-W-S02)	0.32	0.68 (WM01-W-S01)	ASS (>0.5)	WM01-W-S01
Aluminium	mg/L	<0.01 (Numerous)	0.29	2.2 (WM03-N-S03)	FWG (0.055) NPUG (0.2) ASS (1)	FWG – WM01-W-S02, WM02-W-S01, WM03-N-S03, WM03-W-S02B NPUG – WM03-N-S03, WM03-W-S02B ASS – WM03-N-S03, WM03-W-S02B
Arsenic	mg/L	<0.001 (All)	<0.001	0.006 (WM03-N-S03)	-	-
Iron	mg/L	<0.05 (Numerous)	8.1	30.2 (WM02-W-S02)	LIWG (0.2) NPUG (0.3)	LIWG – All NPUG – All
Manganese	mg/L	0.015 (WM03-N-S03)	0.15	0.44 (WM01-W-S01)	LIWG (0.2)	WM01-W-S01, WM02-W-S02, WM03-W-S02B
Nickel	mg/L	<0.001 (Numerous)	<0.001	0.004 (WM01-W-S01)	-	-
Zinc	mg/L	<0.005 (Numerous)	0.008	0.03 (WM01-W-S01)	FWG (0.008)	WM01-W-S01
Total Phosphorus	mg/L	<0.01 (Numerous)	0.2	1.06 (WM01-S-S02)	FWG (0.065)	WM01-W-S01, WM01-W-S02, WM02-W-S02, WM03-N-S03, WM03-W-S02B
Total Nitrogen	mg/L	0.1 (WM01-W-S01)	3.7	42 (WM03-N-S03)	FWG (1.5) LIWG (9)	FWG – WM01-W-S01, WM01-W-S02, WM02-W-S01, WM03-N-S03, WM03-W-S02B

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
						LIWG - WM03-N-S03, WM03-W-S02B
Total Ammonia	mg/L	<0.01 (WM01-W-S01)	2.3	35.1 (WM03-N-S03)	NPUG (0.41) FWG (2.57)	NPUG - WM02-W-S01, WM03-N-S03, WM03-W-S02B FWG - WM03-N-S03
Nitrate and Nitrite	mg/L	<0.01 (All)	0.28	5.97 (WM03-N-S03)	FWG (0.1)	WM02-W-S02, WM03-N-S03

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Results not presented where all results were below the limit of reporting. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

6.2.3 Summary

Groundwater is slightly acidic and acidic to slightly acidic within the Leederville and Superficial Aquifers respectively, both containing low concentrations of acid buffering capacity. Concentrations for dissolved aluminium (Superficial only), iron, manganese and zinc commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Dissolved metal concentrations are typically higher in the Superficial then Leederville Aquifer. Total nitrogen, total ammonia and total phosphorous concentrations reported in the Superficial Aquifer commonly exceeded adopted guidelines, with lower concentrations, which are predominately below adopted guidelines, observed in the Leederville Aquifer.

Based upon a review of the water quality results compared against the DWER ASS guidance, there is some evidence of acidification, i.e. low pH, especially in the Superficial Aquifer.

The groundwater is recognised as being susceptible to further acidification should soils and dewatering not be managed appropriately during construction.

6.3 Surface Water

6.3.1 Surface Water Quality Findings

Surface water conditions were assessed from the nine surface water locations sampled (Section 5.2.1), across the site (Figure 4, Appendix A). Surface water results presented in Table C (Appendix D).

6.3.1.1 Physical Parameters

A summary of field observations from the baseline investigation are presented in Table 6-10 below.

Table 6-10: Surface Water Physical Parameters Summary

Parameter	Unit	Creekline Discharge			Wetland		
		Min	Mean	Max	Min	Mean	Max
pH	pH units	6.4	7.1	7.4	6.1	6.4	7.3
EC	µS/cm	438	750	1,284	256	1,086	3,415
Redox	mV	-37	26	62	5	49	108
DO	mg/L	4.26	7.06	9.1	3.12	6.29	11.42

6.3.1.2 Analytical results

A summary of key ASS parameters and guideline exceedances for the site is provided below in Table 6-11 and Table 6-12 for the creekline discharge and wetlands respectively.

Table 6-11: Surface Water Analytical Results Summary – Creekline Discharge

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Location(s)
		Min (Location)	Mean	Max (Location)		
pH	pH units	6.4 (SW04)	7.1	7.54 (SW04)	FWG (7.0-8.5)	SW02, SW03, SW04, SW05
EC	µS/cm	438 (SW03)	751	1,284 (SW02)	-	-
TDS	mg/L	269 (SW01)	504	619 (SW02)	N/A	N/A
TSS	NTU	21 (SW04)	72	180 (SW05)	N/A	N/A
Alkalinity	mg/L	55 (SW04)	113	175 (SW01)	N/A	N/A
Chloride	mg/L	56 (SW01)	207	326 (SW02)	NPUG (250)	SW02
Sulfate	mg/L	<5 (SW01)	34	47 (SW02)	-	-
Sulfate:Chloride	N/A	0.08 (SW04)	0.13	0.25 (SW03)	-	-
Aluminium	mg/L	<0.01 (SW02)	0.05	0.14 (SW04)	FWG (0.055)	SW01, SW03, SW04
Arsenic	mg/L	<0.001 (SW01-SW04)	<0.001	0.001 (SW05)		
Iron	mg/L	0.28 (SW03)	2.08	8.63 (SW03)	LIWG (0.2), NPUG (0.3)	LIWG, NPUG - All
Manganese	mg/L	<0.001 (SW01)	0.06	0.18 (SW05)	-	-
Total Phosphorus	mg/L	0.06 (SW02)	0.83	6.23 (SW05)	FWG (0.065)	SW02, SW03, SW04, SW05
Reactive Phosphorus	mg/L	<0.01 (SW02)	0.08	0.33 (SW04)	FWG (0.03)	SW02, SW04, SW5
Total Nitrogen	mg/L	1.3 (SW02)	5.7	12.6 (SW05)	FWG (1.5) LIWG (5)	FWG - All LIWG - SW02, SW03, SW05
Total Ammonia	mg/L	<0.01 (SW01)	1.48	4.61 (SW02)	NPUG (0.41) FWG (2.57)	NPUG, FWG: SW02
Nitrate and Nitrite	mg/L	<0.01 (SW02, SW04)	0.21	1.23 (SW05)	FWG (0.1)	SW02, SW05

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Results not presented where all results were below the limit of reporting. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

Table 6-12: Surface Water Analytical Results Summary – Wetland

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Location(s)
		Min (Location)	Mean	Max (Location)		
pH	pH units	6.1 (WM03-WL)	6.4	7.3 (WM02-WL)	FWG (7.0-8.5)	FWG – All
EC	µS/cm	256 (WM01-WL)	1,089	3,415 (WM03-WL)	LIWG (2,300)	WM03-WL
TDS	mg/L	214 (WM01-WL)	826	2,240 (WM03-WL)	LIWG (1,500)	WM03-WL
Turbidity	NTU	2 (WM03-WL)	24	55 (WM02-WL)	N/A	N/A
Alkalinity	mg/L	17 (WM01-WL)	52	82 (WM02-WL)	N/A	N/A
Chloride	mg/L	86 (WM01-WL)	356	942 (WM03-WL)	NPUG (250) LWIG (710)	NPUG – WM02-WL, WM03-WL, LIWG – WM03-WL
Sulfate	mg/L	<5 (WM02-WL)	22	<50 (WM03-WL)	-	-
Sulfate: Chloride	N/A	0.01 (WM02-WL)	0.08	0.16 (WM03-WL)	-	-
Aluminium	mg/L	0.03 (WM01-WL)	0.46	1.47 (WM03-N-SO3)	FWG (0.055), NPUG (0.2), ASS (1)	FWG – All, NPUG – WM01-WL, WM03-WL, ASS – WM03-WL
Iron	mg/L	0.12 (WM01-WL)	1.6	6.3 (WM03-WL)	LIWG (0.2), NPUG (0.3)	LIWG – All, NPUG – All
Manganese	mg/L	0.009 (WM03-WL)	0.03	0.078 (WM03-WL)	-	-
Zinc	mg/L	<0.005 (All)	<0.005	0.007 (WM03-WL)	-	-
Total Phosphorus	mg/L	0.17 (WM02-WL)	1.59	6.53 (WM03-WL)	FWG (0.065)	All
Reactive Phosphorus	mg/L	0.09 (WM02-WL)	1.72	6.1 (WM03-WL)	FWG (0.03)	All
Total Nitrogen	mg/L	2.7 (WM02-WL)	5.6	12.5 (WM03-WL)	FWG (1.5), LIWG (5)	FWG – All, LIWG – WM02-WL, WM03-WL,
Total Ammonia	mg/L	0.03 (WM02-WL)	0.17	0.5 (WM01-WL)	NPUG (0.41)	NPUG – WM01-WL
Nitrate and Nitrite	mg/L	<0.01 (WM02-WL)	0.04	0.11 (WM03-WL)	FWG (0.1)	WM03-WL

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters; Non-potable Drinking Water Guidelines (NPUG).

6.3.2 Summary

Surface water is slightly acidic to neutral (7.8 pH units) and contains measurable levels of acid buffering capacity. Concentrations for dissolved aluminium and iron commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Total nitrogen, reactive phosphorous and total phosphorous concentrations reported in both wetland and creekline discharge samples commonly exceeded adopted guidelines, with isolated exceedances on total ammonia and oxidised nitrogen species.

Based upon a review of the surface water quality results compared against the DWER ASS guidance, there is minimal evidence of acidification.

It is recognised however that surface water is at risk from impacts from acidification, should soils and dewatering effluent not be managed appropriately during construction.

7 GROUNDWATER MODELLING

A preliminary estimation of potential dewatering volumes for the construction of foundations for the turbines and wind monitoring and communication towers has been undertaken by Stantec (August 2025). A summary of the modelling inputs, assumptions and results are presented below. Note the extent of drawdown and pumping rates will be dependent on the water levels at the time of construction.

7.1 Approach

Groundwater time-varying drawdown extent has been based upon Cooper-Jacob equation (Kruseman and de Ridder, 1994), with the Dupuit-Thiem model used to evaluate distance-drawdown and Marinelli and Niccoli (2000) model used to evaluate inflows in steady state conditions.

7.2 Drawdown Modelling Assumptions

7.2.1 General Model Inputs

The following general modelling inputs applied to both time-variant and steady-state models:

- Models rely on limited data and are based on conservative estimates.
- Excavation dimensions will be:
 - Turbines: 30 m by 30 m, depth 0.8-1.2 mbgl.
 - Meteorological tower (Met mast): maximum dimensions – 1.8 m by 1.8 m, depth 1.5 mbgl.
- The models assume that the entire sub-surface is fully saturated from ground surface level.
- To provide dry working conditions across the excavation, groundwater was assumed to be lowered to a maximum depth of approximately:
 - Turbines: 2 mbgl.
 - Meteorological tower: 3 mbgl.
- Horizontal hydraulic conductivity (based on Domenico and Schwartz 1990) was assigned as two zones to enable flexibility across the site, with regards to potential infrastructure placement (Figure 7-1):
 - Zone 1 (bore group WM01): dominant sandy clay (typical silt, clay range) aquifer was assigned 0.5 m/d.
 - Zone 2 (All other locations): dominant sand (typical fine sand range) aquifer was conservatively set to 20 m/day.
 - Transition zone: assigned to highlight an arbitrary boundary between the two zones and was estimated based on the limited soil bores and test pits in the northern area. The transition zone approximately circles the WM01 bore group and extends toward two proposed turbine locations in the north.

7.2.2 Time-Variant Inflow

The following model assumptions have been made in evaluating time-variant groundwater inflow and drawdown:

- For the Cooper-Jacob model the aquifer was unconfined, infinite, homogeneous, isotropic, uniform thickness and pumped at an initial time variant pumping rate attain the target drawdown.
- Five days of initial pumping to attain the target drawdown (which may vary per location). followed by steady-state pumping to maintain the target drawdown to satisfy the excavation development and typical 28-day curing of the concrete. Total dewatering is 33 days. The actual time needed to achieve the target groundwater drawdown may vary between excavation sites; it could be shorter or longer than five days, depending on conditions.
- The discharge is from a single, small diameter bore that is fully penetrating.
- Aquifer thickness was set to 20 m to satisfy the model equations.
- A specific yield of:
 - Zone 1: sandy clay or clayey sand 5% (based on silt) (Morris and Johnson, 1967).
 - Zone 2: sand 20% (based on typical sand) (Heath, 1983).

7.2.3 Steady-State Inflow & Distance-Drawdown

The following model assumptions have been made in evaluating steady-state groundwater inflow and drawdown:

- Aquifer was infinite, homogeneous and anisotropic in both zones (Marinelli and Niccoli 2000).
- For the Dupuit-Thiem model,
 - the aquifer was considered unconfined and was evaluated for steady-state constant daily discharge to maintain the target drawdown.
 - flat initial water table with pumping from a fully penetrating bore under steady-state conditions.
- For the Marinelli and Niccoli model
 - recharge was 30% of the average annual rainfall of 933 mm for the nearest BoM station (Scott River).
 - vertical conductivity was assumed to be half of the horizontal hydraulic conductivity, to account for a matrix comprised of sand.
- No sheet piling or cut off walls are used.

7.3 Results

7.3.1 Drawdown

The potential dewatering drawdown extents are presented in Table 7-1 and visually in Figure 7-1 with potential drawdown, on GDEs and social receptors presented in Figure 7-2 and Figure 7-3, respectively.

Table 7-1: Predicted Drawdown Distances

Structure Type	Maximum Depth of Drawdown (m)*	Location	Predicted Distance-Drawdown (m)			
			>3 m	2 m	1 m	0.5 m
Turbine	2	North (Zone 1)	9.5	17	31	43
		Central/South (Zone 2)	5	17	60	117
Meteorological tower	3	North (Zone 1)	N/A			
		Central/South (Zone 2)	1	6	34	86

* At edge of excavation. N/A not applicable. Meteorological tower not currently proposed in the north. Distances are reported as the radius from the centre of an excavation. Note: Communication Towers will have similar drawdown requirement to the meteorological tower.

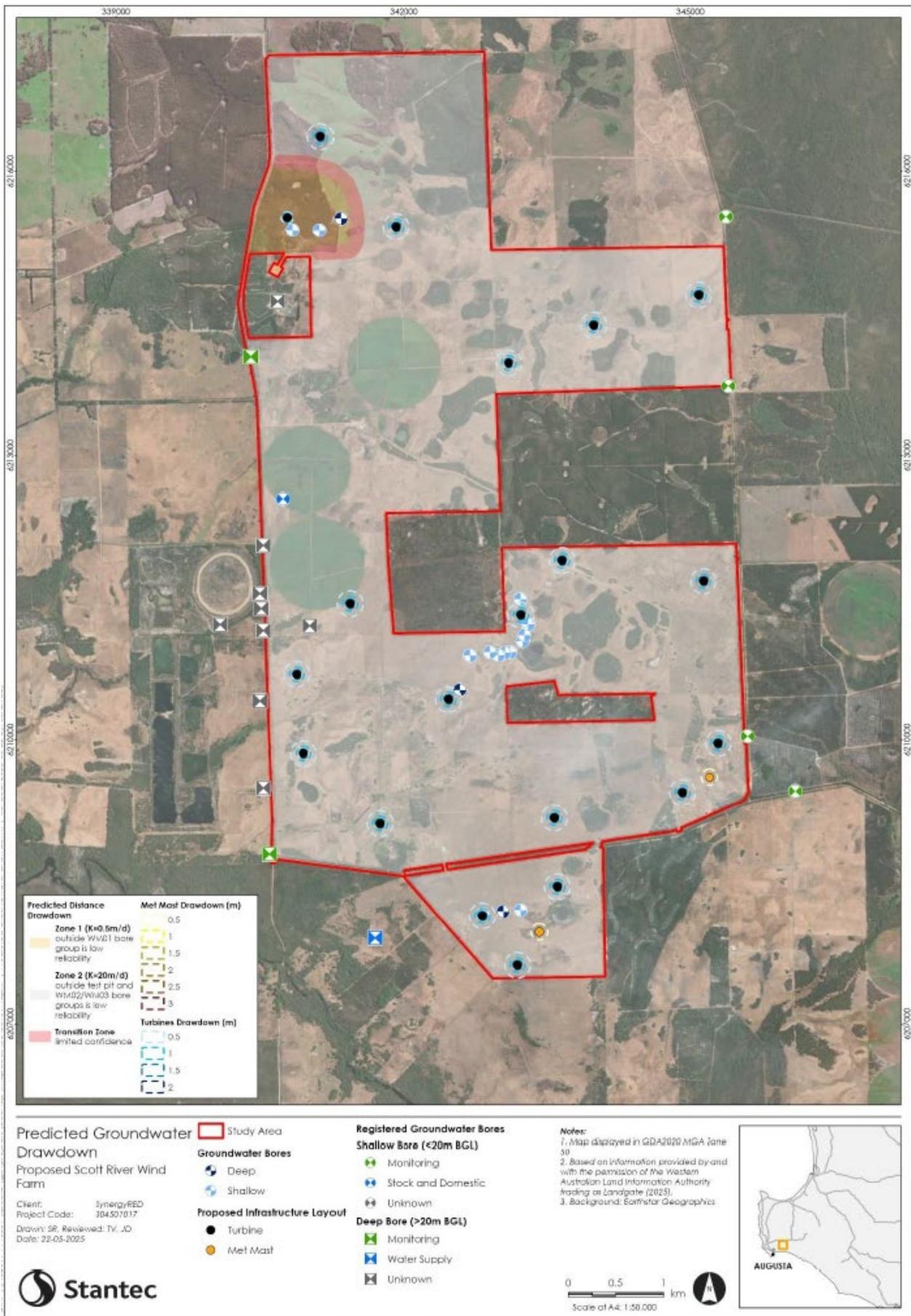


Figure 7-1: Predicted Groundwater Drawdown (Stantec, August 2025)

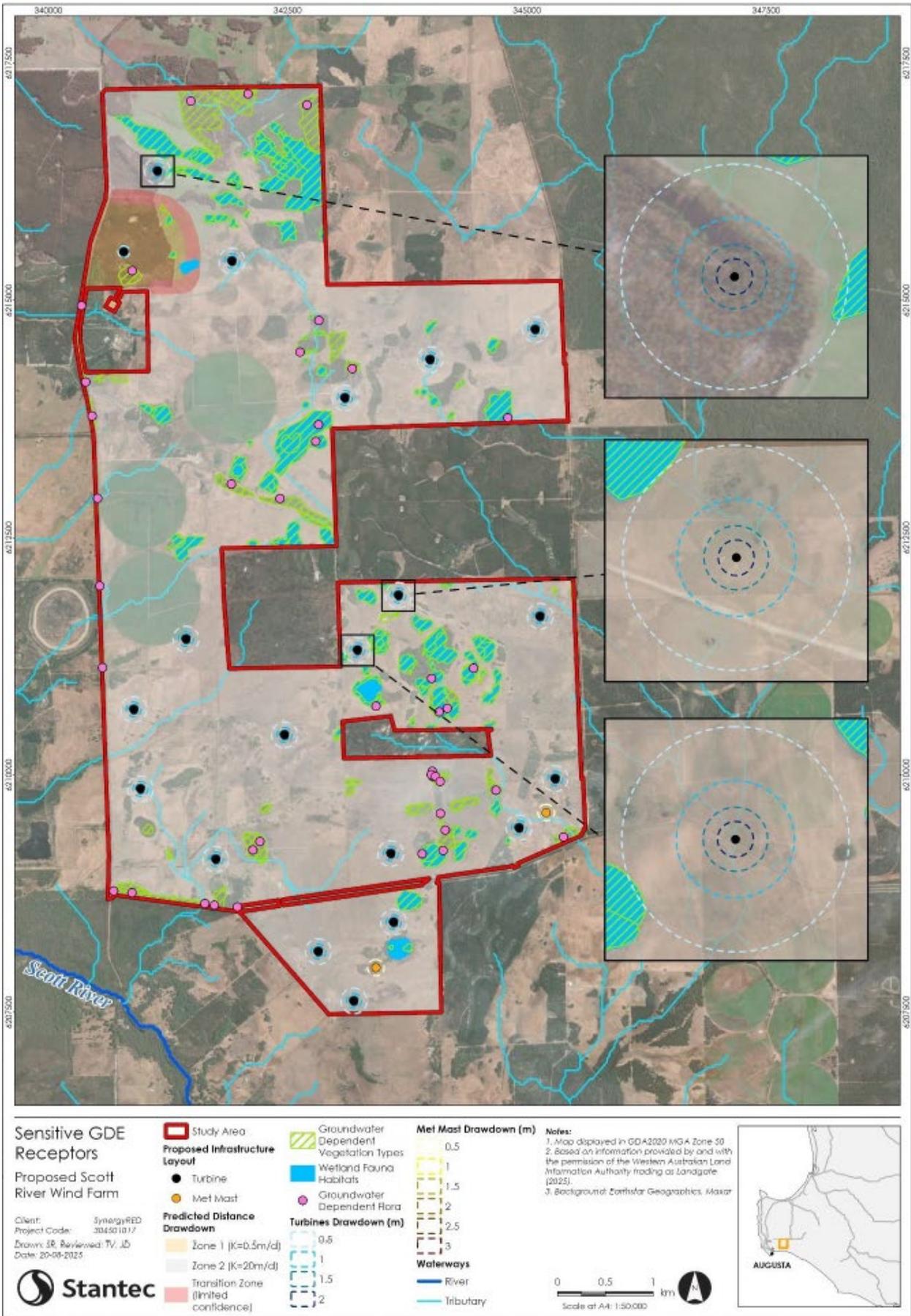


Figure 7-2: Predicted Groundwater Drawdown – GDEs (Stantec, August 2025)

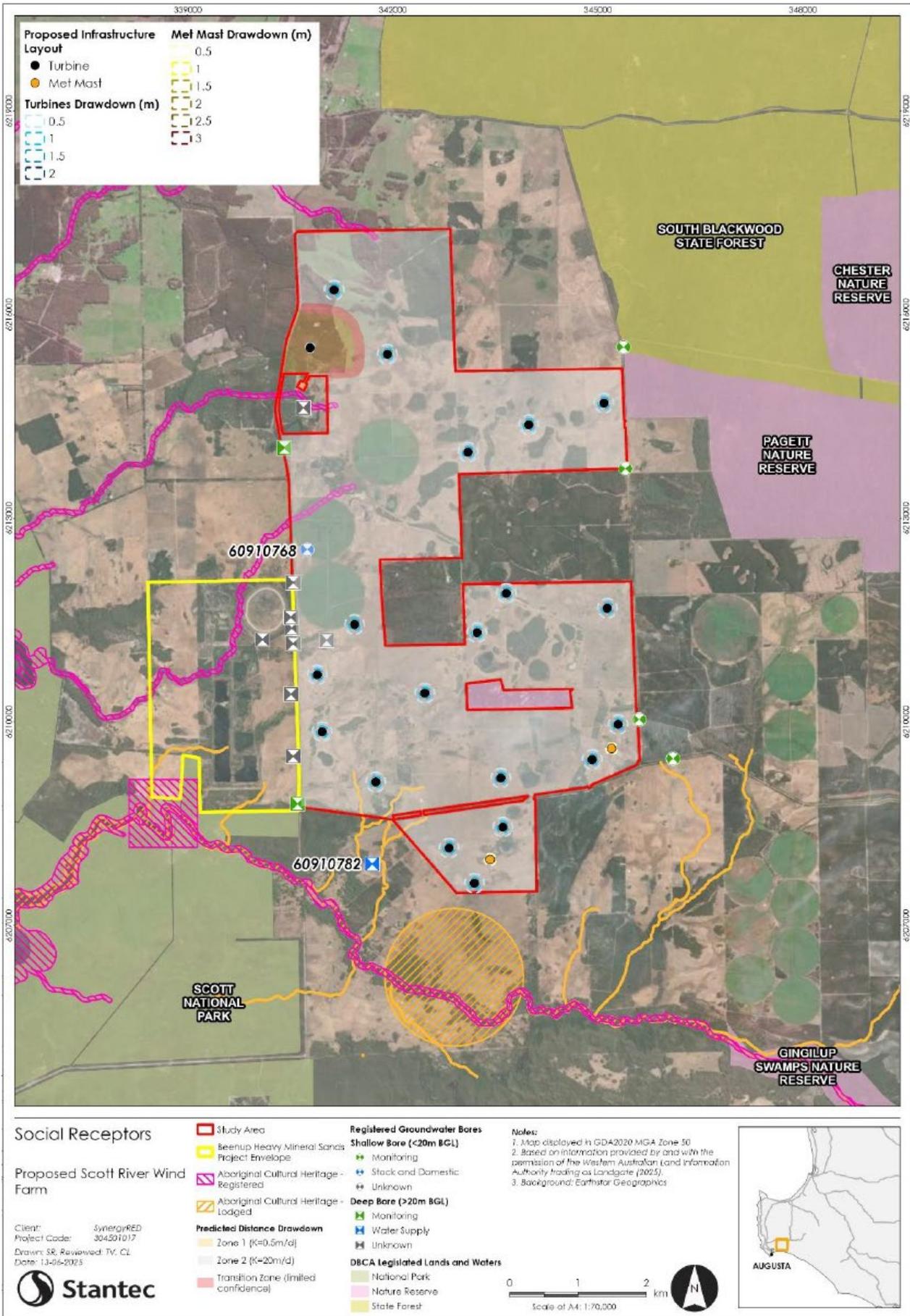


Figure 7-3: Predicted Groundwater Drawdown – Social Receptors (Stantec, August 2025)

7.3.2 Time-Variant Pumping (Cooper-Jacob model)

The elapsed time to attain the targeted drawdown depends upon the pumping rate. For the meteorological tower and turbines in zone 2 ($K=20$ m/d), to achieve the target drawdown at 5 days the following pumping rate is required, per location (Table 7-2).

Table 7-2: Summary of Time-Variant Discharge Rates, Per Location

Model Type	Zone	Hydraulic Conductivity (m/day)	Turbine: Discharge to Achieve Target 2.0 m Drawdown After 5 Days			Meteorological Tower: Discharge to Achieve Target 3.0 m Drawdown After 5 Days		
			Discharge (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume in 5 days (m ³)	Discharge (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume in 5 days (m ³)
Cooper Jacobs (unconfined)	1	0.5 ^[1]	N/A	N/A	N/A	N/A	N/A	N/A
	2	20 ^[2]	2,295	27	11,475	1,525	18	7,625

Notes:

N/A model was unable to calculate initial discharge for target drawdown. To satisfy the model equation, when Zone 1 was 0.5 m/day, the transient pumping estimated over 35 days to be valid and therefore was unable to be calculated. A steady-state model was likely to be representative of the initial discharge (see below).

[1] Clayey sand and sandy clay; [2] Sand.

7.3.3 Steady-State Pumping (Marinelli & Niccoli; Dupuit-Thiem models)

The below pumping rates (Table 7-3) are conservative based on the adopted horizontal hydraulic conductivity values and the absence of any cutoff structures in the excavation, such as sheet piles. Note that initial inflows are predicted to be greater to attain the target drawdown within a week, then the pumping rate would be reduced to maintain the target depth under steady-state conditions.

Table 7-3: Summary of Steady-State Discharge Rates

Model Type	Zone	Target 2.0 m Drawdown for a Single Turbine			Target 3.0 m Drawdown for a Single Meteorological Tower		
		Discharge (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume (m ³) ^[1]	Discharge (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume (m ³)
Dupuit-Thiem (unconfined)	1	95	1	2,660	N/A	N/A	N/A
	2	1,833	21	51,324	-	-	-
Marinelli & Niccoli (Flow to a Pit)	1	56	0.7	1,568	N/A	N/A	N/A
	2	2,045	24	57,260	296	3.4	8,204 ^[2]

Notes: N/A meteorological tower not proposed within the northern area Zone 1; -Dupuit-Thiem model not used for inflow rate in zone 2, only Marinelli and Niccoli. [1]: cumulative value is based on 5 days to reach target drawdown using the steady-state inflow and 28 days dewatering, total 33 days; [2]: cumulative value is based on 5 days to reach target drawdown using the time-variant pumping and steady-state 28 days dewatering total, 33 days.

7.4 Summary

Maximum extent of drawdown (i.e., the area experiencing more than ~0.5 m drawdown) is expected to extend ~117 m from turbines in Zone 2, and ~43 m in Zone 1, with the drawdown expected for the meteorological tower: to be ~86 m in Zone 2.

Table 7-4 below presents a summary of the preliminary modelling outputs with dewatering rates potentially up to 24 L/s, per turbine location, in the majority of site.

Table 7-4: Summary of Pumping Rates and Estimated Volume, Per Location

Zone	Turbine: Discharge for Target 2.0 m Drawdown After 33 Days			Meteorological Tower: Discharge for Target 3.0 m Drawdown After 33 Days		
	Discharge ¹ (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume (m ³)	Discharge (m ³ /day)	Pumping Rate (L/s)	Cumulative Volume days (m ³)
1	75.5	0.9	2,492 ^[1]	-	-	-
2	2,058	24	65,767 ^[2]	293	3.4	15,829 ^[2]

Note: Initial pumping rate to achieve target drawdown will be higher before achieving steady state; Meteorological tower: not planned to be installed in Zone 1; [1]: Mean steady-state models [2]: Cumulative total based on discharge from time-variant 5 days to achieve target drawdown and 28 days steady-state model output

8 POTENTIAL ENVIRONMENTAL IMPACTS

The identified potential environmental impacts associated with earth working and or dewatering of ASS for the proposed construction activities is detailed in the Table 9-1 below. Potential impacts that have been determined as requiring management are addressed in detail within Dewatering Management (Section 10) and ASS Management (Section 11).

Table 8-1: Potential Environmental Impacts

Aspect	Potential Impact	Modelled Predictions	Management Measure
Oxidation of ASS			
Soils/sediments (excavated)	Problems, e.g., oxidation, (acid generation and metal leaching/ mobilisation) caused through the inappropriate handling, treatment or disposal of excavated soils.		Per ASSDMP ASS Management.
Soils/sediments (in situ)	ASS oxidation effects caused through exposure of the soils to air via open excavation and or dewatering.	The drawdown, if required, will be temporary (maximum of four weeks at any location) and localised per location.	Per the ASSDMP Dewatering Management. Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression.
Groundwater	Potential for acid and metal leaching through groundwater from oxidised ASS.	The cone of depression is modelled, based upon a worst-case scenario, i.e. groundwater at the site surface and with no active management, to exceed 50 cm at 100 m from the centre of turbine excavation across the majority of the site. This modelled cone of depression is greater than the recommended maximum in DWER guidelines (2015b), <10 cm at 100 m.	Groundwater level and quality monitoring per the ASSDMP to confirm modelling predictions.
Surface Water	Potential for acid and metal mobilisation into surface water from oxidised ASS.	Where construction works are scheduled in summer months, the cone of depression would be smaller due to lower water tables.	Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression. Surface water level monitoring and quality monitoring (contingency).
Groundwater Drawdown			
Impact on surface water bodies	Reduction in groundwater levels leading to a reduction in surface water levels in adjacent wetlands, with associated reduction in water quality.	The lateral extent of drawdown, based upon a worst-case scenario, i.e. groundwater at the site surface, may potentially impact permanent surface water bodies, i.e. wetlands; however, where construction works are scheduled in summer months, the potential impacts would be minimised due to lower water tables.	Groundwater level and quality monitoring per the ASSDMP to confirm modelling predictions. Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression. Surface water level monitoring and quality monitoring (contingency).
GDE/Vegetation stress	Reduction in groundwater levels (i.e., below root zone) leading to stress of groundwater-dependent vegetation (phreatophytes).	Lateral extent of drawdown has the potential to impact GDEs and other sensitive ecology. Where construction works are scheduled in summer months, the potential impacts would be minimised due to lower water tables.	

Aspect	Potential Impact	Modelled Predictions	Management Measure
Residential users (bores)	Disruption to residential bores through lowering the water table below the intake level.	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to impact on- or off-site bores, likely to be installed in the deeper confined aquifer.	None required.
Irrigation bores	Disruption to residential bores through lowering the water table below the intake level.	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to extend to off-site residences and or impact on-off or off-site bores, installed in the deeper confined aquifer.	None required.
Contaminated Sites	Mobilisation and or migration of contaminants from contaminated sites in groundwater due to dewatering	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to extend off-site or influence groundwater impacted by the former Beenup Mineral Sands mine.	None required.
Dewatering Disposal			
Poor water quality	Ineffective treatment and or disposal resulting in environmental impacts to soils and or groundwater.		Treatment of dewatering in line with ASSDMP
Overflow of dewatering infrastructure	Ineffective management and or sizing of dewatering infrastructure resulting in environmental impacts, e.g. contamination, decline in health, sediment plumes to surface waters and or vegetation		Sizing and management of dewatering infrastructure per ASSDMP

9 MANAGEMENT OBJECTIVES

To minimise potential impacts on the environment and other groundwater users, active management of earthworks and dewatering operations is required during construction. This Preliminary ASSDMP presents preliminary management strategies, based upon available information at the time of reporting, for managing the proposed dewatering and earth working of ASS at the site.

The Preliminary ASSDMP specifically addresses the following proposed measures:

- Management of soil excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS.
- Water table management to mitigate on- and off-site environmental impacts, this includes management of dewatering effluent produced during construction, if required and minimisation of the cone of depression.
- Potential contingency measures and corrective actions that may be implemented to rectify any breaches of the nominated triggers and management measures.
- Proposed soil, groundwater, dewatering effluent and surface water monitoring and validation to confirm works are undertaken in accordance with the performance objectives detailed herein.

10 DEWATERING AND GROUNDWATER MANAGEMENT

The following section outlines the most likely strategies for the management of dewatering effluent and groundwater, to be implemented on-site during construction works based upon information at the time of reporting.

10.1 Administrative Requirements

Dewatering works will potentially be required during construction of various elements of the wind farm including:

- Foundation construction for wind turbines (specifically the partially below ground foundation and the traditional below ground foundation options), wind monitoring and communication towers and potentially the O&M buildings and substation.
- Installation of underground services (e.g., cabling).

These estimates are dependent on the final infrastructure locations and design levels as well as the time of year and associated groundwater levels at the time of construction. Based upon proposed construction methodologies, it has been estimated that a maximum dewatering period of approximately 33 days per turbine or wind monitoring/communication tower location will be required. No dewatering is required for Turbine foundation option 2 (fully above ground foundation) nor transmission poles/towers to be installed by Western Power, however groundwater will be displaced by concrete during the pouring of piles. Dewatering requirements for other infrastructure is currently unknown. The results of dewatering estimates have required the adoption of 'dewatering management level 2' requirements, per DWER guidelines (DWER, 2015b).

Depending on the time of construction works the above may overestimate the actual dewatering required. The estimates are based on groundwater levels being at the surface, however, should construction works occur in summer, the groundwater levels will potentially be lower than those estimated.

This section describes how the groundwater dewatering will be managed within the site to ensure minimal impact to the environment and other groundwater users. It is acknowledged that the management strategies outlined will be part of the dewatering licence granted by the DWER and must be adhered to, as would any other condition of the water extraction licence.

Based upon information to date, the groundwater source to be used is considered to be the Superficial system (Superficial Aquifer and potentially shallow Leederville Aquifer in the north of the site). Groundwater levels and quality in the Superficial Aquifer (and potentially shallow Leederville Aquifer in the north of the site) will be monitored and reviewed during construction by a suitably qualified professional. This operating strategy is limited to the proposed project. It will only be reviewed if works are substantially altered.

10.2 Management Principles

The following management principles are to be promoted to limit the potential impact of dewatering on-site:

- Minimisation of dewatering requirements via modification to the construction methods, i.e. use of pile support foundations as opposed to traditional gravity foundations.
- Minimisation of the cone of depression via infiltration/recharge of most of the treated dewatering effluent and strategic siting and use of recharge basins/trenches.
- Treatment of dewatering effluent
- Monitoring of groundwater table and surface water (if required) levels and quality.

Requirements for the above management principles are outlined in the following sections.

10.3 Dewatering Treatment and Disposal

It is anticipated that dewatering will be required in support of excavation activities during construction. The requirement for dewatering is in part dependent on the earthwork component and depth of excavation and groundwater levels at the time of construction, which varies seasonally with rainfall.

10.3.1 Dewatering Treatment Method and Materials

Table 10-1 below details the dewatering effluent treatment method and neutralising agent proposed for the works.

Table 10-1: Dewatering Treatment Method and Materials

Dewatering Element	Requirement
Dewatering Treatment Method	Automated Dosing Unit
Dewatering Treatment Neutralising Agent	Calcium-based neutralising agent

10.3.2 Dewatering Disposal Assessment

Due to the likely constrained nature of individual construction footprints, e.g. wind turbine construction area, and the hydrogeological and geological conditions of the site an assessment of potential dewatering disposal options, after treatment, per options in DWER ASS guidelines (2015b) has been undertaken to determine the most suitable disposal method following treatment (Section 10.2.3) and detailed in below.

Table 10-2: Dewatering Disposal Options Assessment

Disposal Method	Comments	Suitability
Infiltration	Shallow water table and underlying ferricrete (depending on the time of year and location on-site) potentially limits the volume of water that can be infiltrated back into the superficial aquifer. Infiltration will require suitably sized areas (based upon volumes/rates) located in the project development envelope. Additional storage, e.g. holding tanks/bladders, and or strategic use of infrastructure for infiltration of treated effluent, due to the high-water table, is likely required to make infiltration more effective and minimise potential risks to sensitive receptors, i.e. GDEs.	Suitable with potential limitations to infiltration rates and areas.
Irrigation/ Dust Suppression/ Concrete Production	Groundwater will likely be suitable for irrigation (including surrounding paddocks) and or dust suppression onsite and or potentially used in the production of concrete at the onsite concrete batching plant, though some pre-treatment for pH, acidity and metals, may be required.	Suitable.
Discharge to Sewer	Not applicable (N/A) - No reticulated sewer infrastructure in the area.	N/A
Off-site Disposal	Dewatering effluent could potentially be treated and stored onsite prior to offsite disposal to a wastewater treatment plant, however the volume of dewatering and distance to plant likely make this option.	Not considered suitable - significant cost and emissions to transport to offsite disposal facility.
Discharge to Surface Water	Only considered an option when all other options have been exhausted (DWER 2015b). Dewatering effluent will be required to meet DWER surface water (2015b) criteria prior to any discharge and as such depending on the quality of the receiving water, may potentially not be viable. The drainage channels and ephemeral creeks onsite are hydrologically connected to the Blackwood and Scott Rivers.	Whilst the method may be suitable with likely additional treatment, e.g. metals, nutrients, and approval from DWER/DBCA; is it not considered a suitable option for the site at this time
Reinjection	Wells could potentially be constructed to facilitate reinjection of dewatering effluent. Potential limitations in rate of injection due to underlying geology/hydrogeology and would therefore require multiple wells, per dewatering location, to achieve sufficient rates.	Significant cost to construct wells and approach not guaranteed to achieve required rates.

Based upon a review of the potential dewatering disposal options and discussions with SynergyRED, a combination of dewatering disposal options will likely be required, namely infiltration and reuse for irrigation/dust suppression, with possible storage capacity. Construction methodologies (e.g., modifications to designs to minimise dewatering) to minimise the volume of dewatering have been considered to minimise dewatering requirements and manage dewatering onsite.

No dewatering effluent is to be disposed of, directly or indirectly, to the onsite wetlands, drainage lines and or the Scott or Blackwood Rivers.

10.3.3 Dewatering Treatment Setup

It has been proposed that the following management procedures will be applied for the handling of dewatering effluent, with the requirement for dewatering dependant on final invert levels, construction methodologies and groundwater elevation at the time of construction.

- Effluent will be pumped into an automated lime dosing (treatment) unit, utilising a calcium-based neutralising agent, i.e. hydrated lime, for the duration of the program, to increase the pH level. Lime dosing will be automatically controlled and based upon the results of monitored pH, acidity and alkalinity.
- Treated dewater effluent that is discharged from the automated lime treatment unit will be directed to a lined settlement basin (compacted limestone) and or holding tank/bladder. Sufficient retention time⁵ will be provided to enable the precipitation of trace metals and settlement of solids from the dewatering effluent.
- Treated effluent will then be either:
 - Directed to a banded recharge area, constructed into in-situ natural soils. The treated effluent will be recharged into the superficial aquifer as the primary disposal option, or
 - Reused for irrigation and/or dust suppression and/or in production of concrete onsite, may be considered should the treated effluent be of adequate quality to support this method of disposal.
- The capacity of the settlement basin/storage and recharge area will be maintained such that overflow does not occur to surrounding land. A small percentage of water is expected to recharge into the superficial aquifer via the settlement pond, where compacted limestone is used as a liner.

10.3.4 Dewatering Recharge/Infiltration Basins

Dewatering recharge/infiltration basins or trenches will be positioned to reduce the cone of depression by being positioned as close as possible to the area under abstraction. Depending on the construction footprint and available areas for recharge/infiltration either basins and or trenches will be used.

Where the cone of depression potentially impacts a sensitive receptor(s), e.g. GDE, wetland etc, basins/trenches will be positioned between the sensitive receptor(s) and the area under abstraction, to limit potential impacts to receptors.

All areas proposed for infiltration must be constructed and maintained within the allowable construction footprint for the project, i.e. no overland flow into surrounding vegetation and or surface water bodies.

10.4 Contact Details

Table 10-3: Contact Details

Project Role	Contact Details
Groundwater Consultant	PTG Consulting Pty Ltd Level 4, 167 St Georges Terrace, Perth, WA 6000 ATT: Alan Foley – 0493 090 390
Proponent	SynergyRED Level 23, 152-158 St Georges Terrace, Perth WA 6000

⁵ DWER ASS guidelines (2015b) note; *The retention or settlement basins should be designed such that the dewatering effluent has a minimum of a six to 10-hour retention time, in order to settle sediment with a 0.015-mm target size.*

10.5 Roles and Responsibilities

The following responsibilities for the monitoring requirements are outlined in Table 10-4 below. All formal reporting to the SynergyRED/DWER will be undertaken by a suitably qualified environmental consultant.

All data must be provided to SynergyRED weekly and SynergyRED notified of any exceedances/non-compliance of triggers/criteria within 3 hours of receipt of data.

Table 10-4: Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Dewatering Monitoring		
Daily	Field analysis: pH, EC, total titratable acidity (TTA), total alkalinity (TA) Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	
Fortnightly	Laboratory: <ul style="list-style-type: none"> ▪ DWER Full Analytical Suite¹ 	
Groundwater Monitoring		
Pre Construction Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	Civil Contractor/ Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	
Immediately After Dewatering		
Post-Construction		Site Environment representative/ Specialist consultant
Surface Water Monitoring		
Pre Construction Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: <ul style="list-style-type: none"> ▪ DWER Full Analytical Suite¹ ▪ Turbidity 	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 1²		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2³		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor/ Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level	
Immediately After Dewatering	Laboratory:	

Monitoring Activity	Parameters	Responsibility
Post-Construction ⁴	<ul style="list-style-type: none"> DWER Full Analytical Suite¹ Turbidity 	Site Environment representative/ Specialist consultant
Validation of Treated PASS Soils		
Collection of soil samples upon notification from site contractor	Laboratory: pH _F and pH _{FOX} , and SPOCAS ⁵	Civil Contractor/Site Environment representative/ Specialist consultant
Accumulated Sediments		
Upon completion of dewatering, use of each settlement/recharge basin	Heavy metals	Civil Contractor/Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. 2. Groundwater levels (at 100 m): >0.1 m at 100 m (outside natural decreases). 3. Groundwater decrease (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland. 4. Only if Level 2 monitoring is undertaken. 5. Suspension Peroxide Oxidation Combined Acidity and Sulfur. ^ Within four weeks prior of dewatering commencing.

10.6 Management Guidance

10.6.1 Dewatering Effluent

A summary of the dewatering management requirements are presented below in Table 10-5.

Table 10-5: Dewatering Management Guidance

Dewatering Element	Guidance
Criteria for Source Use	Potential short-term dewatering of groundwater per location from the Superficial Aquifer and potentially shallow Leederville Aquifer (in the north of the site) (based upon current information) to allow the excavation of soil and construction of footings for various infrastructure and underground services.
Dewatering Program	Dewatering will be undertaken in stages, at low to relatively high pumping rates, depending on the location on site, foundation type and the water level at the time of construction. Dewatering at each location is not anticipated to exceed 33 days and is not expected to exceed 2 m of drawdown immediately adjacent to any location.
Timing of Pumping	Pumping when required will likely occur 24 hours a day. At all other times it would be suspended.
Dewatering Licence	A dewatering license from the DWER will be required to be obtained for the project, due the sites location within groundwater management zone and estimated dewatering rates, timeframes and volumes.
Method of Dewatering	The excavations will be dewatered using either groundwater spears or sump pumps.
Abstraction Rate	The abstraction rate for dewatering is predicted to be between 1-24 L/s, with potentially higher initial rates depending on the infrastructure being installed/constructed.
Dewater Treatment	Dewater will be treated on site before disposable. The quality of abstracted dewater may differ from the baseline results presented in this ASSDMP. However using the baseline groundwater data available, it would appear likely that dewater would have a pH of ~4.2-6.5, the TTA will likely be between 40 to 100 mg/L, and the alkalinity will potentially be below 30 mg/L, depending on the time of year. As such, dewater treatment for pH, acidity and alkalinity

Dewatering Element	Guidance
	will be required (as necessary) and is to be undertaken in accordance with current DWER standards which specify that dewater having pH <6.0 and/or TTA >40 mg/L and/or alkalinity <30 mg/L shall be subject to lime neutralisation.
Dewatering Treatment Material	Dewatering effluent is required to be treated with a calcium-based product.
Dewater Disposal	<p>The primary options for disposing of dewatering effluent are via recharge to the Superficial aquifer and/or reuse onsite during construction (e.g., dust suppression).</p> <p>All areas proposed for infiltration must be constructed and maintained within the Development Envelope of the project, located as close as possible to dewatering works and located so as not to discharge directly/indirectly into any surface water bodies (i.e., wetlands).</p> <p>Dewatering recharge/infiltration basin/trenches should be strategically placed between dewatering locations and any nearby sensitive environmental receptor to mitigate potential impacts.</p>

10.7 Dewatering Effluent and Groundwater Monitoring

The following monitoring program has been prepared in line with DWER guidance (2015b) and will be undertaken prior to, during and following the completion of dewatering operations.

10.7.1 Dewatering Effluent

10.7.1.1 Monitoring Regime and Responsibilities

Based upon the groundwater quality at the site exhibiting low pH, the schedule for dewater having pH between 4 and 6 and potentially total titratable acidity (TTA) between 40-100 mg/L (CaCO₃ equivalents) has been adopted, from the and is detailed below (Table 10-6). Samples for analysis will be collected:

- Prior to treatment, and
- Post treatment and before discharge.

Table 10-6: Dewatering Effluent Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Daily	Field analysis: pH, EC, TTA, TA Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	
Fortnightly	Laboratory: <ul style="list-style-type: none"> ▪ DWER Full Analytical Suite¹ 	

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, total alkalinity, dissolved oxygen and redox are recorded during sampling.

The quality of the pre-treatment dewatering effluent will be assessed at the commencement of works and the monitoring regime amended, if required, in line with DWER (2015b) guidelines as detailed in Table 10-7 below.

Table 10-7: Dewatering Effluent Monitoring Matrix

Trigger	Monitoring Activity	Parameters
TTA: <40mg/L pH: >6	Daily	Field analysis: pH, EC, TTA, TA,
	Fortnightly	Laboratory: total acidity, total alkalinity, pH
TTA: <40mg/L, pH: 4 to 6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
TTA: 40-100mg/L pH: >6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
TTA: 40-100mg/L, pH: 4 to 6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
	Fortnightly	Laboratory: DWER ASS Full Analytical Suite ¹
TTA: >100mg/L or pH: <4 or total alkalinity <30 mg/L	Twice Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: DWER Full Analytical Suite ¹

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, TSS, TDS, and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling

10.7.1.2 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for during construction dewatering effluent sampling is presented in Table 10-8 below.

Table 10-8: Dewatering Effluent Sampling Requirements and Analytical Suite

Item	Description
Flow meter	A reading of the flow meter will be collected and recorded.
Locations	Pre-treatment – Prior to lime dosing unit Post-treatment – Infiltration basin opposite inflow point (where water is not present in the infiltration pond at a point furthest from the lime dosing unit outfall).
Dewatering Effluent Sampling Methodology	Dewatering samples submitted for will be recovered using grab methods or directly from a tap/sampling point in the treatment line in line with the following guidelines: <ul style="list-style-type: none"> Australian Standard AS/NZS 5667.4: 1998 - Water quality - Sampling - Guidance on sampling from lakes, natural and man-made (Standards Australia 1998b). Care should be taken not to disturb sediments during sampling collection. All dewatering samples for laboratory analysis will be chilled and submitted to the primary National Associated of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection.
Analytical Suite	Daily: pH, EC, TTA, TA Weekly: total acidity, total alkalinity, pH Fortnightly: DWER Full Analytical Suite ¹ Analytical suite may vary based upon pre-treatment dewatering effluent quality and is to be reviewed and revised in line with Table 10-5.
Quality Control	The following quality control samples will be collected during the DWER full analytical suite monitoring event only: <ul style="list-style-type: none"> Field duplicate Equipment rinsate (only where reusable sampling equipment is used) Field blank.

Item	Description
	The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals only. Where sampling is completed with groundwater sampling, only one set of quality control samples is required.

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, TSS, TDS, and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling

10.7.2 Groundwater

10.7.2.1 Monitoring Regime and Responsibilities

All bores will be monitored during the baseline monitoring event, with selected bores (likely two to three per location) monitored during and after dewatering depending on the location of dewatering/construction works at the time. The monitoring regime and bore network will be finalised with further engineering design and additional bores installed, where required.

Per DWER guidance (DWER June 2015b), the monitoring schedule (Table 10-9) will comprise:

Table 10-9: Groundwater Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Pre Dewatering Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	Civil Contractor/Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly		
Immediately After Dewatering	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite ¹	Site Environment representative/ Specialist consultant
Post-Construction		

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. [^] Within four weeks prior to dewatering commencing.

Upon the commencement of works, the quality of the pre-treatment dewatering effluent will be assessed and the monitoring regime amended, if required, in line with DWER (2015b) guidelines.

Where additional bores are required to be installed or existing bores are damaged/destroyed and are required to be reinstalled, all bores are to be installed accordance with the *Minimum Construction Requirements for Water Bores in Australia* (NUDLC, 2020) and the *Water Quality Protection Note - Groundwater Monitoring Bores* (DoW, 2006).

10.7.2.2 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for baseline, during and post construction groundwater sampling is presented in Table 10-10 below.

Table 10-10: Groundwater Sampling Requirements and Analytical Suite

Item	Description
Standing Water Level	The depth to water will be measured via a water level meter, relative to ground level/top of the bore collar and converted to mAHD using the bore survey data.
Groundwater Sampling Methodology	Groundwater samples submitted for laboratory analysis will be recovered using a low-flow methods, i.e. peristaltic or bladder pump, in accordance with USEPA (1996) guidance (as referenced by Australian Standard, AS/NZS 5667.11:1998) or Victoria EPA guidance (VEPA, 2022).

Item	Description
	Prior to sampling, groundwater will be purged to stability (reference parameters being pH, EC, DO, redox and temperature), measured using electronic probes. Groundwater samples will be then collected into appropriately preserved laboratory supplied containers (being field-filtered for dissolved metals, as applicable). All groundwater samples will be chilled and submitted to the primary National Association of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection.
Post-Construction	Post completion of dewatering operations, groundwater samples would be collected every second month for a period of six months (three sampling events) from the selected bores within the final monitoring network (to be determined based upon final engineering design).
Analytical Suite	<p>Groundwater parameters to be analysed in the field and at the laboratory will comprise of the following:</p> <ul style="list-style-type: none"> ▪ Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc ▪ Total metals: aluminium and iron ▪ Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential ▪ Major cations: calcium (Ca²⁺), magnesium (Mg²⁺), potassium (K⁺) and sodium (Na⁺) ▪ Major anions: sulfate (SO₄²⁻), chloride (Cl⁻), carbonate (CO₃²⁻) and bicarbonate (HCO₃⁻) ▪ Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN) (calculated), total ammonia-N (NH₃+ NH₄-N), nitrates and nitrites (NO_x-N) ▪ Total dissolved solids (TDS), Total suspended solids (TSS) ▪ Acidity ▪ Field TTA and TA.
Quality Control	<p>The following quality control samples will be collected during each groundwater monitoring event:</p> <ul style="list-style-type: none"> ▪ Field duplicate ▪ Equipment rinsate ▪ Field blank. <p>The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals only.</p>

10.8 Dewatering Effluent and Groundwater Water Quality Reference and Trigger Criteria

10.8.1 Groundwater

10.8.1.1 Groundwater Level (Drawdown) Triggers

Groundwater level triggers are developed to manage the depth of groundwater extraction across this site, mitigating impacts to ASS and groundwater dependent ecosystems. Prior to the commencement of dewatering, baseline monitoring event(s) will be undertaken to determine groundwater levels across various seasons and to develop appropriate trigger levels.

The framework for setting the trigger levels is defined below:

- The depth to groundwater in the monitoring bores will be recorded prior to the commencement, as part of a baseline monitoring event(s),
- The estimated maximum dewatering drawdown due to the construction activities at the bore will be determined based upon groundwater modelling,
- The trigger will be established based upon the estimated maximum dewatering drawdown at the bore with an additional tolerance of 0.2 metres (to account for variations in the modelling).

The ASSDMP will be revised to account for final engineering design details, additional baseline monitoring data and establishment of drawdown triggers for individual bores in accordance with the above framework. In

general groundwater will not be allowed to be drawdown by >0.1 m (excluding natural seasonal decreases) 100 m from dewatering works. Where dewatering activities potentially effect GDEs, more stringent groundwater level triggers (if required) will be defined cognisant of natural variation in groundwater levels to ensure no impacts to GDEs greater than seasonal variation in groundwater levels.

Immediately prior to construction works (within a month of commencement), groundwater levels will be measured, and the drawdown triggers will be reviewed and revised where required.

10.8.1.2 Groundwater Quality Reference Criteria

The criteria nominated below are consistent with targets established in DWER guidance literature and have been standardised across all bores. It is noted that ASS criteria were exceeded, or were marginally within the guidelines, during sampling completed to date. It can therefore be expected that these triggers will likely be exceeded during the construction program.

Quarterly baseline groundwater monitoring across the site, should be undertaken at least one year prior to construction to contribute to the baseline dataset for the site, and inform the establishment of appropriate water quality targets and thresholds.

The criteria will serve as a value against which contingency responses would be considered, when taken in the wider context of “monitored data trends” over time, i.e. trends identifying deteriorating conditions.

The bore reference criteria for all bores are as follows:

- pH: 6.0 pH units
- Total Acidity: 40 mg/L (CaCO₃ equivalents)
- Dissolved Aluminium: 1 mg/L.

10.8.2 Dewatering Effluent

Presented in Table 10-11 is a summary of the dewatering treatment and discharge criteria for groundwater dewatering effluent, as specified in *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER June 2015b).

Table 10-11: Dewatering Treatment and Discharge Reference Criteria

Analyte	Treatment Criteria	Discharge Criteria
Acidity	>40 mg/L (CaCO ₃ equivalents)	<40 mg/L (CaCO ₃ equivalents)
pH	<6 pH units	7.0 to 8.5 pH units
Alkalinity	<30 mg/L (CaCO ₃ equivalents)	>30 mg/L (CaCO ₃ equivalents)

10.9 Surface Water Monitoring and Water Quality Triggers and Criteria

The lateral extent of drawdown, based upon a worst-case scenario, i.e. groundwater at the site surface, may potentially impact surface water bodies, i.e. wetlands. Drawdown is not anticipated to impact surface water levels within any wetlands where construction works are undertaken during a summer period. Wetland water levels, however, can be expected to fall naturally over the period of operations, due to evaporation over periods of low rainfall recharge. These effects would be accounted for in the monitoring program. Similarly, catchment runoff might temporarily increase levels after periods of rainfall.

Therefore, surface water monitoring will only be undertaken where groundwater drawdown of >0.1 m is observed 100 m from dewatering activities (outside natural decreases) and the dewatering activities are in the vicinity of a wetland. Based upon the current design and modelled cone of depression only the wetland at WM03-WL (Figure 4, Appendix A) may potentially be impacted by drawdown (based upon a worst-case scenario).

10.9.1 Monitoring Regime and Responsibilities

The proposed monitoring will be undertaken on a staged approach, with no surface water monitoring being undertaken unless the following occurs:

1. Groundwater levels (at 100 m): <0.1 m or nominate groundwater trigger level – no monitoring
2. Groundwater levels⁶ (at 100 m): >0.1 m (outside natural decreases) implement Level 1 monitoring;
3. Groundwater decrease⁸ (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland implement Level 2 monitoring.

The staged monitoring requirements are detailed in (Table 10-12).

Table 10-12: Surface Water Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Pre Dewatering Baseline [^]	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: <ul style="list-style-type: none"> ▪ DWER Full Analytical Suite¹ ▪ Turbidity 	Civil Contractor /Site Environment representative/ Specialist consultant
Level 1		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor / Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level	
Immediately After Dewatering	Laboratory:	Site Environment representative/ Specialist consultant
Post-Construction*	<ul style="list-style-type: none"> ▪ DWER Full Analytical Suite¹ ▪ Turbidity 	

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling.

[^] Within four weeks prior to dewatering commencing.

* Only if Level 2 monitoring is undertaken.

10.9.1.1 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for baseline, during and post construction surface water sampling is presented in Table 10-13 below.

Table 10-13: Surface Water Sampling Requirements and Analytical Suite

Item	Description
Standing Water Level	The depth of water will be measured via a surveyed staff gauge within the wetland.
Surface water Sampling Methodology	Surface water samples submitted for laboratory analysis were recovered via grab samples in line with the following guidelines: <ul style="list-style-type: none"> ▪ Australian Standard AS/NZS 5667.4: 1998 - Water quality - Sampling - Guidance on sampling from lakes, natural and man-made (Standards Australia 1998b). ▪ Australian Standard AS/NZS 5667.6: 1998 - Water quality - Sampling - Guidance on sampling of rivers and streams (Standards Australia 1998b).

⁶ and the dewatering activities are in the vicinity of a wetland.

Item	Description
	Prior to or upon to sampling, surface water physical parameters being pH, EC, DO, redox and temperature, were measured using electronic probes. Surface water samples will then be collected into appropriately preserved laboratory supplied containers (being field-filtered for dissolved metals, as applicable). All surface water samples will be chilled and submitted to the primary National Association of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection
Post Construction	For post-dewatering operations surface water samples will be collected every second month for six months (three sampling events), where Level 2 monitoring (Table 10-12) is implemented onsite during construction.
Analytical Suite	Surface water parameters analysed in the field and at the laboratory comprised the following: <ul style="list-style-type: none"> ▪ Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc ▪ Total metals: aluminium and iron ▪ Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential ▪ Major cations: calcium (Ca²⁺), magnesium (Mg²⁺), potassium (K⁺) and sodium (Na⁺) ▪ Major anions: sulfate (SO₄²⁻), chloride (Cl⁻), carbonate (CO₃²⁻) and bicarbonate (HCO₃⁻) ▪ Nutrients: TP, RP, TN, TKN (calculated), total ammonia-N, NO_x-N ▪ Total dissolved solids (TDS), Total suspended solids (TSS), Turbidity ▪ Acidity ▪ Field TTA and TA.
Quality Control	The following quality control samples will be collected during each groundwater monitoring event: <ul style="list-style-type: none"> ▪ Field duplicate ▪ Equipment rinsate ▪ Field blank. The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals and turbidity only.

10.9.2 Water Quality Reference and Trigger Criteria

10.9.2.1 Water Level (Drawdown) Triggers

DWER guidelines (DWER 2015b) nominate no decline in water levels in surface water bodies, however given the potential for other environmental factors, i.e. evaporation over the course of works, a working trigger will be developed for water levels within the surface water bodies to account for natural factors. Groundwater will not be allowed to be lowered by >10 cm at a distance of 100 m from dewatering activities, with no drawdown immediately adjacent to surface water bodies or within the surface water body itself (outside natural decreases).

As all wetlands are outside the 100 m radius from proposed dewatering works; surface water level monitoring via staff gauges (to be installed) will only be undertaken should a decrease in groundwater of >0.1 m at 100 m (outside natural decreases) occur in the vicinity of a wetland.

Surface water levels will be determined prior to the commencement of construction and a trigger level established. Potential staff gauge and surface sampling locations will be determined once further engineering design is completed.

10.9.2.2 Water Quality Reference Criteria

Quarterly baseline surface water monitoring across the site, should be undertaken at least one year prior to construction to contribute to the baseline dataset for the site, and inform the establishment of appropriate water quality targets and thresholds.

Criteria established in DWER guidance literature and standardised across all surface water locations, will serve as a criterion against which contingency responses would be considered when taken in the wider

context of “monitored data trends” over time, i.e. is there a trend identifying deteriorating conditions. It is noted that pH criteria were exceeded, or were marginally within the guidelines, during sampling completed to date. It can therefore be expected that these triggers will likely be exceeded naturally during the construction program and potentially not as a result of dewatering/construction activities.

The surface water reference criteria are as follows:

- pH – 7.0 to 8.5 pH units
- total acidity – 40 mg/L.

All other parameters will be monitored for data trends of the monitoring period⁷.

10.10 Contingency Responses

The following section provides details regarding potential contingency responses that may be applied, where water quality impacts are deemed attributable to the proposal, and is based upon information at the time of reporting.

The approach to determining the appropriate contingency response is based upon identifying, managing and addressing the specific cause of the water quality impact. If additional measures to those detailed here are required, these will be agreed in consultation with DWER.

10.10.1 Groundwater

10.10.1.1 Bores

Where groundwater monitoring bores are damaged/destroyed prior to or during construction, replacement bores if required to support ongoing implementation of this plan, will be reinstalled to the same depth and construction as the damaged/destroyed bore. Replacement bores are to be installed by a licensed driller and in accordance with *Minimum Construction Requirements for Water Bores in Australia* (NUDLC 2020) and relevant 26D licence.

10.10.1.2 pH, Acidity and Groundwater Levels

Where the triggers are exceeded, the following contingency measures may be implemented:

- Increase frequency of field analysis sampling from every second day to daily
- The addition of a comprehensive suite of groundwater monitoring at an appropriate frequency may be required where dewater discharge and groundwater quality vary significantly from pre-dewatering conditions
- Pumping rates may be reduced
- The area under abstraction at any one time may be reduced
- Where a reduction in pumping rate or area under abstraction does not abate drawdown, pumps shall be suspended to allow groundwater levels to recover above the nominated trigger thresholds, unless otherwise agreed with the DWER/SynergyRED.
- Construction of additional infiltration/recharge basins.
- Implement surface water monitoring program⁸.

10.10.2 Dewatering Effluent

10.10.2.1 Discharge Quality

Where the triggers are exceeded, the following contingency measures may be implemented:

- Increased liming of dewater, and or adjustment/enhancement of existing infrastructure

⁷ It is noted that DWER guidelines (DWER 2015b), specifically Section 3.3.10, does not specify trigger criteria for surface water bodies when dewatering is not discharged directly and or indirectly to a surface water body.

⁸ Where groundwater levels decrease by >0.1 m at 100 m (outside natural decreases) from dewatering activities in the vicinity of surface water bodies.

- Modifications to the settlement infrastructure and or additional onsite treatment infrastructure (as applicable) and or use of flocculants to promote improved settling and precipitation of metals.

10.10.2.2 Management

The dewatering settlement and discharge infrastructure should be designed and maintained to ensure suitable capacity and ongoing integrity for containment of all dewater (i.e., no unplanned loss of dewater to surrounding environment).

Where the integrity of the infrastructure is compromised and or effluent is not contained within the infrastructure, the following measure may be implemented :

- Reduce pump rates or cease all dewatering
- Reduce the area under abstraction
- Modifications to the settlement infrastructure to ensure all future dewater is contained. This may include the addition of extra storage capacity
- Increase volumes used for dust suppression.

Where any breaches occur, the SynergyRED project manager is required to be notified immediately and the aforementioned contingencies measures implemented under direction from SynergyRED.

10.10.3 Surface Water

Where the triggers are exceeded, the following contingency measures may be implemented:

- Dewatering operations in the vicinity of a surface water body to cease immediately should monitoring results show any decline in water levels (excluding natural variation i.e. evaporation) within the surface water body.
- Dewatering operations in the vicinity of a surface water body to cease immediately should monitoring results show any decline in surface water quality.
- Additional infiltration/recharge basins installed between dewatering activities and surface water body.

11 ASS MANAGEMENT

The following section outlines the most likely strategies for the management of soils identified as requiring treatment and management on-site during construction works, based upon information at the time of reporting.

11.1 Soil Excavation and Handling

11.1.1 Overview

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands exceeding the to the depth of investigation. Exceedances of the net acidity management criteria were observed in all soil types, and across all depths, except pale grey sands. Based upon the current proposed excavation depths natural soils, except shallow pale grey/white sands (<1 mbgl), exceed relevant DWER management criteria and will therefore require management and lime neutralisation upon disturbance.

A summary of the management requirements, based upon the current proposed construction methodology and available information at the time of reporting, with respect to ASS is presented below in Table 11-1. The soil management requirements will be reviewed and revised upon detailed design and further investigations. Infrastructure location specific criteria may potentially be developed.

Table 11-1: ASS Management Summary

Soils Requiring Management	Depth* (mbgl)	Management Requirements
Sand – Dark grey/brown/black	All	Lime treatment and reuse onsite where possible
Sandy clay – Pale and dark grey	>1.75	Geotechnically unsuitable material can be used as non-structural fill onsite or will be disposed of off-site at licensed soil treatment facility.
Ferricrete	0.5-3.5	

* Approximate. Soils requiring management, may be encountered at other depths.

11.1.2 Management Principles

The following management principles are to be promoted to limit the potential impact of oxidation and acid leaching for on-site soils.

1. The majority of the infrastructure for the wind farm will be installed into in-situ soils via open excavation and trenches. Soils requiring treatment will be:
 - a. stockpiled prior to treatment on limestone pads. There are likely to be multiple treatment and stockpile locations given the area of development envelope, and distance between excavations.
 - i. Where required, limestone pads will be constructed with crushed compacted⁹ limestone, in accordance with DWER guidelines (2015b); i.e. ~300 mm thickness, with perimeter bunds (minimum 150 mm high)
 - ii. The pad should be graded to a corner such that any leachate generated is contained/captured within the pad.
 - iii. Where treatment on a limestone pad occurs, all soils are to be treated within 18 hours. Stockpiles must be <2 m in height;
 - b. treated upon excavation (i.e. lime incorporated during excavation) and placed adjacent to the excavation, where possible;
2. Aglime will be incorporated into the material at the prescribed liming rate (Section 11.2.2). Treated soils will either be reinterred, reused on-site and or taken off site for disposal (refer Item 4).

⁹ The level of compaction used should produce an appropriately low permeability to prevent infiltration of leachate (DWER, 2015b)

3. In areas requiring soil management and treatment, soils at the base and walls of excavations will be covered with a thin layer of aglime (~20 mm) as a precautionary measure to provide buffering capacity against minor releases of acidity.
4. Geotechnically unsuitable ASS material, where it cannot be used as non-structural fill onsite, will be disposed of offsite at a DWER licensed soil landfill facility and or treatment facility. All trucking and disposal documents must be kept and made available to SynergyRED at the end of works
5. During the works all material excavated and stockpiled, and or material imported to site, is to be stored an adequate distance away from waterways (creek/drainage lines) and wetlands, to minimise the potential for stockpile leachate/runoff entering such water bodies.

11.2 Liming Rate and Material

11.2.1 Lime Material

It is recommended that the lime material used on-site have a particle size distribution of predominately <1 mm. The liming rate will be updated based upon the liming material to be used, and validation test results.

Where material with a particle size of greater than 1 mm is utilised the required level of acid neutralisation may not occur due to the decreased surface area of the particles (neutralising sites), and additional aglime may be required in order to meet validation requirements. In addition, validation sampling may fail to meet accepted criteria due to the laboratory methodology screening soils to remove the >2 mm fraction prior to analysis.

11.2.2 Liming Rates

The liming rate for soils requiring treatment onsite, has been determined using the highest net acidity, and excluding ANC (refer Table 11-2 below). Additional assumptions include; bulk density of 1.6 tonne/m³, a safety factor of 2, and effective neutralising value (ENV) of 50%, per the following calculation.

$$LR = \%S * \rho_{soil} * CF * SF * \frac{100}{ENV}$$

Where: LR = liming rate

%S = percentage Sulfur

ρ_{soil} = bulk density of soil (tonne/m³) assumed at 1.6 tonne/m³

CF = conversion factor (%S to kg pure CaCO₃/tonne) = 31.202

SF = safety factor of 2¹⁰ as per DWER (2015b) guidelines

ENV = effective neutralising value

Table 11-2: Liming Rates

Soils Requiring Management	Depth ¹ (mbgl)	Net acidity ² (%S)	Liming rate (kg aglime/m ³)
Sand – Dark grey/brown/black	0-2.0	0.29	58 (50% ENV)
	2.0->10	2.1	420 (50% ENV)
All sandy clay – Pale and dark grey	>1.75	1.4	280 (50% ENV)
Ferricrete	0.5-3.5	0.09	18 (50% ENV)

1. Soils requiring management encountered outside of the nominated areas and or at different depths and must be treated and management as per the Earthworks Strategy. 2. Excluding ANC.

Upon confirmation of the neutralising agent to be used, and calculation of the neutralising agents ENV, per DWER guidance (2015b), the above liming rates will be adjusted accordingly.

¹⁰ Given the highly reactive nature of the soils, a higher safety factor has been used to increase the neutralising capacity in the soils.

11.3 Validation Sampling

11.3.1 Sampling Protocol

Validation of treated soil will be undertaken via sampling and field pH tests (pH_F and pH_{FOX}) and confirmatory analysis assessment to validate the adequacy of the lime treatment. The number of samples to be collected to validate a stockpile (Table 11-3) will be in accordance with the sampling densities as specified in DWER ASS management guidance (DWER, 2015b) and in *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)* (DWER, 2019).

Table 11-3: Soil Validation Sampling Numbers

Volume (m ³)	Number of samples
100-200	4
200-500	6
500-1,000	8
1,000-2,000	11
2,000-3,000	15
3,000-4,000	18
4,000-5,000	20
5,000-10,000	24
>10,000	24 plus 4 for each additional 10,000 m ³

11.3.2 Validation Criteria

Treated soils/sediments should be well mixed and comply with the validation criteria, per DWER guidance (DWER, 2015b), presented below (Table 11-4). All validated soils are to be analysed for pH_F and pH_{FOX} with confirmatory analysis, SPOCAS, completed on 25% of field validated samples.

Table 11-4: Treated Soil Validation Criteria

Analyte	Criteria
pH_F	>6.5
pH_{FOX}	>5
pH_{KCl}	6.5-8.5
Net acidity	<0.03%S
Excess ANC (ANC _E)	>0.03%S

Experience is that typically the field tests underestimate the buffering capacity of the treated soils (by not reacting fully with the aglime material in the time taken to run the tests). Where the correlation between laboratory and field validation is poor, then the laboratory (confirmatory) results will take precedence, and future field results may be weighted to account for the discrepancy between the methods.

Minor non-compliances above the pH_{KCl} criteria, i.e. $pH > 8.5$, are acceptable and unlikely to pose a risk to the environment however pH values should preferably be below pH 9.5.

11.3.3 Quality Control and Assurance

A minimum of one field duplicate sample will be collected per 20 primary samples.

11.3.4 Contingency measures

Where soils do not meet the above validation criteria, soils are to be retreated and tested, in line with the above protocols, until the results comply with the validation criteria.

11.4 Accumulated Sediments within Dewater Effluent Storage Infrastructure

11.4.1 Sampling Protocol

Sediments accumulated in the base of the dewater effluent storage infrastructure (i.e., settlement basins, holding tanks or inflatable bladders) can potentially contain elevated trace metal concentrations, precipitated from solution as a result of lime treatment. Sampling and analysis of accumulated sediments will be required to determine their suitability for backfill/reuse onsite and or for appropriate landfill disposal, during and on completion of dewatering activities. Sediment samples will be analysed for heavy metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

11.4.2 Validation Criteria

As a conservative approach, noting the presence of residences and sensitive environmental receptors onsite, accumulated sediment results will be compared with the following criteria presented in the *Guideline on the Investigation Levels for Soil and Groundwater* (NEPC, 2013) :

- Ecological Investigation Levels (EILs) – Urban residential/public open space.
- Health Investigation Levels for residential (HIL-A).
- Background concentrations.

EILs and HILs define conservative values to protect the environment and human health respectively. EILs reflect levels that have no observable effect on the most sensitive receptor for each contaminant. HILs reflect levels in soils that would have no observable effect on humans over a lifetime of exposure.

Should the accumulated sediments not be suitable for reuse on site, results would also be compared to Contaminant Threshold and Concentration Limit Guidelines as specified in the *Landfill and Waste Classification and Waste Definitions (as amended 2019)* (DWER, 2019), Australian Standard Leaching Procedure (ASLP) Classes, to determine the appropriate disposal requirements.

11.4.3 Quality Control and Assurance

- A minimum of one field duplicate sample will be collected per 20 primary samples.

12 ASS ENVIRONMENTAL REPORTING

12.1 Overview

The following reports will be prepared for the site following construction activities, with detailed description provided below:

- Closure (Construction Activities Close-out) report.
- Post Dewatering Monitoring Closure Report.

All reporting is required to be completed in general accordance with the DWER ASS guidelines (2015b).

12.2 Closure (Construction Activities Close-out) Report

The initial closure report will be prepared by an environmental consultant and issued to the DWER (Contaminated Sites Branch)/SynergyRED at the cessation of construction works.

The report will contain:

- Management measures undertaken at the site and their effectiveness.
- Soil validation results, both field and laboratory testing as specified in the ASSDMP.
- Amount of neutralising agent used during construction.
- Discussion of potential human health and environmental risk, and any remediation required.
- Photographic record of the earthworks program.
- Summary of the dewatering activities.
- Results of the dewatering, groundwater and surface water monitoring.

12.3 Post Construction Monitoring Closure Report

The closure report will be prepared by an environmental consultant and issued to the DWER (Contaminated Sites Branch)/ SynergyRED at the cessation of construction works.

The report will contain:

- Summary of construction works.
- Findings of the groundwater and surface water post-construction monitoring.

13 REFERENCES

- ANZECC/ARMCANZ. 2000. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Department of Environment and Water Resources, Parkes, ACT.
- ANZG. 2023. Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Guidelines.
- Baddock, L. J. (1992). Scott Coastal Plain bore completion reports, Volume 1 – sites 1 to 10. Hydrogeology Report 1995/35., Unpublished data prepared for the Geological Survey of Western Australia.
- BHP. 1998. Beenup Titanium Minerals: Baseline Monitoring Report, 1998. Unpublished report prepared by BHP.
- BHP. 2015. Beenup Titanium Minerals Project: Annual Environment Report, 2015. Unpublished report prepared by BHP.
- Biodiversity Conservation Act 2016*. State of Western Australia.
- BoM. 2025. http://www.bom.gov.au/climate/averages/tables/cw_009518.shtml (Last accessed 31 March 2025)
- Chan, MY 2011, Bore Completion Report: Scott Coastal Plain, Hydrogeological report series, Report no. HR296, Department of Water, Government of Western Australia
- DBCA. 2023. Scott River Ironstone Association Threatened Ecological Community Fact Sheet. Department of Biodiversity, Conservation and Attractions. September 2023.
- DBCA. 2025. Dandjoo, Biodiversity Data Repository. <https://dandjoo.bio.wa.gov.au/>. Department of Biodiversity, Conservation and Attractions.
- Diamond, M. a. (2000). Hydrogeology report No HR 166. Modelling nutrient management on Scott coastal plain. Bore completion report and pumping test results stage 2. Water and Rivers Commission, Perth, WA
- DoE. 2005. Stream salinity status and trends in south-west Western Australia. Department of the Environment.
- DoH. 2014. Contaminated Sites Ground and Surface Water Chemical Screening Guidelines. Western Australian Department of Health.
- Domenico, P.A., and Schwartz, F.W., 1990. Physical and Chemical Hydrogeology,
- DoW. 2007. Leeuwin Spring Catchment Area and Fisher Road Water Reserve Drinking Water Source Protection Plan. Augusta Town Water Supply. Department of Water, June 2007.
- DoW, 2009. Blackwood groundwater area subarea reference sheets: Plan companion for the South West groundwater areas allocation plan. Department of Water.
- DoW, 2016. The importance of groundwater to the Blackwood and other iconic rivers of the south-west. Government of Western Australia, Perth, WA.
- DPLH. 2024. Shire of Augusta-Margaret River Local Planning Scheme 1. Department of Planning, Lands and Heritage.
- DPLH. 2025. Aboriginal Cultural Heritage Inquiry System (<https://espatial.dplh.wa.gov.au/ACHIS/index.html?viewer=ACHIS>) (last accessed 31 March 2025).
- DWER. 2021. Assessment and management of contaminated sites – Contaminated Sites Guidelines. Department of Environment Regulation, Perth.
- DWER. June 2015a. Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes. Department of Environment Regulation, Perth
- DWER. June 2015b. Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes. Department of Environment Regulation, Perth.
- DWER. 2019. Landfill Waste Classification and Waste Definitions 1996 (as amended). Department of Environment Regulation.

DWER. 2025a. Contaminated Sites Database.

<https://dow.maps.arcgis.com/apps/webappviewer/index.html?id=c2ecb74291ae4da2ac32c441819c6d47>
(last accessed 28 March 2025)

DWER. 2025b. Healthy Rivers South-west. <https://rivers.dwer.wa.gov.au/catchment/lower-blackwood-river/>.
Last accessed 31 March 2025

DWER. 2025c. River Monitoring Stations. <https://kumina.water.wa.gov.au/waterinformation/telem/rain.cfm>
(Last accessed 31 March 2025)

DWER. 2025d. Water Register. <https://maps.water.wa.gov.au/#/webmap/register>, Last accessed 31 March 2025.

Environmental Geochemistry International Pty Ltd, 1993. Sulphur occurrence and geochemistry - Implications for mining and environmental management, Beenup deposit.

Environmental Protection Act 1986. State of Western Australia

Environment Protection and Biodiversity Conservation Act 1999. Commonwealth of Australia.

EPA. 2008. Environmental Guidance for Planning and Development, Guidance Statement No. 33. Environmental Protection Authority, Western Australia.

Heath, R. C., 1983. Basic ground-water hydrology, Water-Supply Paper 2220. U.S. Geological Survey.

Kurseman, G.P., and de Ridder, N.A. 1994. Analysis and Evaluation of Pumping Test Data.

Marinelli, F., and Niccoli, W.L., 2005. Simple Analytical Equations for Estimating Ground Water Inflow to a Mine Pit, Groundwater Volume 38, Issue 2.

Morris, D. A., and Johnson, A. I., 1967. Summary of hydrologic and physical properties of rock and soil materials as analysed by the Hydrologic Laboratory of the U.S. Geological Survey, Water-Supply Paper 1839-D. U.S. Geological Survey

National Map. 2025a. <https://nationalmap.gov.au/>. Acid Sulfate Soil Risk Map, Lower South West (DWER-052) Last accessed 31 March 2025.

National Map. 2025b. <https://nationalmap.gov.au/>. Geomorphic Wetlands, Augusta to Walpole (DBCA-017) Last accessed 31 March 2025.

NEPM. 2013. National Environmental Protection (Assessment of Site Contamination) Measure's 1999 (NEPM) Schedule B1 Guideline on Investigation Levels for Soil and Groundwater (as amended 2013) (NEPM 2013)

NUDLC. 2020. Minimum Construction Requirements for Water Bores in Australia. National Uniform Drillers Licensing Committee.

Phoenix, Environmental Sciences. 2025. Detailed Flora and Vegetation Survey for the Proposed Scott River Wind Farm.

Phoenix, Environmental Services. (in prep.-a). Basic and targeted vertebrate fauna survey for a Proposed Wind Farm in Scott River. Unpublished report prepared for SynergyRED.

Phoenix, Environmental Services. (in prep.-b). Biological Surveys and Wetland Mapping for the Proposed Scott River Wind Farm. Unpublished report prepared for SynergyRED.

Schafer, DB, Johnson, SL, and Kern, AM, 2008, Hydrogeology of the Leederville aquifer in the western Busselton Capel Groundwater Area, Department of Water, Hydrogeological Record Series, HG31

Standards Australia. 1998. AS/NZS 5667.11. Water Quality - Sampling, Part 11: Guidance on sampling of Groundwaters.

Stantec, July 2024. Proposed Wind Farm in Scott River. Preliminary Geotechnical and Baseline Contamination Report.

Stantec, April 2025. Proposed Scott River Wind Farm. Groundwater and Surface Water monitoring Program.

Stantec, August 2025. Beenup Wind Farm Hydrological and Hydrogeological Assessment.

Sullivan, L, Ward, N, Toppler, N and Lancaster, G 2018a, National Acid Sulfate Soils guidance: National acid sulfate soils sampling and identification methods manual, Department of Agriculture and Water Resources, Canberra ACT. CC BY 4.0.

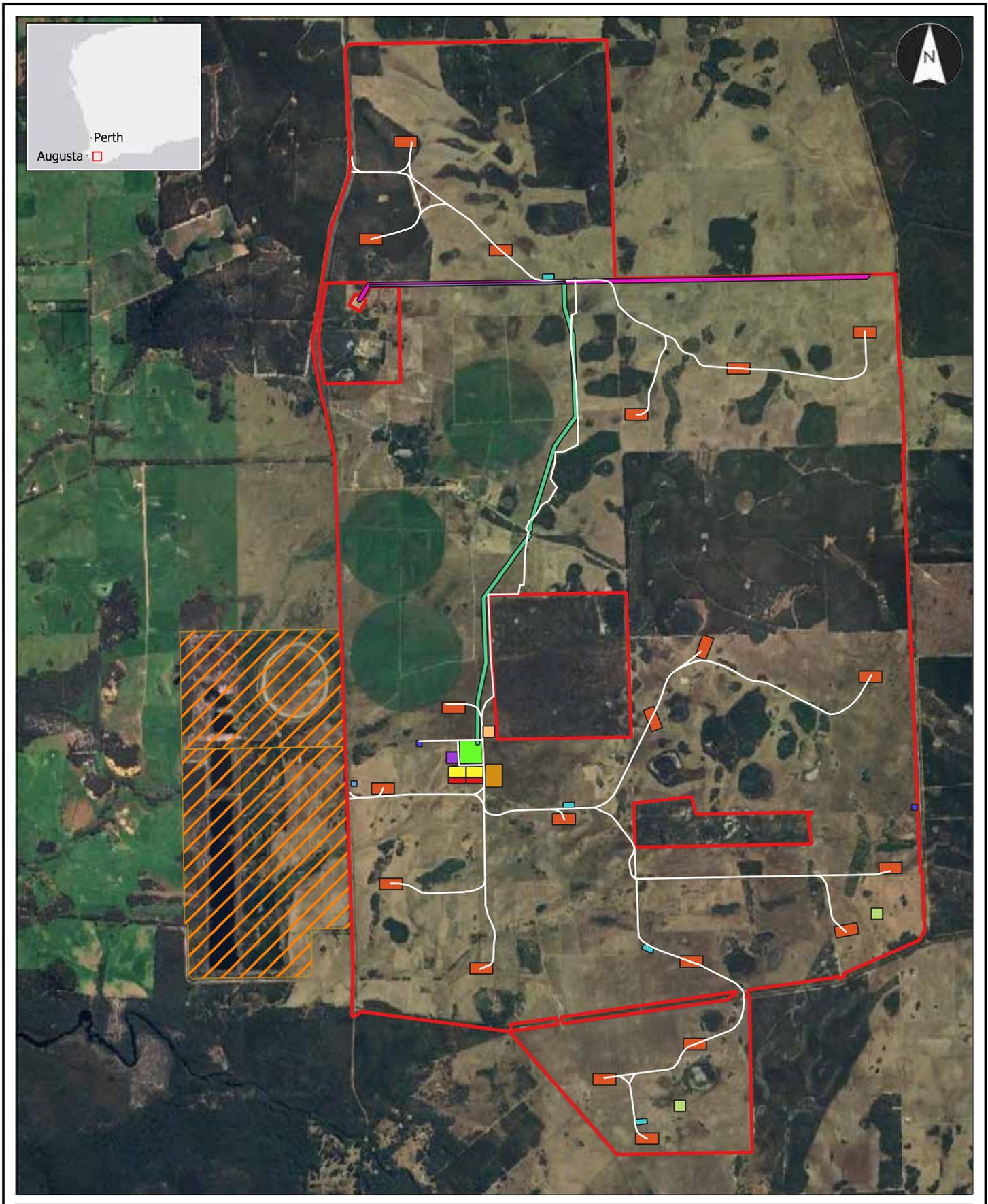
USEPA. 1996. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells. US Environmental Protection Agency Region 1, July 30, 1996 Revision 2.

V & C Semeniuk Research Group. (1997). Mapping and classification of wetlands from Augusta to Walpole in the southwest of Western Australia. Water and Rivers Commission, Perth.

VEPA. 2022. Groundwater Sampling Guidelines. February 2022. Environmental Protection Authority, State Government of Victoria

Appendix A - Figures





Site Location and Layout

Project: Proposed Scott River Wind Farm

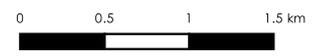
Client: Synergy RED
 Project Code: PTG - 02095
 Drawn By: AW, Checked By: AF
 Date: (2025-08-25)
 Figure No: 1

Legend

- | | | |
|---|---------------------------|--------------------------------|
| Site Boundary | Project Transmission Line | Construction Laydown Area |
| Contaminated Site | Proposed Roads | Construction Site Offices |
| Indicative Infrastructure Location | | |
| Borrow Pit | Wind Turbine | Operation and Maintenance Area |
| Bushfire Water Tank | Construction Laydown Area | Project Substation |
| Communication Tower | WP Transmission Line | Concrete Batching Plant |
| Meteorological Mast | | |

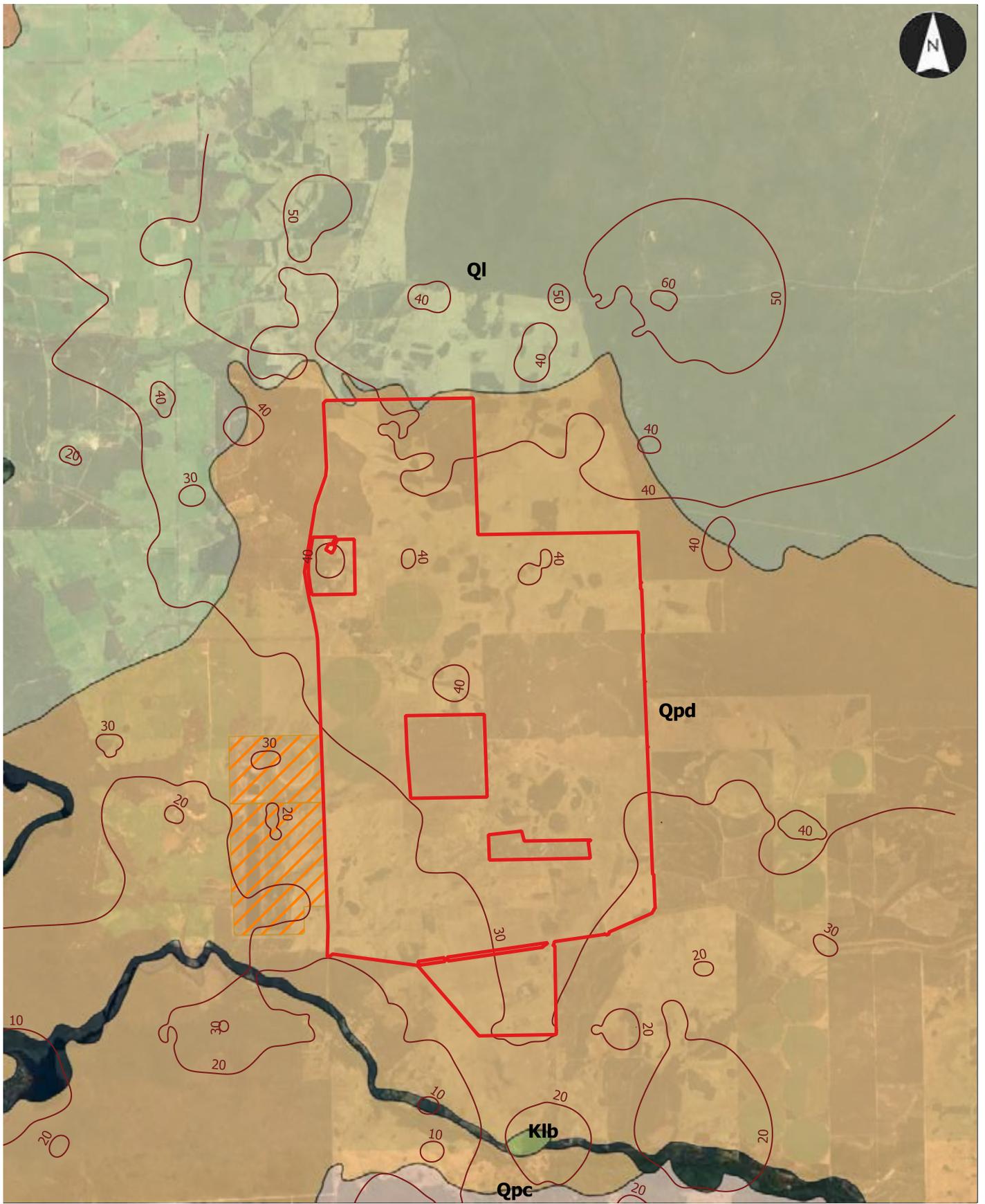


Not For Construction



Scale at A4: 1:45000

This document has been prepared based on information provided by others as cited in the data sources. PTG Consulting has not verified the accuracy and/or completeness of this information and shall not be held responsible for any errors or omissions which may be incorporated herein as a result. PTG Consulting assumes no responsibility for data supplied in electronic format, and recipient accepts full responsibility for verifying the accuracy and completeness of the data.



Topography and Geology

Project: Proposed Scott River Wind Farm

Client: Synergy RED
Project Code: PTG - 02095
Drawn By: AW, Checked By: AF
Date: (2025-07-11)
Figure No: 2

Legend

-  Site Boundary
-  Contaminated Site
- Geology 1:250,000
-  Qpd - Sand Dunes
-  Ql - Laterite and Associated Quartz Sand (undifferentiated)

-  Qpc - Coastal Limestone: Eolian alccarnite with minor occurrences of fossil soil and beach conglomerate
-  Klb - Bunbury Basalt
-  10m Elevation Contours (mAHD)

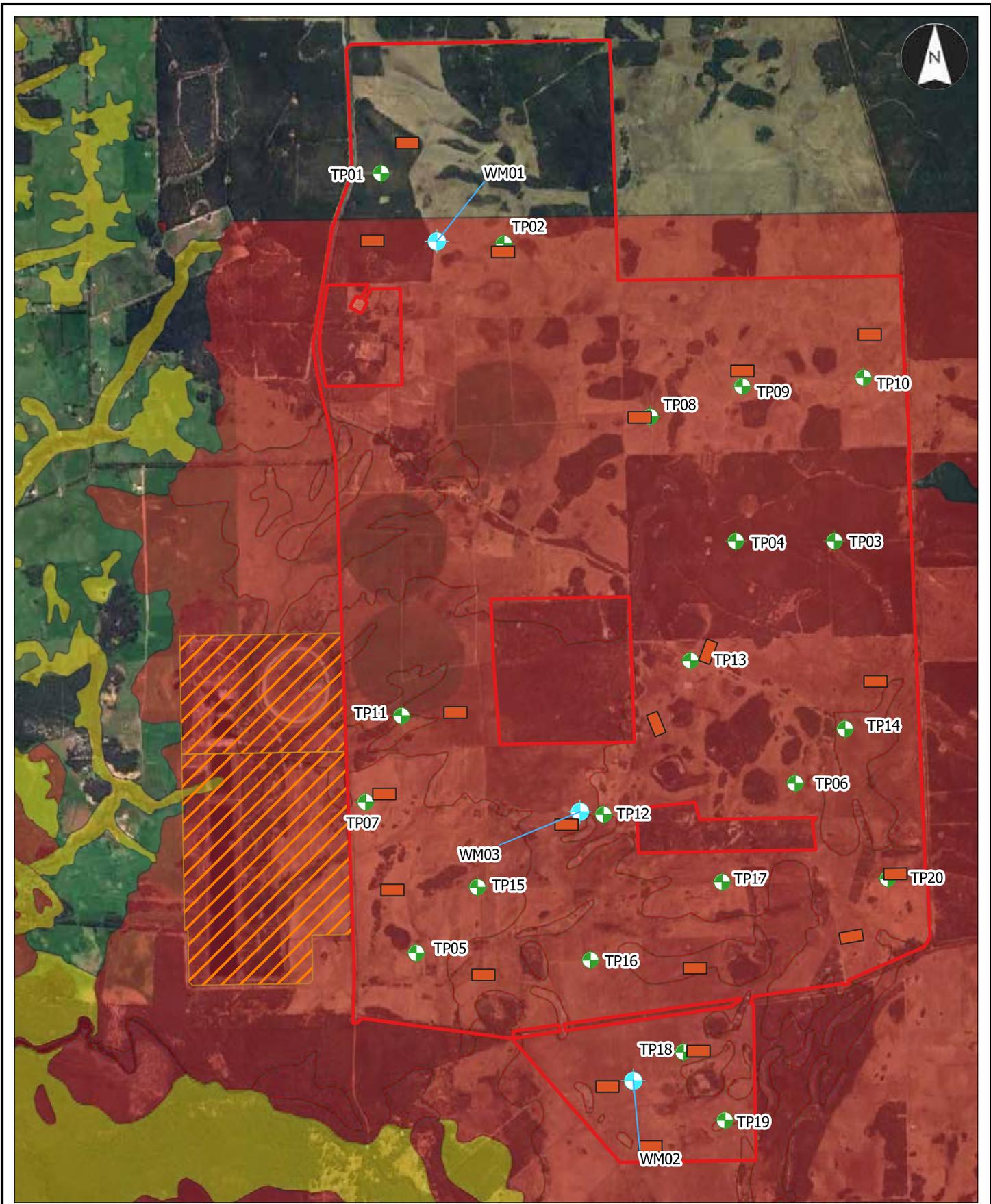


Not For Construction



Scale at A4: 1:80000

This document has been prepared based on information provided by others as cited in the data sources. PTG Consulting has not verified the accuracy and/or completeness of this information and shall not be held responsible for any errors or omissions which may be incorporated herein as a result. PTG Consulting assumes no responsibility for data supplied in electronic format, and recipient accepts full responsibility for verifying the accuracy and completeness of the data.



Acid Sulfate Risk and Soil Sampling Locations

Project: Proposed Scott River Wind Farm

Client: Synergy RED
 Project Code: PTG - 02095
 Drawn By: AW, Checked By: AF
 Date: (2025-07-11)
 Figure No: 3

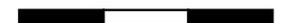
Legend

- Site Boundary
- Contaminated Site
- High to moderate risk
- Moderate to low risk
- Indicative Wind Turbine
- + Soil Sampling Locations
- + Test Pits
- + Deep Bore Hole



Not For Construction

0 0.5 1 1.5 km



Scale at A4: 1:45000



Groundwater, Waterways and Wetlands

Project: Proposed Scott River Wind Farm

Client: Synergy RED
 Project Code: PTG - 02095
 Drawn By: AW, Checked By: AF
 Date: (2025-07-11)
 Figure No: 4

Legend

- Site Boundary
- Contaminated Site
- ⊗ Surface Water Sampling
- ⊗ Shallow Bore Locations
- ⊕ Deep Bore Hole
- Hydrography (DWER 031)
- Major River
- Stream
- Tributary
- Wetlands (DBC A 017)
- Sensitive Wetlands
- Estuary (shoreline and peripheral)
- Estuary (waterbody)



Not For Construction



Scale at A4: 1:85000

This document has been prepared based on information provided by others as cited in the data sources. PTG Consulting has not verified the accuracy and/or completeness of this information and shall not be held responsible for any errors or omissions which may be incorporated herein as a result. PTG Consulting assumes no responsibility for data supplied in electronic format, and recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Appendix B - Database Search Results



Dandjoo Species List Export

Created by Guest User on 31 Mar 2025

Source Dandjoo - Department of Biodiversity, Conservation and Attractions

User defined polygon: [[[[[115.26860061358323, -34.194962955512196], [115.29525288842055, -34.19553108080044], [115.29539027128051, -34.20632473397159], [115.29552765414051, -34.220638394499645], [115.3223173118378, -34.221319936733266], [115.32341637471768, -34.23483605180717], [115.29621456844045, -34.2349496234151], [115.29635195130041, -34.23733459179387], [115.32300422613773, -34.23756172811593], [115.32369114043765, -34.24528399844154], [115.30734258009932, -34.24937197238882], [115.30638090007942, -34.26072641362175], [115.29497812270057, -34.26208884359221], [115.28467440820158, -34.2520971780335], [115.26969967646312, -34.249485524386095], [115.26860061358323, -34.194962955512196]]]]].

Method

Date time 2025-03-31T15:19:47.135136+08:00

Conservation status summary	Count
CD	1
CR	4
EN	12
EX	1
None	109
OS	1
P1	9
P2	7
P3	27
P4	16
Parent of conservation listed taxa	3
VU	5
Total	195

Kingdoms	Count
Animalia	20
Fungi	1
Plantae	174
Total unique species	195

#	Class	Family	Name	Establishment	Conservation
---	-------	--------	------	---------------	--------------

Animalia

1	Actinopterygii Klein, 1885	Galaxiidae	Galaxiella munda McDowall, 1978 (<i>mud minnow</i>)	native	VU
2	Actinopterygii Klein, 1885	Galaxiidae	Galaxiella nigrostriata (Shipway, 1953) (<i>Black-stripe Minnow</i>)	native	EN
3	Actinopterygii Klein, 1885	Lepidogalaxiidae Rosen, 1974	Lepidogalaxias salamandroides Mees, 1961 (<i>Salamanderfish</i>)	native	EN
4	Arachnida	Idiopidae Simon, 1889	Idiosoma Ausserer, 1871		Parent of conservation listed taxa
5	Aves	Ardeidae	Botaurus poiciloptilus (Wagler, 1827) (<i>Australasian Bittern</i>)	native	EN
6	Aves	Cacatuidae	Calyptorhynchus banksii naso Gould, 1837 (<i>Forest Red-tailed Black</i>)	native	VU

			<i>Cockatoo</i>		
7	Aves	Cacatuidae	Zanda Mathews, 1913		Parent of conservation listed taxa
8	Aves	Cacatuidae	Zanda baudinii Lear, 1832 (<i>Baudin's Cockatoo</i>)	native	EN
9	Aves	Cacatuidae	Zanda latirostris Carnaby, 1948 (<i>Carnaby's Cockatoo</i>)	native	EN
10	Aves	Falconidae	Falco peregrinus Tunstall, 1771 (<i>Peregrine Falcon</i>)	native	OS
11	Aves	Megapodiidae	Leipoa ocellata Gould, 1840 (<i>Malleefowl</i>)	native	VU
12	Bivalvia	Hyriidae	Westralunio carteri Iredale, 1934 (<i>Carter's Freshwater Mussel</i>)	native	VU
13	Insecta	Scarabaeidae	Onthophagus ferox Harold, 1867		
14	Malacostraca	Parastacidae	Cherax tenuimanus Smith, 2002	native	CR
15	Malacostraca	Parastacidae	Engaewa reducta Riek, 1967 (<i>Dunsborough Burrowing Crayfish</i>)	native	EN
16	Mammalia	Dasyuridae	Phascogale tapoatafa wambenger Aplin, Rhind, Ten Have & Chesser, 2015 (<i>South-western Brush-tailed Phascogale</i>)	native	CD
17	Mammalia	Macropodidae	Setonix brachyurus (Quoy & Gaimard, 1830) (<i>Quokka</i>)	native	VU
18	Mammalia	Muridae	Hydromys chrysogaster Geoffroy, 1804 (<i>Water-rat</i>)	native	P4
19	Mammalia	Peramelidae	Isoodon fusciventer (Gray, 1841)	native	P4
20	Mammalia	Pseudocheiridae	Pseudocheirus occidentalis (Thomas, 1888) (<i>Western Ringtail Possum</i>)	native	CR

Fungi

21	Basidiomycetes	Amanitaceae Pouzar	Amanita fibrillopes O.K.Mill.	native	P3
----	----------------	--------------------	-------------------------------	--------	----

Plantae

22	Liliopsida	Anarthriaceae D.F.Cutler & Airy Shaw	Anarthria scabra R.Br.	native	
23	Liliopsida	Anarthriaceae D.F.Cutler & Airy Shaw	Lyginia imberbis R.Br.	native	
24	Liliopsida	Asparagaceae Juss.	Lomandra caespitosa (Benth.) Ewart (<i>Tufted Mat Rush</i>)	native	
25	Liliopsida	Asparagaceae Juss.	Lomandra suaveolens (Endl.) Ewart	native	
26	Liliopsida	Cyperaceae Juss.	Cyathochaeta stipoides K.L.Wilson	native	P3
27	Liliopsida	Cyperaceae Juss.	Cyathochaeta teretifolia W.Fitzg.	native	P3
28	Liliopsida	Cyperaceae Juss.	Evandra aristata R.Br.	native	
29	Liliopsida	Cyperaceae Juss.	Ficinia marginata (Thunb.) Fourc.		
30	Liliopsida	Cyperaceae Juss.	Isolepis cyperoides R.Br.	native	
31	Liliopsida	Cyperaceae Juss.	Lepidosperma Labill.		
32	Liliopsida	Cyperaceae Juss.	Machaerina ascendens R.L.Barrett & K.L.Wilson	native	P2
33	Liliopsida	Cyperaceae Juss.	Reedia spathacea F.Muell.	mixed	EN
34	Liliopsida	Cyperaceae Juss.	Schoenus elegans S.T.Blake	native	
35	Liliopsida	Cyperaceae Juss.	Schoenus indutus (F.Muell.) Benth.	native	P1
36	Liliopsida	Cyperaceae Juss.	Schoenus loliaceus K–k.	native	P2
37	Liliopsida	Cyperaceae Juss.	Tricostularia davisii R.L.Barrett & K.L.Wilson (<i>Davis's™ Tricostularia</i>)	native	P3
38	Liliopsida	Dasypogonaceae Dumort.	Dasypogon bromeliifolius R.Br. (<i>Pineapple Bush</i>)	native	
39	Liliopsida	Haemodoraceae R.Br.	Anigozanthos flavidus DC. (<i>Tall Kangaroo Paw</i>)	native	
40	Liliopsida	Haemodoraceae R.Br.	Anigozanthos viridis Endl. subsp. viridis	native	
41	Liliopsida	Haemodoraceae R.Br.	Haemodorum simplex Lindl.	native	
42	Liliopsida	Haemodoraceae R.Br.	Phlebocarya ciliata R.Br.	native	
43	Liliopsida	Hemerocallidaceae R.Br.	Caesia occidentalis R.Br.	native	
44	Liliopsida	Orchidaceae Juss.	Caladenia abbreviata Hopper & A.P.Br. (<i>Coastal Spider Orchid</i>)	native	P3
45	Liliopsida	Orchidaceae Juss.	Caladenia thinicola Hopper & A.P.Br. (<i>Scott River Spider Orchid</i>)	native	
46	Liliopsida	Orchidaceae Juss.	Microtis alba R.Br. (<i>White Mignonette Orchid</i>)	native	
47	Liliopsida	Orchidaceae Juss.	Microtis media R.Br. subsp. media	native	
48	Liliopsida	Philydraceae Link	Philydrella pygmaea subsp. minima L.G.Adams	native	P1
49	Liliopsida	Restionaceae R.Br.	Chordifex amblycoleus (F.Muell.) B.G.Briggs & L.A.S.Johnson	native	

50	Liliopsida	Restionaceae R.Br.	Chordifex gracilior (Benth.) B.G.Briggs & L.A.S.Johnson	native	P3
51	Liliopsida	Restionaceae R.Br.	Chordifex isomorphus (K.W.Dixon & Meney) B.G.Briggs & L.A.S.Johnson	native	
52	Liliopsida	Restionaceae R.Br.	Chordifex jacksonii B.G.Briggs & L.A.S.Johnson	native	P3
53	Liliopsida	Restionaceae R.Br.	Cytogonidium leptocarpoides (Benth.) B.G.Briggs & L.A.S.Johnson	native	
54	Liliopsida	Restionaceae R.Br.	Desmocladus Nees		
55	Liliopsida	Restionaceae R.Br.	Desmocladus castaneus B.G.Briggs & L.A.S.Johnson	native	
56	Liliopsida	Restionaceae R.Br.	Desmocladus fasciculatus (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
57	Liliopsida	Restionaceae R.Br.	Empodisma gracillimum (F.Muell.) L.A.S.Johnson & D.F.Cutler	native	
58	Liliopsida	Restionaceae R.Br.	Hypolaena caespitosa B.G.Briggs & L.A.S.Johnson	native	
59	Liliopsida	Restionaceae R.Br.	Hypolaena pubescens (R.Br.) Nees	native	
60	Liliopsida	Restionaceae R.Br.	Hypolaena robusta Meney & Pate	native	P4
61	Liliopsida	Restionaceae R.Br.	Leptocarpus R.Br.		
62	Liliopsida	Restionaceae R.Br.	Leptocarpus laxus (R.Br.) B.G.Briggs	native	
63	Liliopsida	Restionaceae R.Br.	Leptocarpus scariosus R.Br.	native	
64	Liliopsida	Restionaceae R.Br.	Leptocarpus scoparius B.G.Briggs	native	
65	Liliopsida	Restionaceae R.Br.	Leptocarpus trisepalus (Nees) B.G.Briggs	native	
66	Liliopsida	Restionaceae R.Br.	Lepyrodia R.Br.		
67	Liliopsida	Restionaceae R.Br.	Lepyrodia heleocharoides Gilg	native	P3
68	Liliopsida	Restionaceae R.Br.	Lepyrodia macra Nees (<i>Large Scale Rush</i>)	native	
69	Liliopsida	Restionaceae R.Br.	Lepyrodia porterae B.G.Briggs & L.A.S.Johnson	native	
70	Liliopsida	Restionaceae R.Br.	Loxocarya cinerea R.Br.	native	
71	Liliopsida	Restionaceae R.Br.	Loxocarya magna Meney & K.W.Dixon	native	P3
72	Liliopsida	Restionaceae R.Br.	Melanostachya ustulata (Ewart & Sharman) B.G.Briggs & L.A.S.Johnson	native	
73	Liliopsida	Restionaceae R.Br.	Sporadanthus strictus (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
74	Liliopsida	Restionaceae R.Br.	Tremulina B.G.Briggs & L.A.S.Johnson		
75	Liliopsida	Restionaceae R.Br.	Tremulina tremula (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
76	Liliopsida	Xyridaceae C.Agardh	Xyris lanata R.Br.	native	
77	Liliopsida	Xyridaceae C.Agardh	Xyris roycei N.A.Wakef.	native	
78	Magnoliopsida	Apiaceae Lindl.	Xanthosia tasmanica Domin	native	
79	Magnoliopsida	Asteraceae Bercht. & J.Presl	Blennospora doliiformis Keighery	native	P3
80	Magnoliopsida	Asteraceae Bercht. & J.Presl	Cotula turbinata L.	alien	
81	Magnoliopsida	Asteraceae Bercht. & J.Presl	Leptinella drummondii (Benth.) D.G.Lloyd & C.J.Webb	native	P3
82	Magnoliopsida	Asteraceae Bercht. & J.Presl	Pithocarpa corymbulosa Lindl.	native	P3
83	Magnoliopsida	Asteraceae Bercht. & J.Presl	Vellereophyton dealbatum (Thunb.) Hilliard & B.L.Burt	alien	
84	Magnoliopsida	Caryophyllaceae Juss.	Silene gallica L. var. gallica	alien	
85	Magnoliopsida	Celastraceae R.Br.	Tripterococcus sp. Brachylobus (A.S. George 14234)	native	P4
86	Magnoliopsida	Dilleniaceae Salisb.	Hibbertia stellaris Endl. (<i>Orange Stars</i>)	native	
87	Magnoliopsida	Droseraceae Salisb.	Drosera enodes N.G.Marchant & Lowrie	native	
88	Magnoliopsida	Droseraceae Salisb.	Drosera fimbriata DeBuhr	native	P4
89	Magnoliopsida	Droseraceae Salisb.	Drosera glanduligera Lehm.	native	
90	Magnoliopsida	Droseraceae Salisb.	Drosera leucoblata Benth. (<i>Wheel Sundew</i>)	native	
91	Magnoliopsida	Ericaceae Juss.	Andersonia caerulea R.Br. subsp. caerulea	native	
92	Magnoliopsida	Ericaceae Juss.	Andersonia ferricola Lemson	native	P1
93	Magnoliopsida	Ericaceae Juss.	Andersonia sp. Amabile (N. Gibson & M. Lyons 355)	native	P3
94	Magnoliopsida	Ericaceae Juss.	Leucopogon alternifolius R.Br.	native	P3
95	Magnoliopsida	Ericaceae Juss.	Leucopogon australis R.Br.	native	
96	Magnoliopsida	Ericaceae Juss.	Leucopogon cordatus Sond.	native	
97	Magnoliopsida	Ericaceae Juss.	Leucopogon gilbertii Stschegl.	native	
98	Magnoliopsida	Ericaceae Juss.	Leucopogon wheelerae Hislop	native	P3
99	Magnoliopsida	Ericaceae Juss.	Needhamiella pumilio (R.Br.) L.Watson	native	

100	Magnoliopsida	Ericaceae Juss.	Sphenotoma gracilis (R.Br.) Sweet (<i>Swamp Paper-heath</i>)	native	
101	Magnoliopsida	Ericaceae Juss.	Styphelia intricata Hislop	native	P2
102	Magnoliopsida	Ericaceae Juss.	Styphelia pendula (R.Br.) Spreng.	native	
103	Magnoliopsida	Fabaceae Lindl.	Acacia inops Maiden & Blakely	native	P3
104	Magnoliopsida	Fabaceae Lindl.	Acacia lateriticola var. Glabrous variant (B.R.Maslin 6765)	native	P3
105	Magnoliopsida	Fabaceae Lindl.	Acacia myrtifolia (Sm.) Willd.	native	
106	Magnoliopsida	Fabaceae Lindl.	Acacia pulchella R.Br. var. pulchella	mixed	
107	Magnoliopsida	Fabaceae Lindl.	Acacia tayloriana F.Muell.	native	P4
108	Magnoliopsida	Fabaceae Lindl.	Aotus carinata Meisn.	native	P4
109	Magnoliopsida	Fabaceae Lindl.	Aotus gracillima Meisn.	native	
110	Magnoliopsida	Fabaceae Lindl.	Aotus intermedia Meisn.	native	
111	Magnoliopsida	Fabaceae Lindl.	Bossiaea praetermissa J.H.Ross	native	
112	Magnoliopsida	Fabaceae Lindl.	Daviesia inflata Crisp	native	
113	Magnoliopsida	Fabaceae Lindl.	Gastrolobium formosum (Lindl.) G.Chandler & Crisp	native	P3
114	Magnoliopsida	Fabaceae Lindl.	Gompholobium polymorphum R.Br.	native	
115	Magnoliopsida	Fabaceae Lindl.	Gompholobium tomentosum Labill. (<i>Hairy Yellow Pea</i>)	native	
116	Magnoliopsida	Fabaceae Lindl.	Jacksonia horrida DC.	native	
117	Magnoliopsida	Fabaceae Lindl.	Latrobea diosmifolia Benth.	native	
118	Magnoliopsida	Fabaceae Lindl.	Loricobbia pinifolia (Meisn.) R.L.Barrett & T.Macfarlane	native	P3
119	Magnoliopsida	Fabaceae Lindl.	Sphaerolobium drummondii Turcz.	native	
120	Magnoliopsida	Fabaceae Lindl.	Sphaerolobium macranthum Meisn.	native	
121	Magnoliopsida	Goodeniaceae R.Br.	Dampiera heteroptera Rajput & Carolin	native	P3
122	Magnoliopsida	Goodeniaceae R.Br.	Lechenaultia expansa R.Br.	native	
123	Magnoliopsida	Haloragaceae R.Br.	Gonocarpus pusillus (Benth.) Orchard	native	P4
124	Magnoliopsida	Lamiaceae Martinov	Hemigenia obovata F.Muell.	native	P1
125	Magnoliopsida	Lamiaceae Martinov	Hemigenia sp. Nillup (R.D. Royce 98)	native	P2
126	Magnoliopsida	Myrtaceae Juss.	Actinodium Schauer		
127	Magnoliopsida	Myrtaceae Juss.	Actinodium cunninghamii Schauer (<i>Albany Daisy</i>)	native	
128	Magnoliopsida	Myrtaceae Juss.	Agonis flexuosa (Willd.) Sweet var. flexuosa (<i>Peppermint</i>)	mixed	
129	Magnoliopsida	Myrtaceae Juss.	Astartea onycis Rye & Trudgen (<i>Clawed Astartea</i>)	native	P4
130	Magnoliopsida	Myrtaceae Juss.	Beaufortia sparsa R.Br. (<i>Swamp Bottlebrush</i>)	native	
131	Magnoliopsida	Myrtaceae Juss.	Calothamnus lateralis var. crassus (Benth.) A.S.George	native	P3
132	Magnoliopsida	Myrtaceae Juss.	Darwinia ferricola Keighery	native	EN
133	Magnoliopsida	Myrtaceae Juss.	Homalospermum firmum Schauer	native	
134	Magnoliopsida	Myrtaceae Juss.	Hypocalymma ericifolium Benth.	native	
135	Magnoliopsida	Myrtaceae Juss.	Hypocalymma strictum Schauer	native	
136	Magnoliopsida	Myrtaceae Juss.	Kunzea recurva Schauer	native	
137	Magnoliopsida	Myrtaceae Juss.	Kunzea sulphurea Tovey & P.Morris	native	
138	Magnoliopsida	Myrtaceae Juss.	Melaleuca basicephala Benth.	native	P4
139	Magnoliopsida	Myrtaceae Juss.	Melaleuca incana R.Br. subsp. incana	native	
140	Magnoliopsida	Myrtaceae Juss.	Melaleuca thymoides Labill.	native	
141	Magnoliopsida	Myrtaceae Juss.	Pericalymma crassipes Schauer	native	
142	Magnoliopsida	Myrtaceae Juss.	Pericalymma megaphyllum Cranfield	native	P1
143	Magnoliopsida	Myrtaceae Juss.	Pericalymma spongiocaulum Cranfield	native	
144	Magnoliopsida	Myrtaceae Juss.	Taxandria inundata J.R.Wheeler & N.G.Marchant	native	
145	Magnoliopsida	Myrtaceae Juss.	Taxandria parviceps (Schauer) J.R.Wheeler & N.G.Marchant	native	
146	Magnoliopsida	Myrtaceae Juss.	Verticordia lehmannii Schauer	native	P4
147	Magnoliopsida	Myrtaceae Juss.	Verticordia plumosa var. vassensis A.S.George	native	EN
148	Magnoliopsida	Proteaceae Juss.	Adenanthos detmoldii F.Muell. (<i>Scott River Jugflower</i>)	native	P4
149	Magnoliopsida	Proteaceae Juss.	Adenanthos meisneri Lehm.	native	
150	Magnoliopsida	Proteaceae Juss.	Adenanthos x pamela E.C.Nelson	native	P4
151	Magnoliopsida	Proteaceae Juss.	Banksia attenuata R.Br. (<i>Slender Banksia</i>)	native	
152	Magnoliopsida	Proteaceae Juss.	Banksia dallanneyi A.R.Mast & K.R.Thiele subsp. dallanneyi	native	
153	Magnoliopsida	Proteaceae Juss.	Banksia ilicifolia R.Br. (<i>Holly-leaved Banksia</i>)	native	

154	Magnoliopsida	Proteaceae Juss.	<i>Banksia littoralis</i> R.Br. (<i>Swamp Banksia</i>)	native	
155	Magnoliopsida	Proteaceae Juss.	<i>Banksia meisneri</i> subsp. <i>ascendens</i> (A.S.George) A.S.George (<i>Scott River Banksia</i>)	native	P4
156	Magnoliopsida	Proteaceae Juss.	<i>Banksia nivea</i> subsp. <i>uliginosa</i> (A.S.George) A.R.Mast & K.R.Thiele	native	EN
157	Magnoliopsida	Proteaceae Juss.	<i>Conospermum caeruleum</i> subsp. <i>debile</i> (Meisn.) E.M.Benn.	native	
158	Magnoliopsida	Proteaceae Juss.	<i>Conospermum flexuosum</i> R.Br.	native	
159	Magnoliopsida	Proteaceae Juss.	<i>Conospermum quadripetalum</i> E.M.Benn.	native	CR
160	Magnoliopsida	Proteaceae Juss.	<i>Grevillea brachystylis</i> Meisn.	native	Parent of conservation listed taxa
161	Magnoliopsida	Proteaceae Juss.	<i>Grevillea brachystylis</i> subsp. <i>australis</i> Keighery	native	CR
162	Magnoliopsida	Proteaceae Juss.	<i>Grevillea manglesii</i> PÄ©pin	native	
163	Magnoliopsida	Proteaceae Juss.	<i>Grevillea manglesioides</i> subsp. <i>ferricola</i> Keighery	native	P3
164	Magnoliopsida	Proteaceae Juss.	<i>Grevillea manglesioides</i> subsp. <i>metaxa</i> Makinson	native	
165	Magnoliopsida	Proteaceae Juss.	<i>Grevillea papillosa</i> (McGill.) Olde & Marriott	native	P3
166	Magnoliopsida	Proteaceae Juss.	<i>Hakea tuberculata</i> R.Br.	native	
167	Magnoliopsida	Proteaceae Juss.	<i>Hakea varia</i> R.Br.	native	
168	Magnoliopsida	Proteaceae Juss.	<i>Isopogon formosus</i> subsp. <i>dasylepis</i> (Meisn.) Foreman	native	P3
169	Magnoliopsida	Proteaceae Juss.	<i>Lambertia orbifolia</i> subsp. <i>vespera</i> A.D.Webb, L.T.Monks & Wege (<i>Scott River Honeysuckle</i>)	native	EN
170	Magnoliopsida	Proteaceae Juss.	<i>Synaphea macrophylla</i> A.S.George	native	P1
171	Magnoliopsida	Proteaceae Juss.	<i>Synaphea nexosa</i> A.S.George	native	P1
172	Magnoliopsida	Proteaceae Juss.	<i>Synaphea otio stigma</i> A.S.George	native	P3
173	Magnoliopsida	Proteaceae Juss.	<i>Synaphea petiolaris</i> R.Br. (<i>Synaphea</i>)	native	
174	Magnoliopsida	Proteaceae Juss.	<i>Synaphea petiolaris</i> subsp. <i>triloba</i> A.S.George	native	
175	Magnoliopsida	Rhamnaceae Juss.	<i>Spyridium spadiceum</i> (Fenzl) Benth.	native	P4
176	Magnoliopsida	Rhamnaceae Juss.	<i>Stenanthemum sublineare</i> Rye	native	P2
177	Magnoliopsida	Rubiaceae Juss.	<i>Opercularia hispidula</i> Endl.	native	
178	Magnoliopsida	Rutaceae Juss.	<i>Boronia anceps</i> Paul G.Wilson	native	P3
179	Magnoliopsida	Rutaceae Juss.	<i>Boronia exilis</i> Paul G.Wilson	native	EN
180	Magnoliopsida	Rutaceae Juss.	<i>Boronia spathulata</i> Lindl. (<i>Boronia</i>)	native	
181	Magnoliopsida	Santalaceae R.Br.	<i>Leptomeria dielsiana</i> Pilg. (<i>Diel's Currant Bush</i>)	native	EX
182	Magnoliopsida	Santalaceae R.Br.	<i>Leptomeria furtiva</i> Lepschi	native	P2
183	Magnoliopsida	Santalaceae R.Br.	<i>Leptomeria squarrulosa</i> R.Br.	native	
184	Magnoliopsida	Stylidiaceae R.Br.	<i>Levenhookia preissii</i> (Sond.) F.Muell.	native	P1
185	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium amoenum</i> R.Br. var. <i>amoenum</i>	native	
186	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium calcaratum</i> R.Br.	native	
187	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium despectum</i> R.Br. (<i>Dwarf Triggerplant</i>)	native	
188	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium inundatum</i> R.Br.	native	
189	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium leeuwinense</i> Lowrie & Kenneally	native	P4
190	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium repens</i> R.Br. (<i>Matted Triggerplant</i>)	native	
191	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium</i> sp. Scott River Plain (N.G. Marchant 74/23)	native	P1
192	Magnoliopsida	Stylidiaceae R.Br.	<i>Stylidium trudgenii</i> Lowrie & Kenneally	native	P3
193	Magnoliopsida	Thymelaeaceae Juss.	<i>Pimelea hispida</i> R.Br. (<i>Bristly Pimelea</i>)	native	
194	Magnoliopsida	Thymelaeaceae Juss.	<i>Pimelea longiflora</i> R.Br.	native	
195	Magnoliopsida	Violaceae Batsch	<i>Pigea volubilis</i> (E.M.Benn.) P.I.Forst.		P2

Conservation status definitions

Threatened species

- CR – Critically Endangered
- EN – Endangered
- VU – Vulnerable
- EX – Extinct
- EW – Extinct in the Wild
- CD – Species of special conservation interest (conservation dependent)
- OS – Species otherwise in need of special protection (other specially protected)
- MI – Migratory
- SP – Specially protected species

Priority species

- P1 – Priority 1: Poorly-known species – known from few locations, none on conservation lands
- P2 – Priority 2: Poorly-known species – known from few locations, some on conservation lands
- P3 – Priority 3: Poorly-known species – known from several locations
- P4 – Priority 4: Rare, Near Threatened and other species in need of monitoring

Dandjoo specific codes

- Parent of conservation listed taxa
- Cons code inherited from parent, X

Read full definitions at <https://bio.wa.gov.au/guide/conservation-status-definitions>

Disclaimer

The production and usage of this report is deemed acceptance of Dandjoo's conditions of use. Details available via our web - [Dandjoo Conditions of Use | Biodiversity Information Office](#)

Further note, precise locations of [conservation listed species](#) are considered sensitive. To protect this information, [obfuscation](#) has been applied to conservation-listed species records. For these species, the true location is ± 10 km from the search area used to generate this species list.

List of Aboriginal Cultural Heritage (ACH) Register

Search Criteria

1 Aboriginal Cultural Heritage (ACH) Register in Custom search area - Polygon - 115.265855430364°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.2631202316705°S (GDA94)

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the *Aboriginal Heritage Act 1972*.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you provide the details to the Department via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form> and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land **within or adjacent to** the following Indigenous Land Use Agreement(s): South West Boojarah #2 Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DEMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at <https://www.wa.gov.au/organisation/departments-of-the-premier-and-cabinet/south-west-native-title-settlement>.

Further advice can also be sought from the Department of Planning, Lands and Heritage via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form>.

Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register established and maintained under the *Aboriginal Heritage Act 1972*.

Location information data licensed from Western Australian Land Information Authority (WALIA) trading as Landgate. Copyright in the location information data remains with WALIA. WALIA does not warrant the accuracy or completeness of the location information data or its suitability for any particular purpose.

Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- **Boundary Reliable (Yes/No):** Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
- **Boundary Restricted = No:** Represents the actual location of the ACH as understood by the Department.
- **Boundary Restricted = Yes:** To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- **Culturally Sensitive = No:** Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- **Culturally Sensitive = Yes:** Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form>.
- **Culturally Sensitive Nature:**
 - **No Gender / Initiation Restrictions:** *Anyone* can view the information.
 - **Men only:** Only *males* can view restricted information.
 - **Women only:** Only *females* can view restricted information.

Status:

- **Register:** Aboriginal cultural heritage places that are assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972*.
- **Lodged:** Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the *Aboriginal Heritage Act 1972*.
- **Historic:** Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the *Aboriginal Heritage Act 1972*. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 2020 Datum.

Basemap Copyright

Map was created using ArcGIS software by Esri. ArcGIS and ArcMap are the intellectual property of Esri and are used herein under license. Copyright © Esri. All rights reserved. For more information about Esri software, please visit www.esri.com.

Satellite, Hybrid, Road basemap sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, HERE, DeLorme, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community.

Topographic basemap sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.

Aboriginal Cultural Heritage Inquiry System

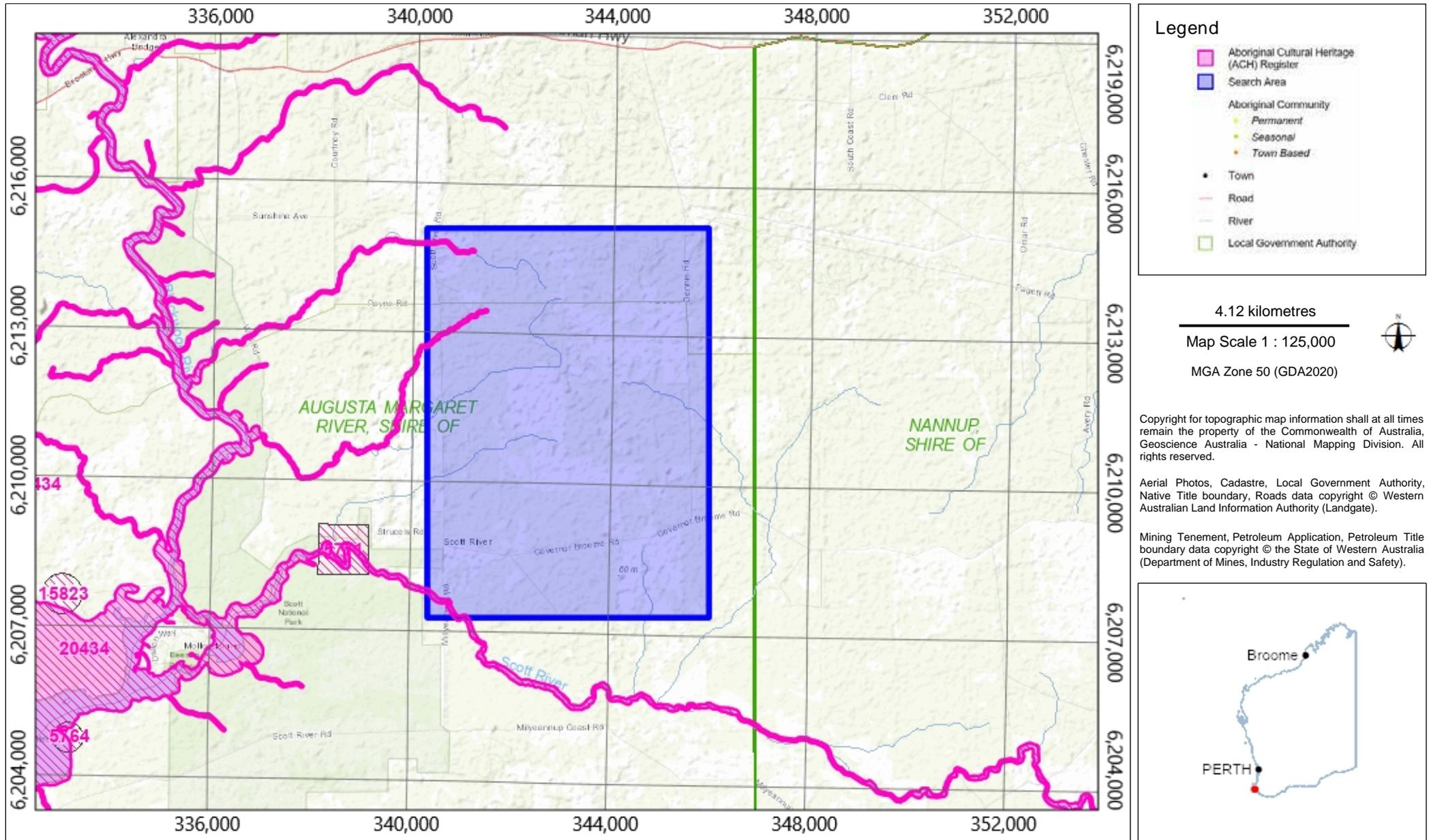
List of Aboriginal Cultural Heritage (ACH) Register

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
20434	Blackwood River	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register

For further important information on using this information please see the WA.gov.au website's Terms of Use at <https://www.wa.gov.au/terms-of-use>



List of Aboriginal Cultural Heritage (ACH) Lodged

Search Criteria

1 Aboriginal Cultural Heritage (ACH) Lodged in Custom search area - Polygon - 115.265855430364°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.2631202316705°S (GDA94)

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the Aboriginal Heritage Act 1972.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you provide the details to the Department via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form> and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land within or adjacent to the following Indigenous Land Use Agreement(s): South West Boojarah #2 Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DEMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at <https://www.wa.gov.au/organisation/departments-of-the-premier-and-cabinet/south-west-native-title-settlement>.

Further advice can also be sought from the Department of Planning, Lands and Heritage via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form>.

Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register established and maintained under the Aboriginal Heritage Act 1972.

Location information data licensed from Western Australian Land Information Authority (WALIA) trading as Landgate. Copyright in the location information data remains with WALIA. WALIA does not warrant the accuracy or completeness of the location information data or its suitability for any particular purpose.

List of Aboriginal Cultural Heritage (ACH) Lodged

Terminology

ID: ACH on the Register is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- Boundary Reliable (Yes/No): Indicates whether to the best knowledge of the Department, the location and extent of the ACH boundary is considered reliable.
- Boundary Restricted = No: Represents the actual location of the ACH as understood by the Department.
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Culturally Sensitive = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- Culturally Sensitive = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact via <https://achknowledge.dplh.wa.gov.au/ach-enquiry-form>.
- Culturally Sensitive Nature:
 - No Gender / Initiation Restrictions: Anyone can view the information.
 - Men only: Only males can view restricted information.
 - Women only: Only females can view restricted information.

Status:

- Register: Aboriginal cultural heritage places that are assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Lodged: Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the Aboriginal Heritage Act 1972.
- Historic: Aboriginal heritage places assessed as not meeting the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 2020 Datum.

Basemap Copyright

Map was created using ArcGIS software by Esri. ArcGIS and ArcMap are the intellectual property of Esri and are used herein under license. Copyright © Esri. All rights reserved. For more information about Esri software, please visit www.esri.com.

Satellite, Hybrid, Road basemap sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, HERE, DeLorme, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community.

Topographic basemap sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.

Aboriginal Cultural Heritage Inquiry System

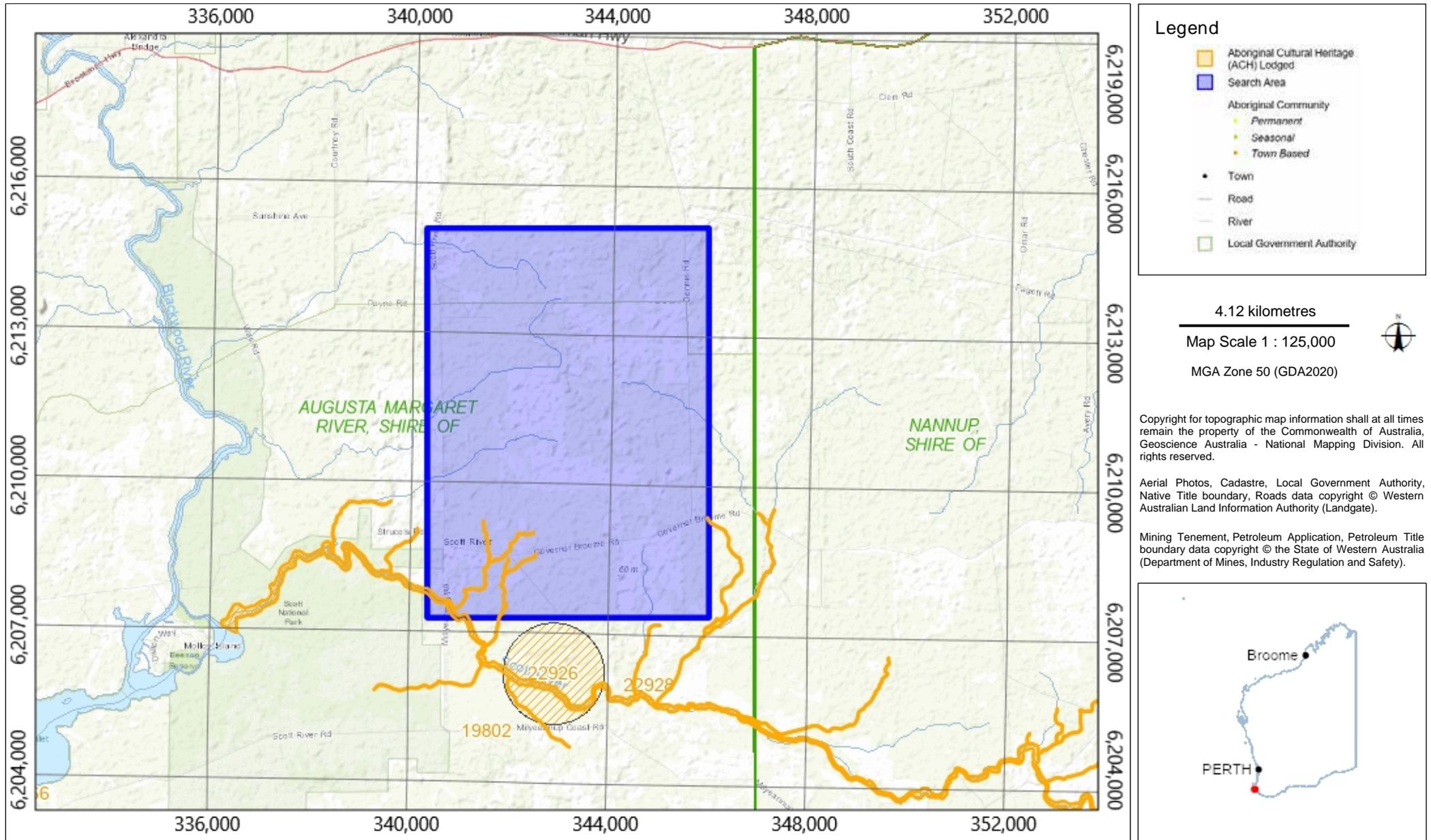
List of Aboriginal Cultural Heritage (ACH) Lodged

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
22928	Scott River	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged

For further important information on using this information please see the WA.gov.au website's Terms of Use at <https://www.wa.gov.au/terms-of-use>



**Appendix C – Sampling and
Groundwater Bore Construction Logs**



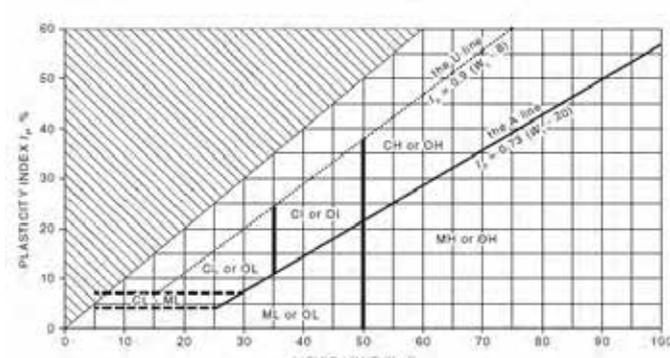
SOIL AND ROCK EXPLANATORY NOTES, ABBREVIATIONS & TERMS (DESCRIPTIONS, CLASSIFICATION CHARTS AND LOG KEYS)

CLASSIFICATION AND INFERRED STRATISGRAPHY

Soil and rock are classified and described in accordance with the recommendations of Australian Standard AS 1726-2017 Geotechnical Site Investigations which unless mentioned otherwise has been used to prepare these notes. The material properties are assessed in the field by visual/tactile methods. The order in which descriptions are provided on logs is as follows:

SOIL TYPE (AS 1726-2017 Classification) using BLOCK LETTERS, colour, structure, particle characteristics, geological origin, other minor components. The consistency/density and moisture conditions are listed as abbreviations in separate columns.

The presence of FILL and TOPSOIL shall be indicated at the beginning of the description using BLOCK LETTERS.

Particle Size Definitions				Plasticity Properties
Fraction	Components	Sub Division	Particle Size	 <p style="font-size: small;">NOTE: The U line is an approximate upper bound for most natural soils. Data which plots above the U line may represent unusual/problem soil behaviour, or unreliable data and should be considered carefully.</p>
Oversize	BOULDERS		> 200mm	
	COBBLES		63 – 200mm	
Coarse Grained	GRAVEL	Coarse	19 – 63mm	
		Medium	6.70 – 19mm	
		Fine	2.36 – 6.70mm	
	SAND	Coarse	0.60 – 2.36mm	
		Medium	0.21 – 0.60mm	
		Fine	0.075 – 0.21mm	
Fine Grained	SILT		0.002 – 0.075mm	
	CLAY		< 0.002mm	

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Major Soil Group	Descriptor	Coefficient of Uniformity (C_u) : $C_u = D_{60} / D_{10}$
G - Gravel S - Sand	W - Well-Graded P - Poorly-Graded S - Silty C - Clayey	Coefficient of Curvature (C_c) : $C_c = (D_{30})^2 / (D_{10}D_{60})$
		D_{10} – Grain Diameter (mm) Corresponding to 10% Soil Passing
		D_{30} – Grain Diameter (mm) Corresponding to 30% Soil Passing
		D_{60} – Grain Diameter (mm) Corresponding to 60% Soil Passing
M - Silt C - Clay O - Organic	L - Low Plasticity (LL < 35%) H - High Plasticity (LL > 50%)	NOTE: Well-Graded Sand (SW) : $C_u > 6$ and $C_c = 1-3$ Well-Graded Gravel (GW) : $C_u > 4$ and $C_c = 1-3$

Organic – The soil has between 20% – 75% Organic Matter / Medium Plasticity (Fine Grained Clay Soils ONLY): 35% < LL < 50%

MINOR COMPONENTS

Zoning	Description
Layer	The zone is continuous across the exposure or sample
Lens	Discontinuous layer of different material, with lenticular shape
Pocket	Irregular inclusions of different material
Interbedded / Interlaminated	Layers of alternating soil types are too thin to be described individually

The structure of soil layers may include: defects such as softened zones, fissures, cracks, joints and root-holes; and coarse-grained soils may be described as strongly or weakly cemented.

Cementation State	Description
Uncemented (U_c)	No cementation present
Weakly Cemented (W_k)	The soil may be easily disaggregated by hand in air or water
Moderately Cemented (M_o)	Effort is required to disaggregate the soil by hand in air or water

Terminology	Field Guide	Coarse Grained Soils		Fine Grained Soils
		Percentage Fines	Percentage Coarse	Percentage Coarse
Trace	Presence just detectable	≤ 5%	≤ 15%	≤ 15%
With	Presence easily detectable	> 5% / ≤ 12%	> 15% / ≤ 30%	> 15% / ≤ 30%

Soil types may be qualified by the presence of minor components on the basis of field examination methods and/or the soil grading

SYMBOLS

	GRAVEL (GW / GP / GM / GC)		COBBLES & BOULDERS
	SAND (SW / SP / SM / SC)		PEAT (Pt)
	SILT (ML / OL / MH / OH)		TOPSOIL
	CLAY (CL / OL / CH / OH)		FILL

Combinations of these basic graphic symbols may be used to indicate and describe mixed materials such as Gravelly CLAY. EXAMPLE: GP-GC = Poorly-Graded GRAVEL with Silt

SOIL ORIGIN DESCRIPTIONS

Fill	Anthropogenic deposits or disturbed material
Topsoil	Zone of soil affected by roots and root fibres
Peat	Significantly organic soils
Colluvial	Transported down slopes by gravity and/or water
Aeolian	Transported and deposited by wind
Alluvial	Deposited by streams and rivers
Estuarine	Deposited in coastal estuaries
Lacustrine	Deposited in freshwater lakes
Marine	Deposits in marine environments
Residual Soil	Soil formed by in situ weathering of rock, with no structure/fabric of parent rock evident
Extremely Weathered Material	Formed by in-situ weathering of geological formations, with the structure/fabric of parent rock intact but with soil strength properties

MOISTURE CONDITIONS (COARSE GRAINED AND FINED GRAINED SOILS)

Symbol	Term	Description
Coarse Grained Soils -		
D	Dry	Non-cohesive and free running/flowing
M	Moist	Soil feels cool, darkened in colour, soil tends to stick together
W	Wet	Soil feels cool, darkened in colour, soil tends to stick together, free water forms when handling
Fine Grained Soils -		
w < PL	Moist	Moist, Dry of Plastic Limit (PL), hard and friable or powdery
w ≈ PL		Moist, near Plastic Limit (PL), soils can be moulded at a moisture content approximately equal to the Plastic Limit (PL)
w > PL		Moist, Wet of Plastic Limit (PL), soils usually weakened and free water forms on hands when handling
w ≈ LL	Wet	Wet, near Liquid Limit (LL)
w > LL		Wet, Wet of Liquid Limit (LL)

MOISTURE CONDITIONS (ROCK)		
Symbol	Term	Description
D	Dry	Looks and feels dry
M	Moist	Feels cool, darkened in colour, but no water is visible on the surface
W	Wet	Feels cool, darkened in colour, water film or droplets visible on the surface

GROUNDWATER	
	Water Level at Date Shown
	Water Inflow - Water Flowing/Flooding into Hole
	Water Outflow - Partial Water Loss
	Water Outflow - Complete Water Loss
GROUNDWATER NOT OBSERVED	The observation of groundwater, whether present or not, was not possible due to drilling water surface seepage or cave in of the borehole and/or test pit
GROUNDWATER NOT ENCOUNTERED	The borehole and/or test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole and/or test pit been left open for a longer period.

Perched groundwater may result in a misleading indication of the depth to the true water table. Groundwater levels are also likely to fluctuate with variations in climatic and site conditions.

DENSITY / CONSISTENCY (COARSE GRAINED AND FINE GRAINED SOILS)

Relative Density (Coarse Grained Soils) -					
Symbol	Term	Density Index (%)	SPT (150mm) *	DCP (100mm) *	DCP (150mm) *
VLs	Very Loose	Less than 15%	0 - 4	0 - 1	0 - 1
Ls	Loose	15% - 35%	4 - 10	1 - 2	1 - 3
MD	Medium Dense	35% - 65%	10 - 30	2 - 5	3 - 8
D	Dense	65% - 85%	30 - 50	5 - 10	8 - 15
VD	Very Dense	More than 85%	> 50	> 10	> 15

Consistency (Fine Grained Soils) -					
Symbol	Term	Undrained Shear Strength (kPa)	Field Guide	DCP (100mm) *	DCP (150mm) *
VS	Very Soft	Less than 12kPa	Exudes between fingers when squeezed in hand	0	0
S	Soft	12kPa - 25kPa	Can be moulded by light finger pressure	0 - 1	0 - 1.5
F	Firm	25kPa - 50kPa	Can be moulded by strong finger pressure	1 - 2	1.5 - 3
St	Stiff	50kPa - 100kPa	Cannot be moulded by fingers, can be indented by thumb	2 - 4	3 - 6
VSt	Very Stiff	100kPa - 200kPa	Can be easily indented by thumb nail	4 - 8	6 - 12
Hd	Hard	More than 200kPa	Can be indented with difficulty by thumb nail	> 8	> 12

(*) - Number of blows are depth related and can vary significantly. In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material. SPT and DCP are not stated in AS 1726-2017, and may be subject to corrections for overburden pressure and equipment type. Corrections have not been performed in preparing the following logs.

C	Curved	The defect has a gradual change in orientation.
U	Undulating	The defect has a wavy surface.
St	Stepped	The defect has one or more well defined steps.
I	Irregular	The defect has many sharp changes of orientation.

Alternatively, the surface roughness may be characterised by the Joint Roughness Coefficient (JRC) [AS 1726:2017 – Figure 9]

Defect Coatings and Composition of Seams -

KL	Clean	No visible coatings.
S	Stained	No visible coating but surfaces are discoloured.
V	Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy.
C	Coating	A visible coating up to 1mm thick. Thicker soil material shall be described using defect terms (e.g. infilled seam). Thicker rock strength material shall be described as a vein.

DRILLING / EXCAVATION METHODS

Subsurface investigations may be conducted by either one or a combination of the following methods.

Test Pitting: Excavation/Trench [TP] -		Spiral Flight Auger Drilling [SFAD] -	
BH	Backhoe Bucket	AS	Auger Screwing
EX	Excavator Bucket	AD/V	Continuous Flight Auger with V-Bit
R	Ripper	AD/T	Continuous Spiral Flight Auger with TC-Bit
H	Hydraulic Hammer	ADH	Continuous Hollow Flight Auger
EE	Existing Excavation	Rotary Non-Core Drilling [RNCD] -	
N	Natural Exposure	WB	Washbore Drilling
Manual Drilling: Hand Operated Tools [MD] -		RR	Rock Roller
HA	Hand Auger	AIRCORE	Air Core
HAND	Excavated by Hand Methods	JET	Jetting
Continuous Sample Drilling [CSD] -		Rotary Core Drilling [RCD] -	
PT	Push Tube Sampling	PQ3	83mm - Diamond Wire Line Core Barrel
EPT	Extruded Push Tube	HMLC	63mm - Diamond Wire Line Core Barrel
PS	Percussion Sampling	HQ3	61mm - Diamond Wire Line Core Barrel
SONIC	Sonic Drilling	NMLC	52mm - Diamond Conventional Core Barrel
Hammer Drilling [HD] -		NQ3	45mm - Diamond Wire Line Core Barrel
AH	Air Hammer	DTC	Diatube Concrete Coring
AT	Air Track		
RAB	Percussion Rotary Air Blast		
RC	Reverse Circulation		

Boreholes -

Vertical Boreholes	The dip (inclination from horizontal) of the defect is given
Inclined Boreholes	The inclination is measured as the acute angle between the core axis and the vertical direction

PENETRATION / EXCAVATION RESISTANCE

VE	Very Easy	Rapid penetration possible with very little effort from the equipment used
E	Easy	Rapid penetration possible with little effort from the equipment used
F	Firm	Excavation possible at an acceptable rate with moderate effort from the equipment used
H	Hard	Further penetration is possible at a slow rate and requires significant effort from the equipment used
VH	Very Hard	Further penetration is possible at a very slow rate and requires maximum effort from the equipment used

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

EXCAVATION STABILITY CONDITIONS			
Stable	No obvious/gross short-term instability noted		
Unstable	Collapse of the majority, or one or more faces of the excavation		
Flooding	Excavation filled with water		
Major Spalling	Major material falling into excavation		
Minor Spalling	Minor material falling into excavation		
CORE DRILLING PARAMETERS			
There are a number of parameters that may be measured during core drilling (of both soil and rock profiles), and which may provide useful investigation data. The measurements that define these parameters should be taken during the drilling process, when drill core is relatively undamaged.			
Symbol	Term	Calculation Formula	
TCR	Total Core Recovery	$TCR = \frac{\text{Length of Core Recovered}}{\text{Length of Core Run}} \times 100\%$	
RQD	Rock Quality Designation	$RQD = \frac{\sum \text{Length of Sound Core Pieces} > 100\text{mm in Length}}{\text{Length of Core Run}} \times 100\%$	
FF	Fracture Frequency	$FF = \frac{\text{Number of Defects}}{\text{Length of Core Recovered (m)}}$	
SAMPLING METHODS			
BDS	Bulk Disturbed Sample	SPT	Standard Penetration Test Sample
DS	Disturbed Sample	ES	Environmental Soil Sample
U	Thin Wall Tube Undisturbed Sample	WS	Environmental Water Sample
C	Core Sample	ASS	Acid Sulfate Soil Sample
TESTING METHODS			
SPT	Standard Penetration Test (AS 1289.6.3.1) – Blows per 150mm and N Value		
N	Blows per 300mm Penetration following 150mm seating (First 150mm)		
RW	Penetration occurred under the rod weight only		
HW	Penetration occurred under the hammer and the rod weight only		
HB	Hammer double bouncing on anvil		
HP / PP	Hand/Pocket Penetrometer Test expressed as instrument reading in kPa		
PSP	Perth Sand Penetrometer (AS 1289.6.3.3) – Blows per 150mm		
DCP	Dynamic Cone Penetrometer (AS 1289.6.3.2) – Blows per 150mm		
CPT	Cone Penetration Test		
CPTu	Cone Penetration Test with Pore Pressure (u) measurement		
WPT	Water Pressure Test		
FP	Field Permeability Test over section noted		
FV	Field Vane Shear Test expressed as Uncorrected Shear Strength (sv = Peak Value / sr = Residual Value)		
PID	Photoionisation Detector Reading in ppm (Parts Per Million)		
PM	Pressuremeter Test over section noted		

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E341346.000 N6215506.000	Angle from Horizontal: 90°	Surface Elevation: 40.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 26/2/24	Date Completed: 27/2/24	Logged By: ES
		Checked By: BP

Drilling		Material Description					Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
PT	PVC	1	39.1	1	QDD	<p>0.10m TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics, dark black brown mottled; with silt. (Topsoil)</p> <p>SAND (SP): fine to coarse grained, sub-rounded to sub-angular, pale grey brown to; with silty fines. (Aeolian)</p>	Uc	VLS to LS	SPT 0.00 - 0.45 m 2, 2, 2 N*=4	100	0	20 60 200 600 2000	0.00: PID: 6.6ppm 0.00: PID: 6.6ppm; SPT Recovery: 0.45 m 0.00: QC1		
		2	38.2	2	Leederville Formation	Sandy CLAY (Cl): medium plasticity, pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; zones of clay high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded; (Residual Soil)	VS	VS	SPT 1.50 - 1.95 m 1, 0, 1 N*=1	100	0		0.50: PID: 4.0ppm 1.00: PID: 4.6ppm 1.50: PID: 5.3ppm 1.50: PID: 5.3ppm; SPT Recovery: 0.45 m		
		3	37.3	3			S to F	S to F	SPT 3.00 - 3.45 m 0, 1, 2 N*=3				3.00: SPT Recovery: 0.45 m		
		4	36.4	4					SPT 4.50 - 4.95 m 2, 1, 3 N*=4	100	0		4.50: SPT Recovery: 0.45 m		
		5	35.5	5				St	SPT 6.00 - 6.45 m 1, 4, 5 N*=9	100	0		6.00: SPT Recovery: 0.45 m		
			34.6	6					SPT 7.50 - 7.95 m 1, 3, 4 N*=7	100	0		7.50: SPT Recovery: 0.45 m		
			33.7	7											

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E341346.000 N6215506.000	Angle from Horizontal: 90°	Surface Elevation: 40.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 26/2/24	Date Completed: 27/2/24	Logged By: ES
		Checked By: BP

Drilling		Material Description						Defect Description					
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details	
Casing	RL (m AHD)	Graphic Log							20 60 200 600 2000				
PT	6	Leederville Formation	Sandy CLAY (Cl): medium plasticity, pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; zones of clay high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded; (Residual Soil) (<i>continued</i>)	Uc	St		100	0		9.00: SPT Recovery: 0.75 m			
	31					SPT 9.00 - 9.45 m 6, 8, 5 N*=13		100	0				
	30					SPT 10.50 - 10.95 m 6, 6, 3 N*=9		100	0				
	29			SAND (SP): medium to coarse grained, sub-rounded to sub-angular, quartz and lithics, pale grey mottled dark grey; with clay high plasticity; frequent lenses of clay and sandy clay, medium to high plasticity; (Residual Soil)	MD			100	0		11.00: SPT Recovery: 0.45 m		
	28		SPT 11.00 - 11.45 m 3, 9, 11 N*=20				100	0					
	27		SPT 12.50 - 12.95 m 6, 10, 11 N*=21				24	0					
	26		12.95-13.8: Core Loss										
	25			Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics and peat, dark grey; high plasticity; trace black peat fragments; (Residual Soil)	VSt			100	0		14.00: SPT Recovery: 0.45 m		
	15.70m		CLAY (CH): high plasticity, dark grey and black; with peat; (Residual Soil)	MD									
	15.40m										15.50: SPT Recovery: 0.45 m		

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED	Job No: 304501017	Sheet: 3 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 40.000 m AHD
Location: Shire of Augusta Margaret River	Mounting: Track	Contractor: National Geotech
Position: E341346.000 N6215506.000	Logged By: ES	Checked By: BP
Rig Type: Geoprobe 7822dt	Date Started: 26/2/24	Date Completed: 27/2/24

Drilling		Material Description				Defect Description					
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
Casing	RL (m AHD)	Graphic Log		Strength / Density / Consistency				20 60 200 600 2000			
	12	Leederville Formation	16.10m Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics and peat, dark grey; high plasticity; trace black peat fragments; (Residual Soil) <i>(continued)</i> CLAY (CH): high plasticity, dark grey and black; with peat; frequent lenses of clayey sand & sandy clay; (Residual Soil)	Uc	VSt to Hd	100	0				
	17						100	0		17.00: SPT Recovery: 0.45 m	
	18										
	13			18.55m Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics, pale grey; high plasticity; (Residual Soil)		MD	SPT 18.50 - 18.95 m 6, 10, 13 N*=23			18.50: SPT Recovery: 0.45 m	
	19						100	0			
	14			19.90m CLAY (CH): high plasticity, dark grey and black; with peat; frequent lenses of clayey sand & sandy clay; (Residual Soil)		VSt	SPT 20.00 - 20.45 m 6, 7, 10 N*=17			20.00: SPT Recovery: 0.45 m	
	20										
	15			21.00m Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics, pale grey; low plasticity. (Residual Soil)		CL				21-21.5: Core Loss	
	21						52	0		21.50: SPT Recovery: 0.45 m	
	16					MD to D	SPT 21.50 - 21.95 m 8, 11, 17 N*=28				
	17						100	0			
	17										
	23									23.00: SPT Recovery: 0.45 m	
	23			23.90m							

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PS Push tube PT Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA Photo_Monitoring Tools HQ-3

Client: Synergy RED	Job No: 304501017	Sheet: 4 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 40.000 m AHD
Location: Shire of Augusta Margaret River	Mounting: Track	Contractor: National Geotech
Position: E341346.000 N6215506.000	Date Completed: 27/2/24	Checked By: BP
Rig Type: Geoprobe 7822dt	Logged By: ES	

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		17			Leederville Formation		CLAY (CH): high plasticity, dark grey and black; with Peat; frequent lenses of clayey sand & sandy clay; (Residual Soil) (continued)	Uc	Hd		100	0	20 60 200 600 2000	24.50: SPT Recovery: 0.45 m		
				15			Clayey SAND (SC): fine to medium grained, sub-rounded to sub-angular, quartz, lithics, grey; high plasticity; (Residual Soil)		MD to D	SPT 24.50 - 24.95 m 6, 15, 15 N*=30						
				25			TERMINATED AT 24.95 m Target depth									
				26												
				27												
				28												
				29												
				30												
				31												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



WM01: 0 - 5m,
0.0 - 3.0m



WM01: 5 - 10m,
5.0 - 10.0 m

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



WM01: 10 - 15m,
10.0 - 15.0m



WM01: 15 - 20m,
15 m to 20m

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



**WM01: 20 - 25m,
20.0 - 25.0 m**

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 31.000 m AHD
Location: Shire of Augusta Margaret River	Mounting: Track	Contractor: National Geotech
Position: E343044.000 N6208189.000	Logged By: ES	Checked By: BP
Rig Type: Geoprobe 7822dt	Date Completed: 28/2/24	
Data Started: 27/2/24		

Drilling		Material Description					Defect Description					
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
Casing	RL (m AHD)	Graphic Log							20 60 200 600 2000			
PT			0.10m TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics, dark black brown mottled; with silt. (Topsoil)	Uc	Ls	SPT 0.00 - 0.45 m 2, 4, 6 N*=10				0.00: PID: 3.2ppm 0.00: PID: 3.2ppm; SPT Recovery: 0.45 m 0.00: QC1		
PVC			SAND (SP): fine to medium grained, sub-rounded to sub-angular, pale grey brown to; trace; (Aeolian)							0.50: PID: 4.6ppm		
	30		1.00m FERRICRETE: granular, fine to coarse grained, dark orange brown to red-brown; <10% vuggs (DI Duricrust).	Mo	M to H		100			1.00: PID: 6.4ppm 1.50: PID: 3.2ppm		
	29		Duricrust			SPT 2.00 - 2.05 m 30/50mm N*=R				2.00: 50mm 2.00: SPT Recovery: 0.45 m; 50mm		
	28		2.70m SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz, lithics and rich in organics; dark brown to grey; with silty fines. (Aeolian)	Uc	MD to D		100			3.50: SPT Recovery: 0.45 m		
	27					SPT 3.50 - 3.95 m 11, 15, 16 N*=31				5.00: SPT Recovery: 0.45 m		
	26		Quaternary Dune Deposits			SPT 5.00 - 5.45 m 6, 10, 17 N*=27				5.45: Core was recovered but driller dropped core upon transfer to split		
	25					SPT 6.50 - 6.95 m 5, 10, 13 N*=23				6.50: SPT Recovery: 0.45 m		
	24						100			8.00: SPT Recovery: 0.45 m		

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained CU Curved DIS Discontinuous CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide QZ Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA Photo Monitoring Tools

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 31.000 m AHD
Location: Shire of Augusta Margaret River	Mounting: Track	Contractor: National Geotech
Position: E343044.000 N6208189.000	Logged By: ES	Checked By: BP
Rig Type: Geoprobe 7822dt	Date Completed: 28/2/24	
Data Started: 27/2/24		

Drilling			Material Description					Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
		6	22.9	9.25m	Quaternary Dune Deposits		SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz, lithics and rich in organics; dark brown to grey; with silty fines. (Aeolian) (continued)	Uc	MD to D	SPT 8.00 - 8.45 m 4, 7, 14 N*=21	100			0.45 m		
		7	21.10	11.00m			Sandy CLAY (Cl): medium plasticity; pale grey and dark grey; sand, fine to medium grained, sub angular to sub rounded; zones of clay, high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded. (Residual Soil)	F to St		SPT 9.50 - 9.95 m 0, 0, 3 N*=3	100			9.50: SPT Recovery: 0.45 m		
		8	20.11	12.70m	Leederville Formation		CLAY (CH): high plasticity, dark grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)			SPT 11.00 - 11.45 m 1, 5, 4 N*=9	100			11.00: SPT Recovery: 0.45 m		
		9	19.12	15.10m			SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil)	VD		SPT 12.50 - 12.95 m 12, 27, 30 N*=57	100			12.50: SPT Recovery: 1.05 m		
		10	17.14	15.55m			CLAY (CH): high plasticity, dark grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)	Hd		SPT 14.00 - 14.45 m 11, 13, 7 N*=20	100			14.00: SPT Recovery: 1.05 m		
			16.15				SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil)	D		SPT 15.50 - 15.95 m 5, 17, 28 N*=45	100			15.50: SPT Recovery: 1.05 m		

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained CU Curved DIS Discontinuous CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA Photo_Monitoring Tools HQ-3

Client: Synergy RED	Job No: 304501017	Sheet: 3 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343044.000 N6208189.000	Angle from Horizontal: 90°	Surface Elevation: 31.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 27/2/24	Date Completed: 28/2/24	Logged By: ES
		Checked By: BP

Drilling		Material Description					Defect Description					
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
	11	Leederville Formation	SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil) (<i>continued</i>)	Uc	D		100					
	12		SAND (SP): fine to coarse grained, sub-rounded to sub-angular; dark grey; with clay, medium plasticity. (Residual Soil)		MD		100				17.00: SPT Recovery: 1.05 m	
	13						100				18.50: SPT Recovery: 1.05 m	
	14			SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey; with clay, low to medium plasticity. (Residual Soil)			100				20.00: SPT Recovery: 1.05 m	
	15			CLAY (CH): medium plasticity, pale grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)		VSt to Hd	100				21.50: SPT Recovery: 1.05 m	
	16						100				23.00: SPT Recovery: 1.05 m	

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED	Job No: 304501017	Sheet: 4 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343044.000 N6208189.000	Angle from Horizontal: 90°	Surface Elevation: 31.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 27/2/24	Date Completed: 28/2/24	Logged By: ES
		Checked By: BP

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		16			Leederville Formation		CLAY (CH): medium plasticity, pale grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil) (continued)	Uc	VSt to Hd		100		20 60 200 600 2000	24.50: SPT Recovery: 1.05 m		
				25			TERMINATED AT 24.95 m Target depth			SPT 24.50 - 24.95 m 10, 14, 16 N*=30						
				26												
				27												
				28												
				29												
				30												
				31												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Client: Synergy RED
 Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
 Location: Shire of Augusta Margaret River Job No: 304501017



**WM02: 0 - 0.5m,
0.0 - 5.0**



**WM02: 5 - 10m,
5.0 - 10.0**

Client: Synergy RED
 Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
 Location: Shire of Augusta Margaret River Job No: 304501017



**WM02: 10 - 15m,
 10.0 - 15.0**



**WM02: 15 - 20m,
 15.0 - 20.0**

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



**WM02: 20 - 25m,
20.0 - 25.0**

Client: Synergy RED Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation Location: Shire of Augusta Margaret River	Job No: 304501017 Angle from Horizontal: 90° Mounting: Track	Sheet: 1 of 4 Surface Elevation: 32.000 m AHD Contractor: National Geotech
Position: E342583.000 N6210534.000	Data Started: 28/2/24	Date Completed: 29/2/24
Rig Type: Geoprobe 7822dt	Logged By: ES	Checked By: BP

Drilling		Material Description					Defect Description					
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
PT		TS	TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics; dark black & mottled brown; with silty fines. (Topsoil)	Uc	Ls	SPT 0.00 - 0.40 m 3, 6, 30/100mm N*=R			2000	0.00: PID: 6.1ppm; 400mm 0.00: PID: 6.1ppm; SPT Recovery: 0.45 m; 400mm 0.00: QC1		
			SAND (SP): fine to medium grained, sub-rounded to sub-angular, pale grey-brown. (Aeolian)	Mo	M to H				600	0.50: PID: 3.8ppm		
			FERRICRETE: granular, fine to coarse grained, dark orange brown to red-brown; <10% vugs (DI Duricrust).						200	1.00: PID: 4.3ppm		
									600	1.50: PID: 5.4ppm		
									2000	2.00: 70mm 2.00: SPT Recovery: 0.07 m; 70mm		
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
									2000			
									600			
		</										

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E342583.000 N6210534.000	Angle from Horizontal: 90°	Surface Elevation: 32.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 28/2/24	Date Completed: 29/2/24	Logged By: ES
		Checked By: BP

Drilling			Material Description						Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details	
		6	23.9	9	Leederville Formation		SAND (SP): fine to medium grained, sub-rounded to sub-angular, dark grey, mottled black. (Residual Soil) (continued)	Uc	MD	SPT 8.00 - 8.45 m 7, 10, 14 N*=24	100	20 60 200 600 2000	0.45 m				
		7	22.10	10			D	SPT 9.50 - 9.95 m 7, 16, 20 N*=36	100					9.50: SPT Recovery: 0.45 m			
		8	21.11	11				SPT 11.00 - 11.45 m 11, 21, 28 N*=49	100					11.00: SPT Recovery: 0.45 m			
		9	20.12	12				SPT 12.50 - 12.95 m 7, 15, 18 N*=33	100					12.50: SPT Recovery: 0.45 m			
		10	19.13	13				SPT 14.00 - 14.45 m 5, 12, 14 N*=26	100					14.00: SPT Recovery: 0.45 m			
			18.14	14				SPT 15.50 - 15.95 m 4, 12, 29 N*=41	100					15.50: SPT Recovery: 0.45 m			
			17.15	15					D								

DRILLING	WATER	ROCK STRENGTH	DEFECT TYPE	PLANARITY	COATING
AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA Photo Monitoring Tools HQ-3

Client: Synergy RED	Job No: 304501017	Sheet: 3 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E342583.000 N6210534.000	Angle from Horizontal: 90°	Surface Elevation: 32.000 m AHD
Rig Type: Geoprobe 7822dt	Mounting: Track	Contractor: National Geotech
Data Started: 28/2/24	Date Completed: 29/2/24	Logged By: ES
		Checked By: BP

Drilling		Material Description					Defect Description				
Method	Core Run	Geology	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
Casing	RL (m AHD)	Graphic Log		Strength / Density / Consistency				20 60 200 600 2000			
	11		SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; pale grey to dark grey; trace clayey fines. (Residual Soil) (continued)	Uc	D		100				
	12		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey to dark grey; layers of clay, low to medium plasticity. (Residual Soil)		VD	SPT 17.00 - 17.24 m 19, 30/90mm N*=R	100		17.00: 180mm 17.00: SPT Recovery: 0.45 m; 180mm		
	13		SANDSTONE: fine grained, siliceous; dark grey-brown. (Weathered Rock)		MD	SPT 18.50 - 18.95 m 10, 12, 21 N*=33	100		18.50: SPT Recovery: 0.45 m		
	14		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey; with clay, low plasticity. (Residual Soil)			SPT 20.00 - 20.45 m 8, 9, 11 N*=20	100		20.00: SPT Recovery: 0.45 m		
	15					SPT 21.50 - 21.95 m 9, 12, 12 N*=24	100		21.50: SPT Recovery: 0.45 m		
	16					SPT 23.00 - 23.45 m 8, 13, 17 N*=30	100		23.00: SPT Recovery: 0.45 m		

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017 BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA Photo Monitoring Tools HQ-3

Client: Synergy RED	Job No: 304501017	Sheet: 4 of 4
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River	Angle from Horizontal: 90°	Surface Elevation: 32.000 m AHD
Position: E342583.000 N6210534.000	Rig Type: Geoprobe 7822dt	Mounting: Track
Date Started: 28/2/24	Date Completed: 29/2/24	Logged By: ES
		Checked By: BP

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
													20 60 200 600 2000			
HO-3		16			Leederville Formation		Sandy CLAY (Cl): medium plasticity, fine to coarse grained, sub-rounded to sub-angular; pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; interbedded high plasticity clays and fine to coarse-grained, sub-rounded to angular sands; trace fine gravel. (Residual Soil) (continued)	Uc	VSt		100			24.50: SPT Recovery: 0.45 m		
				7			TERMINATED AT 24.95 m Target depth			SPT 24.50 - 24.95 m 4, 7, 11 N*=18						
				25												
				26												
				27												
				28												
				29												
				30												
				31												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



WM03: 0 - 0.5m,
0.0 - 5.0



WM03: 5 - 10m,
5.0 - 10.0

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



**WM03: 10 - 15m,
10.0 - 15.0**



**WM03: 15 - 20m,
15.0 - 20.0**

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



**WM03: 20 - 25m,
20.0 - 25.0**

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP01: Downhole



TP01: Coretray - 0.0 - 2.1

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E341925.000 N6215486.000	Angle from Horizontal: 90°	Surface Elevation: 43.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 2.50m (Length) by 4.00m (Width)	Contractor: RemX Australia	
Date Excavated: 14/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing		Material Description											
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations		
EX VE Stable Not Encountered				ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace silty fines. (Topsoil)	D	Uc	Ls	0.00 m: PID - 2.3ppm		
				ES 0.25 m							SAND (SP): fine to coarse grained, sub-rounded, quartz; pale grey, with dark grey; trace silty fines. (aeolian)			MD to D		
				ES 0.50 m		42.5	0.5									0.50 m: PID - 3.2ppm
				ES 0.75 m												
VH				Refusal		42.0	1.0	Quaternary Dune Deposits (QDD)	0.90m	FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).	We	M		1.00 m: PID - 4.1ppm		
						41.5	1.5			TERMINATED AT 1.00 m Refusal on rock						
						41.0	2.0									
						40.5	2.5									

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP02: Downhole



TP02: Coretray - 0.0 - 1.0m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E344783.000 N6212893.000	Angle from Horizontal: 90°	Surface Elevation: 43.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia	
Date Excavated: 12/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing		Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH ↑ VE Unstable Not Encountered				ES 0.00 m	3 6 9 12	43.000	0.00	Fill	0.15m	FILL: Gravelly SAND: Fine to Coarse, sub angular to sub rounded, white sand; Fine to coarse, sub angular, white gravel. (Unsealed Road).	D	Uc	VD	
				ES 0.25 m	3	42.750	0.25		0.50m	SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)	MD			
				ES 0.50 m	3	42.500	0.50		0.50m	SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz; white. (aeolian)				
				ES 0.75 m	2	42.250	1.00	Quaternary Dune Deposits (QDD)						
				ES 1.00 m	3	42.000	1.50							
				ES 1.25 m	2	41.750	2.00							
				ES 1.50 m	2	41.500	2.50							
				ES 1.75 m	2	41.250								
ES 2.00 m	3	41.000					TERMINATED AT 2.00 m Practical Refusal (side wall collapse)							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP03: Downhole



TP03: Coretray - 0.0. - 2.0

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 41.000 m AHD
Location: Shire of Augusta Margaret River	Excavation Method: 600mm Toothed Trenching Bucket	
Position: E343930.000 N6212893.000	Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia
Machine Type: Backhoe	Date Excavated: 12/3/24	Logged By: ES
		Checked By: BP

Excavation Method	Resistance	Stability	Water	Sampling & Testing		RL (m AHD)	Depth (m)	Geology	Graphic Log	Material Description	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations				
				Sample or Field Test	DCP TEST Blows													
BH ↑ VE ↓	Unstable	Not Encountered	Not Encountered	ES 0.00 m	3	41.000	Quaternary Dune Deposits (QDD)	TS	0.15m	TOPSOIL: Gravelly SAND: fine to coarse grained, sub angular to sub rounded, grey sand; Fine to coarse, Sub angular, white gravel; trace fines; Organics; (Topsoil)	D	Uc	VD	0.00 m: PID - 1.8ppm				
				DUP 0.00 m	6	5								0.5	0.50m	SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey mottled pale brown. (aeolian)	MD	Ls to MD
				TRIP 0.00 m	9													
				ASS 0.25 m	12	3								40.0	1.0	ES 0.75 m	3	1.00 m: PID - 4.3ppm
						3								39.0	2.0	ES 1.25 m	3	
		3	38.5	2.5	ES 1.50 m		3											
						ES 1.75 m		4	38.5	2.5	TERMINATED AT 1.75 m Practical Refusal (side wall collapse)							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP04: Downhole



TP04: Core tray - 0.0 - 1.75m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 27.000 m AHD
Location: Shire of Augusta Margaret River	Excavation Method: 600mm Toothed Trenching Bucket	
Position: E341167.000 N6209303.000	Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia
Machine Type: Backhoe	Date Excavated: 13/3/24	Logged By: ES
		Checked By: BP

Excavation Method	Resistance	Stability	Water	Sampling & Testing		RL (m AHD)	Depth (m)	Geology	Graphic Log	Material Description	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations		
				Sample or Field Test	DCP TEST Blows											
BH VE Stable Not Encountered VH				ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace silty fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 2.0ppm		
				ES 0.25 m	2						SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey, mottled dark brown. (aeolian)			D		
				ES 0.50 m	4	26.5	0.5									0.50 m: PID - 4.5ppm
				ES 0.75 m	5											
				Refusal	1	26.0	1.0	D	0.90m	FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (Di duricrust). TERMINATED AT 0.90 m Refusal on rock		We	M			

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - TEST PIT 304501017 TESTPITS - COPY.GPJ <<DrawingFile>> 17/05/2024 15:06 10.03.00.09 Datigel AGS RTA, Photo Monitoring Tools

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP05: Downhole



TP05: Coretray - 0.0 - 0.9m

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP06: Downhole



TP06: Coretray - 0.0 - 0.7m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E340730.000 N6210619.000	Angle from Horizontal: 90°	Surface Elevation: 25.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 2.00m (Length) by 1.00m (Width)	Contractor: RemX Australia	
Date Excavated: 14/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing			Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations	
BH ↑ VE ↓ Unstable	VE	Unstable	▽	ES 0.00 m	3 6 9 12	25.00	0.00	Quaternary Dune Deposits (QDD)	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 1.6ppm	
				ES 0.25 m	1	24.75	0.25		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey; trace silty fines. (aeolian)	M		D			
				ES 0.50 m	2	24.50	0.50							0.50 m: PID - 3.1ppm	
				ES 0.75 m	5	24.25	0.75								
				ES 1.00 m	7	24.00	1.00								1.00 m: PID - 4.8ppm
				ES 1.25 m	7	23.75	1.25								
				ES 1.50 m	9	23.50	1.50								
				Bs 1.70 m	24/100	23.50	1.70			TERMINATED AT 1.70 m Practical Refusal (side wall collapse)					
					24	23.00	2.00								
					25	22.50	2.50								
				Practical refusal	25										

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER ▽ Water Level on Date shown ▲ water inflow ▼ water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP07: Downhole



TP07: Coretray - 0.0 - 1.7m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 43.000 m AHD
Location: Shire of Augusta Margaret River	Excavation Method: 600mm Toothed Trenching Bucket	
Position: E343189.728 N6213977.040	Excavation Dimensions: 1.50m (Length) by 3.00m (Width)	Contractor: RemX Australia
Machine Type: Backhoe	Date Excavated: 12/3/24	Logged By: ES
		Checked By: BP

Excavation			Sampling & Testing			Material Description										
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations		
↑ BH VE Unstable ▽ ↓			▽	ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace fines. (Topsoil)	D	Uc	D	0.00 m: PID - 2.0ppm		
				ES 0.25 m							SAND (SP): fine to coarse grained, rounded to sub-angular, quartz, pale grey; trace silty fines. (aeolian)			MD		
				ES 0.50 m			42.5	0.5					M		0.50 m: PID - 2.5ppm	
				ES 0.75 m												
				ES 1.00 m			42.0	1.0								1.00 m: PID - 5.6ppm
				ES 1.25 m												
				ES 1.50 m			41.5	1.5								
				ES 1.75 m												
				ES 2.00 m Bs 2.00 m	35	41.0	2.0		1.95m 2.00m	SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey, mottled dark brown. (aeolian)						
				Refusal	40					TERMINATED AT 2.00 m Practical Refusal (side wall collapse)						
						40.5	2.5									

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER ▽ Water Level on Date shown ▲ water inflow ▼ water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP08: Downhole view



TP08: Core tray 0.0 - 2.0

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343986.000 N6214241.000	Angle from Horizontal: 90°	Surface Elevation: 46.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 1.00m (Length) by 3.00m (Width)	Contractor: RemX Australia	
Date Excavated: 12/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing		Material Description											
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations		
↑ BH ↓	VE	Unstable	▽	ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey. (Topsoil).	D	Uc	Ls to MD	0.00 m: PID - 2.0 ppm		
				ES 0.25 m	2						SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)					
				ES 0.50 m	2	45.5	0.5	Quaternary Dune Deposits (QDD)							0.50 m: PID - 5.6 ppm	
				ES 0.75 m	2											
				ES 1.00 m	2	45.0	1.0									1.00 m: PID - 6.7ppm
				ES 1.25 m	2											
			▽	ES 1.50 m Bs 1.50 m	refusal 25	44.5	1.5		1.40m 1.50m	SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz and iron oxide; pale yellow and stained dark brown. (aeolian) TERMINATED AT 1.50 m Practical Refusal (side wall collapse)	M to W		VD			
						44.0	2.0									
						43.5	2.5									

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP09: Downhole



TP09: Core tray 0.0- 1.5

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP10: 0.0 - 1.2



TP10: Downhole view

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E341041.000 N6211370.000	Angle from Horizontal: 90°	Surface Elevation: 28.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 2.50m (Length) by 1.00m (Width)	Contractor: RemX Australia	
Date Excavated: 14/3/24	Logged By: ES	Checked By: BP

Excavation Method	Resistance	Stability	Water	Sampling & Testing		RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations				
				Sample or Field Test	DCP TEST Blows													
BH VE Unstable Not Encountered				ES 0.00 m DUP 0.00 m TRIP 0.00 m	3 6 9 12	28.000	0.00	Quaternary Dune Deposits (QDD)	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.3ppm 0.01 m: had to move to new location due to spraying				
				ES 0.25 m		27.75	0.25			SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz with lithics; pale brown to brown. (aeolian)								
				ES 0.50 m		27.50	0.50										0.50 m: PID - 3.6ppm	
				ES 0.75 m		27.25	0.75											
				ES 1.00 m		27.00	1.00											1.00 m: PID - 4.3ppm
				ES 1.25 m		26.75	1.25											
				ES 1.50 m		26.50	1.50											
				ES 1.75 m		26.25	1.75						1.70m	SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; brown to dark brown; pockets of organics. (aeolian).				
				ES 2.00 m D 2.00 m		26.00	2.00		2.00m	TERMINATED AT 2.00 m Practical Refusal (side wall collapse)								
						25.50	2.50											

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP11: Downhole



TP11: Coretray - 0.0 - 2.0m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E342786.000 N6210510.000	Angle from Horizontal: 90°	Surface Elevation: 36.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 3.00m (Length) by 1.00m (Width)		Contractor: RemX Australia
Date Excavated: 13/3/24	Logged By: ES	Checked By: BP

Excavation				Sampling & Testing			Material Description							
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m	3 6 9 12			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls	0.00 m: PID - 3.4ppm
VH					Refusal			D		SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale yellow-brown. (aeolian) FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (Dl duricrust).	We	M		
							35.5 0.5			TERMINATED AT 0.20 m Refusal on rock				
							35.0 1.0							
							34.5 1.5							
							34.0 2.0							
							33.5 2.5							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP12: Downhole



TP12: Coretray - 0.0 - 0.2m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River	Angle from Horizontal: 90°	Surface Elevation: 39.000 m AHD
Position: E343538.000 N6211851.000	Excavation Method: 600mm Toothed Trenching Bucket	
Machine Type: Backhoe	Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia
Date Excavated: 13/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing		Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH ↑ VE Unstable Not Encountered ↓				ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.7ppm
				ES 0.25 m	1			Quaternary Dune Deposits (QDD)		SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled dark grey. (aeolian)				
				ES 0.50 m	2	38.5	0.5						MD	0.50 m: PID - 2.9ppm
				ES 0.75 m	3									
				ES 1.00 m	3	38.0	1.0						D	1.00 m: PID - 4.2ppm
				ES 1.25 m	3									
				ES 1.50 m Bs 1.50 m	15	37.5	1.5						M	
				ES 1.75 m	20						1.70m	SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; dark grey; pockets of organics. (aeolian)		Wk
			ES 2.00 m D 2.00 m	Refusing 15		37.0	2.0			2.00m	TERMINATED AT 2.00 m Practical Refusal (side wall collapse)			
							2.5							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP13: Downhole



TP13: Corebox - 0.0 - 2.0

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E344875.000 N6211256.000	Angle from Horizontal: 90°	Surface Elevation: 38.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 3.00m (Length) by 1.00m (Width)		Contractor: RemX Australia
Date Excavated: 13/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing			Material Description								
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ASS 0.00 m	3 6 9 12			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	MD to D	0.00 m: PID - 2.5ppm
	VH			ES 0.25 m	Refusal			QDD		SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)				
						37.5	0.5			FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (Di duricrust). TERMINATED AT 0.40 m Refusal on rock	We	M		

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP14: Downhole



TP14: Corebox - 0.0 - 0.4

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River	Angle from Horizontal: 90°	Surface Elevation: 28.000 m AHD
Position: E341697.000 N6209876.000	Excavation Method: 600mm Toothed Trenching Bucket	Contractor: RemX Australia
Machine Type: Backhoe	Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Checked By: BP
Date Excavated: 13/3/24	Logged By: ES	

Excavation			Sampling & Testing		Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH ↑ ↓ VH	VE Stable	Not Encountered	Not Encountered	ES 0.00 m	3 6 9 12	27.5	0.5	Quaternary Dune Deposits (QDD)	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD to D	0.00 m: PID - 0.5ppm
				ES 0.25 m	3				SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and iron oxide; dark yellow, stained dark orange. (aeolian)	0.50 m: PID - 1.5ppm				
				ES 0.50 m	4									
				ES 0.75 m	5									
				Refusal on coffee rock		27.0	1.0		0.95m	FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 1.00 m Refusal on rock		We	M	1.00 m: PID - 2.9ppm

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP15: Downhole



TP15: Coretray - 0.0 - 1.0m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E342673.000 N6209242.000	Angle from Horizontal: 90°	Surface Elevation: 30.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 1.50m (Length) by 1.00m (Width)		Contractor: RemX Australia
Date Excavated: 13/3/24	Logged By: ES	Checked By: BP

Excavation				Sampling & Testing		Material Description								
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m DUP 0.00 m TRIP 0.00 m	3 6 9 12					TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	VD	0.00 m: PID - 0.6ppm
	VH			Refusal on coffee rock						FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.15 m Refusal on rock		We	M	
							29.5	0.5						
							29.0	1.0						
							28.5	1.5						
							28.0	2.0						
							27.5	2.5						

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP16: Downhole



TP16: Coretray - 0.0 - 0.15m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343812.000 N6209922.000	Angle from Horizontal: 90°	Surface Elevation: 37.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia	
Date Excavated: 13/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing		Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH ↑ ↓ VE VH	Stable	Not Encountered	Not Encountered	ES 0.00 m	3 6 9 12			TS	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.6ppm
				ES 0.25 m	Refusal			ODD	0.45m	SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled dark grey. (aeolian)			VD	
				ES 0.50 m		36.5	0.5	D	0.50m	FERRICRETE: fine grained; dark orange brown; massive, variably cemented comprising soil and rock strength fragments. (Di duricrust). TERMINATED AT 0.50 m Refusal on rock	We		M	0.50 m: PID - 1.6ppm

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP17: Downhole



TP17: Coretray - 0.0. - 0.5m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343477.000 N6208439.000	Angle from Horizontal: 90°	Surface Elevation: 33.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 2.00m (Length) by 1.00m (Width)		Contractor: RemX Australia
Date Excavated: 14/3/24	Logged By: ES	Checked By: BP

Excavation				Sampling & Testing		Material Description								
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m	3 6 9 12			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	VD	0.00 m: PID - 1.0ppm
VH				Refusal						FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.15 m Refusal on rock		We	M	
							32.5 0.5							
							32.0 1.0							
							31.5 1.5							
							31.0 2.0							
							30.5 2.5							

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP18: Downhole



TP18: Coretray - 0.0 - 0.15m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation		
Location: Shire of Augusta Margaret River		
Position: E343836.000 N6207845.000	Angle from Horizontal: 90°	Surface Elevation: 35.000 m AHD
Machine Type: Backhoe	Excavation Method: 600mm Toothed Trenching Bucket	
Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia	
Date Excavated: 14/3/24	Logged By: ES	Checked By: BP

Excavation			Sampling & Testing			Material Description									
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations	
BH ↑ VE Stable ↓ VH		Stable	Not Encountered	ES 0.00 m	3 6 9 12			Quaternary Dune Deposits (QDBDS)	0.10m	TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	D	0.00 m: PID - 0.7ppm	
				ES 0.25 m						0.55m	SAND (SP): fine to medium grained, rounded to angular; pale grey, mottled dark grey. (aeolian)	M			
				ES 0.50 m							0.60m	FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.60 m Refusal on rock	We	M	0.50 m: PID - 2.3ppm
				Refusal											

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP19: Downhole



TP19: Coretray - 0.0 - 0.6m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation	Angle from Horizontal: 90°	Surface Elevation: 33.000 m AHD
Location: Shire of Augusta Margaret River	Excavation Method: 600mm Toothed Trenching Bucket	
Position: E345245.000 N6209951.000	Excavation Dimensions: 3.00m (Length) by 1.00m (Width)	Contractor: RemX Australia
Machine Type: Backhoe	Date Excavated: 13/3/24	Logged By: ES
		Checked By: BP

Excavation Method	Resistance	Stability	Water	Sampling & Testing		RL (m AHD)	Depth (m)	Geology	Graphic Log	Material Description	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations	
				Sample or Field Test	DCP TEST Blows										
BH VE Stable Not Encountered VH				ES 0.00 m	3	32.5	0.5	TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.1ppm	
				DUP 0.00 m	6										
				TRIP 0.00 m	9										
					12										
				ES 0.25 m					SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz; pale yellow stained orange-brown. (aeolian)						
				ES 0.50 m										0.50 m: PID - 1.7ppm	
				ES 0.75 m											
				ES 1.00 m						FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (Di duricrust). TERMINATED AT 0.90 m Refusal on rock	We	M			

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION VE Very Easy (No Resistance) E Easy F Firm H Hard VH Very Hard (Refusal) WATER Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Photoionisation Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES Bs - Bulk disturbed sample D - Disturbed sample E - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff Hd - Hard RELATIVE DENSITY VLs - Very Loose Ls - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	--	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River Job No: 304501017



TP20: Downhole



TP20: Corebox - 0.0 - 0.9m

Client: Synergy RED Project: Beenup Wind Farm Project Location: Shire of Augusta Margaret River	Job No: 304501017 Sheet: 1 of 2
Position: E340844.970 N6215378.790 50 MGA94 Rig Type: Geoprobe 7822dt Data Started: 12/3/24	Angle from Horizontal: 90° Mounting: Light Vehicle Date Completed: 12/3/24 Logged By: NM
Surface Elevation: 35.140 m AHD Contractor: National Geotech Checked By:	

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:00 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Drilling			Material Description						Defect Description						
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
												20 60 200 600 2000			
	N/A		35.0	0.5			SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; pale brown, mottled orange-brown; trace silt, non-plastic; trace rootlets to 0.2m depth. (Aeolian)	Uc					0.00: Stickup: 0.5m		
			34.5	1.0	Quaternary Dune Deposits		Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz & iron oxide; grey, mottled yellow-brown; clay, low plasticity. (Aeolian)								
			34.0	1.5											
			33.5	2.0											
			33.0	2.5	Leederville Formation		Sandy CLAY (CI): medium plasticity; grey; sand, fine to medium grained, sub-rounded to angular, quartz & lithics. (Residual)	Wk							
			32.5	3.0											
			32.0	3.5											
			31.5	4.0			Organic CLAY (OH): medium to high plasticity; dark grey to black; trace sand, fine-grained, quartz & lithics. (Residual).								

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 2
Project: Beenup Wind Farm Project	Position: E340844.970 N6215378.790 50 MGA94	Angle from Horizontal: 90°
Location: Shire of Augusta Margaret River	Surface Elevation: 35.140 m AHD	Contractor: National Geotech
Rig Type: Geoprobe 7822dt	Mounting: Light Vehicle	Checked By:
Data Started: 12/3/24	Date Completed: 12/3/24	Logged By: NM

Drilling			Material Description						Defect Description						
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
				31.0			Organic CLAY (OH): high plasticity; black. (Residual)	Wk				20 60 200 600 2000			
				4.5											
				30.5											
				5.0											
				30.0											
				5.5											
				29.5											
				6.0											
				29.0											
				6.5											
				28.5											
				7.0			TERMINATED AT 7.00 m Target depth Soil Logging								
				28.0											
				7.5											
				27.5											

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 - XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:00 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM1-W-S01: 0 - 7m, Boxes 1

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 2
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 36.350 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E341131.110 N6215376.110 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 12/3/24	Data Started: 12/3/24

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
	N/A						SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets to 0.8m depth (Aeolian).	Uc					20 60 200 600 2000	0.00: Stickup: 0.65m		
				0.5												
				1.0												
				1.5												
				2.0			Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz; grey; clay, low to medium-plasticity. (Residual)									
				2.5												
				3.0												
				3.5												
				3.5												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:00 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED Project: Beenup Wind Farm Project Location: Shire of Augusta Margaret River	Job No: 304501017 Sheet: 2 of 2
Position: E341131.110 N6215376.110 50 MGA94 Rig Type: Geoprobe 7822dt Data Started: 12/3/24	Angle from Horizontal: 90° Mounting: Light Vehicle Date Completed: 12/3/24 Logged By: NM
Surface Elevation: 36.350 m AHD Contractor: National Geotech Checked By:	

Hole No: WM1-W-S02

Drilling		Material Description						Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
							Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz; grey; clay, low to medium-plasticity. (Residual) (continued) 4.20m Sandy CLAY (CI): medium plasticity; dark grey; sand, fine to coarse-grained, sub-rounded to angular, quartz & lithics. (Residual) 4.50m Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz & lithics; grey; clay, high-plasticity. (Residual)	Uc				20 60 200 600 2000				
						Leederville Formation										
							TERMINATED AT 7.00 m Target depth Soil Logging									

DRILLING	WATER	ROCK STRENGTH	DEFECT TYPE	PLANARITY	COATING
AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 - XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:00 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 2
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 28.920 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E343226.910 N6208201.060 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 13/3/24	Data Started: 13/3/24

Drilling			Material Description						Defect Description						
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
												20 60 200 600 2000			
	N/A			28.5	0.5		SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz; grey; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc					0.00: Stickup: 0.6m		
				28.0	1.0	Quaternary Dune Deposits	Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; pale brown; trace clayey fines, low plasticity. (Aeolian)								
				27.0	2.0	Dill Duricrust	FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).								
				26.5	2.5	Quaternary Dune Deposits	SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz & organics; black; with clay, low-plasticity. (Aeolian)	Wk							

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Client: Synergy RED
 Project: Beenup Wind Farm Project
 Location: Shire of Augusta Margaret River
 Job No: 304501017
 Sheet: 2 of 2
Hole No: WM2-W-S01

Position: E343226.910 N6208201.060 50 MGA94
 Angle from Horizontal: 90°
 Surface Elevation: 28.920 m AHD

Rig Type: Geoprobe 7822dt
 Mounting: Light Vehicle
 Contractor: National Geotech

Data Started: 13/3/24
 Date Completed: 13/3/24
 Logged By: NM
 Checked By:

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
							SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz & organics; black; with clay, low-plasticity. (Aeolian) (continued)	Wk					20 60 200 600 2000			
				24.5			Sandy CLAY (C): medium plasticity; dark brown to dark grey; sand, fine to medium-grained, sub-rounded to rounded, quartz & organics. (Alluvial).	Uc								
				4.5			TERMINATED AT 4.50 m Target Water Contact Soil Logging									
				24.0	5.0											
				23.5	5.5											
				23.0	6.0											
				22.5	6.5											
				22.0	7.0											
				21.5	7.5											
				21.0												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Qz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM2-W-S01: 0 - 4.5m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 2
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 27.450 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E342827.500 N6208156.170 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 12/3/24	Data Started: 12/3/24

Drilling		Material Description					Defect Description						
Method	Core Run	RL (m AHD)	Depth (m)	Geology	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
N/A			27.0	Quaternary Dune Deposits	SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; brown; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc				20 60 200 600 2000	0.00: Stickup: 0.6m		
			26.5	DII Duricrust	FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).								
			25.0	Quaternary Dune Deposits	Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz; mottled white-brown to grey; clay, low plasticity. (Aeolian)	Wk							
			24.5	Quaternary Dune Deposits	Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz & organics; dark grey to black; clay, low plasticity. (Aeolian)								

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 2
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 27.450 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E342827.500 N6208156.170 50 MGA94	Date Completed: 12/3/24	Checked By:
Rig Type: Geoprobe 7822dt	Logged By: NM	

Drilling			Material Description						Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details	
							Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz & organics; dark grey to black; clay, low plasticity. (Aeolian) (continued)	Wk					20 60 200 600 2000				
				23.0	4.5	Quaternary Dune Deposits		Uc									
				22.5	5.0												
				22.0	5.5												
				21.5	6.0		TERMINATED AT 6.00 m Target depth Soil Logging										
				21.0	6.5												
				20.5	7.0												
				20.0	7.5												
				19.5													

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM2-W-S02: 0 - 6m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 33.840 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E343246.590 N6211039.500 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 14/3/24	

Drilling			Material Description						Defect Description						
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
	N/A											20 60 200 600 2000			
				33.5		SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; grey; trace silt, non-plastic; trace rootlets to 0.1m. (Aeolian)	Uc						0.00: Stickup: 0.6m		
				33.0		SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; dark brown; with silt/clay, low plasticity. (Aeolian)									
				32.5		From 1.4m... mottled orange-brown									
				32.0		Clayey SAND (SC): fine to medium-grained, sub-rounded to sub-angular; quartz & organics; black; clay, low plasticity. (Lauustrine)	Wk								
				31.5		TERMINATED AT 2.00 m Refusal Soil Logging									

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-N-S01: 0 - 2m

Client: Synergy RED Project: Beenup Wind Farm Project Location: Shire of Augusta Margaret River	Hole No: WM3-N-S02 (A) Job No: 304501017 Sheet: 1 of 1
Position: E343265.730 N6211102.080 50 MGA94 Rig Type: Geoprobe 7822dt Data Started: 14/3/24	Angle from Horizontal: 90° Mounting: Light Vehicle Date Completed: 14/3/24 Logged By: NM
Surface Elevation: 33.710 m AHD Contractor: National Geotech Checked By:	

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <-DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Drilling			Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level
												20 60 200 600 2000		
	N/A			33.5			SAND (SP): fine to medium grained; sub-angular to sub-rounded; quartz; yellow, mottled orange; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						
				0.40m			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).						0.40: Well Install	
				0.5			TERMINATED AT 0.40 m Refusal Soil Logging						NO WELL INSTALLATION DEPTH TOO SHALLOW	
				33.0										
				1.0										
				32.5										
				1.5										
				32.0										
				2.0										
				31.5										
				2.5										
				31.0										
				3.0										
				30.5										
				3.5										
				30.0										

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-N-S02 (A): 0 - 0.4m

Client: Synergy RED Project: Beenup Wind Farm Project Location: Shire of Augusta Margaret River	Hole No: WM3-N-S02 (B) Job No: 304501017 Sheet: 1 of 1
Position: E343265.730 N6211102.080 50 MGA94 Rig Type: Geoprobe 7822dt Data Started: 14/3/24	Angle from Horizontal: 90° Mounting: Light Vehicle Date Completed: 14/3/24 Logged By: NM
Surface Elevation: 33.710 m AHD Contractor: National Geotech Checked By:	

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A			33.5	QDD		Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz; orange-brown; trace clay, low to medium plasticity. (Aeolian)	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		WM3-N-S02
ADV				33.0	DI - Dil Duricrust		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
				32.5			TERMINATED AT 1.00 m Refusal Soil Logging									
				1.0												
				32.0												
				1.5												
				32.0												
				2.0												
				31.5												
				2.5												
				31.0												
				3.0												
				30.5												
				3.5												
				30.0												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-N-S02 (B): 0 - 1m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 34.000 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E343304.400 N6211216.990 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 14/3/24	
Data Started: 14/3/24		

Drilling		Material Description						Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
	N/A						SAND (SP): medium to fine-grained; sub-angular to sub-rounded; quartz; pale grey to grey; trace silt, non-plastic; trace rootlets to 0.1m. (Aeolian)	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		
				33.5	0.5		SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; pale grey to grey; with clayey fines; low plasticity. (Aeolian)									
				33.0	1.0											
				32.5	1.5		Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; brown to red brown; clay, low to medium plasticity. (Aeolian)	Wk								
				32.0	2.0		Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz & organics; dark brown; clay, medium plasticity. (Aeolian)									
				31.5	2.5											
				31.0	3.0		TERMINATED AT 3.00 m Target depth Soil Logging									
				30.5	3.5											

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-N-S03: 0 - 3m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 34.790 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E343223.940 N6211480.060 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 14/3/24	Data Started: 14/3/24

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <-DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
N/A			34.5	0.5			SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; pale grey; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		
			34.0	1.0			Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz & organics; dark brown; silty/clayey fines, low to medium plasticity. (Aeolian)	Wk								
			33.5	1.5			TERMINATED AT 1.90 m Refusal Soil Logging									
			33.0	1.90m												
			32.5	2.0												
			32.0	2.5												
			31.5	3.0												
			31.0	3.5												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-N-S04: 0 - 1.9m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 33.670 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E343118.740 N6210924.010 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 14/3/24	

Drilling		Material Description					Defect Description							
Method	Core Run	RL (m AHD)	Depth (m)	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
N/A		33.5	0.5		SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets to 0.6m depth (Aeolian).	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		
		33.0	0.80m		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).	Wk								
		32.5	1.00m		TERMINATED AT 1.00 m Refusal Soil Logging									
		32.0	1.5											
		31.5	2.0											
		31.0	2.5											
		30.5	3.0											
		30.0	3.5											

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA Photo Monitoring Tools

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S01: 0 - 1m

Client: Synergy RED
 Project: Beenup Wind Farm Project
 Location: Shire of Augusta Margaret River
 Job No: 304501017
 Sheet: 1 of 1

Position: E343059.020 N6210916.440 50 MGA94
 Angle from Horizontal: 90°
 Surface Elevation: 33.340 m AHD

Rig Type: Geoprobe 7822dt
 Mounting: Light Vehicle
 Contractor: National Geotech

Data Started: 13/3/24
 Date Completed: 13/3/24
 Logged By: NM
 Checked By:

Hole No: WM3-W-S02 (A)

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <-DrawingFile> 30/05/2024 17:01 10.03.00.09 Datgel AGS.RTA Photo Monitoring Tools

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
													20 60 200 600 2000			
	N/A						SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz and ferricrete fragments; orange-brown. (Aeolian)	Uc						0.00: Stickup: 0.6m		
			33.0	0.5			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
			32.5	1.0			TERMINATED AT 1.00 m Target depth Soil Logging									
			32.0	1.5												
			31.5	2.0												
			31.0	2.5												
			30.5	3.0												
			30.0	3.5												
			29.5													

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S02 (A): 0 - 1m

Client: Synergy RED Project: Beenup Wind Farm Project Location: Shire of Augusta Margaret River	Job No: 304501017 Sheet: 1 of 1
Position: E343058.710 N6210917.830 50 MGA94 Rig Type: Geoprobe 7822dt Data Started: 13/3/24	Angle from Horizontal: 90° Mounting: Light Vehicle Date Completed: 13/3/24 Logged By: NM
Surface Elevation: 33.350 m AHD Contractor: National Geotech Checked By:	

Hole No: WM3-W-S02 (B)

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA Photo Monitoring Tools

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
												20 60 200 600 2000				
	N/A			33.0			SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; gray; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						0.00: Stickup: 0.6m		
				32.5			SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; pale to dark orange-brown; with silty fines, low plasticity. (Aeolian)									
				32.0												
				31.5												
				31.0												
				30.5			Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; grey; clay, low to medium plasticity. (Aeolian).	Wk								
				30.0			TERMINATED AT 3.00 m Target depth Soil Logging									

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S02 (B): 0 - 3m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 33.870 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E342987.260 N6210892.360 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 13/3/24	Data Started: 13/3/24

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Drilling			Material Description						Defect Description							
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
													20 60 200 600 2000			
	N/A			33.5			SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; grey; trace silt, non-plastic. (Aeolian)	Uc						0.00: Stickup: 0.6m		
				33.0			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
				32.5			TERMINATED AT 1.00 m Target depth Soil Logging									
				32.0												
				31.5												
				31.0												
				30.5												
				30.0												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Slockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S03: 0 - 1m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 1
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 33.140 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E342901.620 N6210922.540 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 13/3/24	Data Started: 13/3/24

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Drilling		Material Description						Defect Description								
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
AD/V	N/A		33.0	0.5			SAND (SP): fine to medium-grained, sub-rounded to sub-angular, quartz; grey; trace silt, non-plastic; rootlets to 0.1m depth (Aeolian).	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		
			32.5	1.0			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
			32.0	1.5			SAND (SP): fine to medium-grained; sub-rounded to sub-angular, quartz & organics; black; with silt, non-plastic. (Aeolian)	Wk								
			31.5	2.0			TERMINATED AT 2.00 m Target depth Soil Logging									
			31.0	2.5												
			30.5	3.0												
			30.0	3.5												
			29.5													

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S04: 0 - 2m

Client: Synergy RED	Job No: 304501017	Sheet: 1 of 2
Project: Beenup Wind Farm Project	Angle from Horizontal: 90°	Surface Elevation: 32.500 m AHD
Location: Shire of Augusta Margaret River	Mounting: Light Vehicle	Contractor: National Geotech
Position: E342692.990 N6210889.200 50 MGA94	Logged By: NM	Checked By:
Rig Type: Geoprobe 7822dt	Date Completed: 13/3/24	Data Started: 13/3/24

Drilling		Material Description						Defect Description						
Method	Core Run	RL (m AHD)	Depth (m)	Geology	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
N/A			0.5		SAND (SP): fine to medium-grained, subangular to rounded; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets <0.1m. (Aeolian)	Uc					20 60 200 600 2000	0.00: Stickup: 0.6m		
			1.0											
			1.5											
			2.0		SAND (SP): fine to medium-grained; subangular to rounded; quartz & organics; dark brown-black; with silt and clay, low plasticity. (Aeolian)									
			2.5		Clayey SAND (SC): fine to medium-grained, sub-angular to sub-rounded, quartz; brown; trace silt, low to medium plasticity. (Aeolian)	Wk								
			3.0											
			3.5											

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Oz Quartz
--	---	--	---	---	--

2023.03.16 STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06 GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:01 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy RED	Job No: 304501017	Sheet: 2 of 2
Project: Beenup Wind Farm Project	Position: E342692.990 N6210889.200 50 MGA94	Angle from Horizontal: 90°
Location: Shire of Augusta Margaret River	Surface Elevation: 32.500 m AHD	Contractor: National Geotech
Rig Type: Geoprobe 7822dt	Mounting: Light Vehicle	Checked By:
Data Started: 13/3/24	Date Completed: 13/3/24	Logged By: NM

Drilling			Material Description							Defect Description						
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP ▼							Clayey SAND (SC): fine to medium-grained, sub-angular to sub-rounded, quartz; brown; trace silt, low to medium plasticity. (Aeolian) (continued)	Wk								
				28.0 - 4.5			SAND (SP): fine to medium-grained, sub-angular to sub-rounded, quartz & organics; dark brown-black; trace silt, non-plastic. (Aeolian)	Uc								
							TERMINATED AT 4.50 m Target Water Contact Soil Logging									
				27.5 - 5.0												
				27.0 - 5.5												
				26.5 - 6.0												
				26.0 - 6.5												
				25.5 - 7.0												
				25.0 - 7.5												

DRILLING AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller PQ Rotary core (85mm) HQ Rotary core (63.5mm) NMLC Rotary core (51.94mm) DT Diatube concrete coring PT Push tube PS Percussion sampling SON Sonic drilling AH Air hammer	WATER Water Level on date shown water inflow water outflow ROCK QUALITY DESCRIPTIONS RQD Rock Quality Designation (%) TCR Total Core Recovery (%)	ROCK STRENGTH EH Extremely High VH Very High H High M Medium L Low VL Very Low ROCK WEATHERING FR Fresh SW Slightly Weathered MW Moderately Weathered HW Highly Weathered XW Extremely Weathered	DEFECT TYPE J Joint P Parting SM Seam SZ Sheared zone FL Foliation V Vein CSM Crushed Seam FZ Fracture Zone HB Handing Break DB Drilling Break	PLANARITY PL Planar IR Irregular CU Curved DIS Discontinuous ST Stepped UN Undulose ROUGHNESS VR Very Rough RO Rough SO Smooth SL Stockensided POL Polished	COATING CN Clean STN Stained VN Veneer (thin or patchy) CT Coating (up to 1mm) INFILL MATERIALS X Carbonaceous MU Unidentified mineral MS Secondary mineral KT Chlorite CA Calcite Fe Iron Oxide Qz Quartz
--	---	--	---	---	--

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017



WM3-W-S05: 0 - 4.5m

Appendix D - Tables



Location	Date	Depth (mbgl)	Soil Description	Trigger	Field Tests				Acidity Trail				SPOS		SNAS		Net Acidity		ANC				
					pH-F	pH-FOX	pH-A	Reaction	pH-KCl	pH-Ox	TAA	TPA	SPOS	SNAS	TAA+SPOS+SNAS	ANCE							
					Units	pH	-	-	pH	-	%S	mht	%S	mht	%S	mht	%S	mht	%S	mht	%S	mht	
					ASS	<4	<4	-	-	-	0.03	18	0.03	18	0.03	18	0.03	18	0.03	18	-	-	
					LOR	0.1	0.1	0.1	-	0.1	0.1	0.005	2	0.02	2	0.005	2	0.005	2	0.005	2	0.02	2
TP01	14/03/2024	0.00	SAND: fine to medium grained, dark grey			4.6	3.1	1.5	2	4.6	2.9	0.075	47	0.130	81	0.024	15	---	---	---	---	---	---
TP01	14/03/2024	0.25				4.6	3.2	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	0.75				4.8	3.7	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.00	SAND: fine to coarse grained, pale grey with dark grey; trace fines			4.8	3.8	1.0	2	5.1	3.5	0.014	9	<0.02	<2	<0.005	<2	---	---	---	---	---	---
TP01	14/03/2024	1.25				4.6	3.8	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.50				4.5	3.8	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.75				4.7	3.6	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	2.00	SAND: fine to coarse grained, dark grey/brown; trace fines			4.7	3.5	1.2	2	4.7	2.6	0.060	37	0.100	62	0.037	23	---	---	---	---	---	---
TP02	14/03/2024	0.00	SAND: fine to medium grained, dark grey			4.8	3.4	1.4	2	5.0	2.7	0.034	21	0.030	19	0.024	15	---	---	---	---	---	---
TP02	14/03/2024	0.25				4.8	3.9	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP02	14/03/2024	0.50	SAND: fine to coarse grained, dark grey; trace fines			4.8	3.9	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP02	14/03/2024	0.75				4.8	3.9	0.9	2	5.1	3.7	0.034	21	0.030	19	0.009	6	---	---	---	---	---	---
TP02	14/03/2024	1.00	FERRICRETE: dark orange brown			4.8	3.9	0.9	2	4.8	4.2	0.076	47	0.140	87	0.013	8	---	---	---	---	---	---
TP03	12/03/2024	0.00	Gravelly SAND: Fine to Coarse, white sand;			6.4	5.1	1.3	2	6.9	6.5	<0.003	<2	<0.02	<2	0.018	11	---	---	---	---	---	---
TP03	12/03/2024	0.25				6.5	5.1	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP03	12/03/2024	1.00	SAND: fine to medium grained, pale grey, mottled pale brown			5.8	3.5	2.3	2	5.6	4.6	0.005	3	<0.02	<2	<0.005	<2	---	---	---	---	---	---
TP04	12/03/2024	0.00	Gravelly SAND: fine to coarse grained, grey sand			5.4	3.2	2.2	2	5.2	5.7	0.028	17	<0.02	<2	0.030	19	---	---	---	---	---	---
TP04	12/03/2024	0.50	SAND: fine to medium grained, pale grey mottled pale brown			6.1	3.9	2.2	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.00				6.1	4.2	1.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.25	SAND: fine to medium grained, white			6.1	4.6	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.75				5.7	3.9	1.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.00				5.6	2.7	2.9	2	5.3	6.2	0.022	14	<0.02	<2	0.054	34	---	---	---	---	---	---
TP05	13/03/2024	0.25	SAND: fine to medium grained, dark grey; trace silty fines.			6.0	3.1	2.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.50				6.0	3.9	2.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.75				6.2	4.2	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP06	13/03/2024	0.00	SAND: fine to medium grained, dark grey			5.0	3.9	1.1	2	4.8	2.5	0.058	36	<0.02	<2	0.050	31	---	---	---	---	---	---
TP06	13/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled pale brown			4.9	4.1	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP06	13/03/2024	0.50				4.9	4.4	0.5	2	5.6	3.9	0.006	4	<0.02	<2	<0.005	<2	---	---	---	---	---	---
TP07	14/03/2024	0.00	SAND: fine to medium grained, dark grey			6.0	5.0	1.0	2	6.3	3.0	0.004	2	<0.02	<2	0.065	41	---	---	---	---	---	---
TP07	14/03/2024	0.25				6.0	5.1	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	0.50	SAND: fine to coarse grained, pale grey; trace silty fines.			6.2	5.2	1.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	0.75				6.3	5.4	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	1.00	SAND: fine to coarse grained, dark			6.7	5.7	1.0	2	6.0	4.4	<0.003	<2	<0.02	<2	<0.005	<2	---	---	---	---	---	---
TP07	14/03/2024	1.25	grey, mottled dark brown; pockets of organics			6.7	5.6	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	1.50				6.0	2.2	3.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.00	SAND: fine to medium grained, dark grey			5.0	3.8	1.2	2	5.4	2.9	0.013	8	<0.02	<2	0.023	14	---	---	---	---	---	---
TP08	12/03/2024	0.25				5.3	4.6	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.50				5.2	4.3	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.75	SAND: fine to coarse grained, pale grey; trace silty fines.			5.3	4.4	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.00				6.1	4.6	1.5	2	5.5	3.6	0.009	6	<0.02	<2	0.014	9	---	---	---	---	---	---
TP08	12/03/2024	1.25				6.3	4.8	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.50				5.2	4.4	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.75				5.9	4.4	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	2.00	SAND: fine to coarse grained, dark grey, mottled dark brown;			5.0	2.8	2.2	2	5.5	3.8	0.015	9	0.050	31	0.059	37	---	---	---	---	---	---
TP09	12/03/2024	0.00	SAND: fine to medium grained, dark grey			5.1	4.2	0.9	2	5.4	2.9	0.032	20	<0.02	<2	0.059	37	---	---	---	---	---	---
TP09	12/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled pale brown			5.1	4.4	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP09	12/03/2024	1.00				5.6	4.9	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP09	12/03/2024	1.50	SAND: fine to medium grained, pale yellow and stained dark brown.			6.0	5.2	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP10	12/03/2024	0.00	SAND: fine to medium grained, dark grey			6.0	4.0	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP10	12/03/2024	1.00				6.1	4.1	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.00	SAND: fine to medium grained, dark grey			5.9	3.8	2.1	2	5.9	3.0	0.007	4	<0.02	<2	0.042	26	---	---	---	---	---	---
TP11	14/03/2024	0.25				6.1	4.0	2.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.50				6.0	3.7	2.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.75	SAND: fine to coarse grained, pale brown to brown			6.5	5.1	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.00				6.6	5.2	1.4	2	6.3	4.8	<0.003	<2	<0.02	<2	0.006	4	---	---	---	---	---	---
TP11	14/03/2024	1.25				6.2	4.3	1.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.50				6.3	4.3	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.75	SAND: fine to coarse grained, brown to dark brown; pockets of organics.			5.9	3.1	2.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	2.00				5.3	3.4	1.9	4	5.0	3.3	0.049	31	0.410	256	0.210	131	---	---	---	---	---	---
TP12	13/03/2024	0.00	SAND: fine to medium grained, dark grey			6.0	4.1	1.9	2	6.0	6.2	0.007	4	<0.02	<2	0.032	20	---	---	---	---	---	---
TP13	13/03/2024	0.00	SAND: fine to medium grained, dark grey			5.9																	

Appendix E - Laboratory Documentation



Stantec Australia Pty Limited
 6F 226, Adelaide Terrace
 Perth
 WA 6000



NATA Accredited
 Accreditation Number 2377
 Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Brenton Petracca**

Report **1075587-S**
 Project name **BEENUP WIND FARM**
 Received Date **Mar 05, 2024**

Client Sample ID			WM01-0.0	WM01-0.5	WM01-1.0	WM01-1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013729	L24- Ma0013730	L24- Ma0013731	L24- Ma0013732
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
BTEX						
4-Bromofluorobenzene (surr.)	1	%	82	104	57	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
beta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
delta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bifenthrin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bromophos Ethyl	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorpyrifos	0.02	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p,p-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			WM01-0.0	WM01-0.5	WM01-1.0	WM01-1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013729	L24- Ma0013730	L24- Ma0013731	L24- Ma0013732
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
OCOP in Soil						
p,p-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p,p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o,p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan Sulfate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Lindane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Oxychlorane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Fenitrothion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Nutrients						
Ammonia-N	10	mg/kg	36	37	38	36
Chromium (VI)	1	mg/kg	< 1	< 1	< 1	< 1
Filterable Reactive Phosphorus	1	mg/kg	7.9	< 1	< 1	< 1
Nitrate-N	1	mg/kg	1.6	1.3	1.2	< 1
Nitrite-N	1	mg/kg	1.6	1.3	1.2	< 1
NOx-N	1	mg/kg	1.6	1.4	1.2	< 1
Total Kjeldahl Nitrogen	10	mg/kg	370	680	280	40
Total Nitrogen	10	mg/kg	370	680	280	40
Phosphorus	1	mg/kg	19	27	4.5	3.4
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Beryllium	2	mg/kg	< 2	< 2	< 2	< 2
Boron	10	mg/kg	< 10	< 10	< 10	< 10
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Cobalt	5	mg/kg	< 5	< 5	< 5	< 5
Copper	1	mg/kg	< 1	< 1	< 1	< 1
Lead	1	mg/kg	5.2	4.6	7.8	6.1
Manganese	5	mg/kg	< 5	< 5	5.9	< 5
Mercury	0.02	mg/kg	< 0.02	< 0.02	0.02	< 0.02
Nickel	1	mg/kg	< 1	< 1	< 1	< 1
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Zinc	5	mg/kg	< 5	< 5	< 5	< 5
Sample Properties						
% Moisture	1	%	11	4.4	20	16

Client Sample ID			WM02-0.0	WM02-0.5	WM02-1.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013733	L24- Ma0013734	L24- Ma0013735	L24- Ma0013737
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	61	< 50	180
TRH C29-C36	50	mg/kg	< 50	68	< 50	190
TRH C10-C36 (Total)	50	mg/kg	< 50	129	< 50	370
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
BTEX						
4-Bromofluorobenzene (surr.)	1	%	99	90	97	116
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	110	< 100	310
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	100
TRH >C10-C40 (total)*	100	mg/kg	< 100	110	< 100	410
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
beta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
delta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bifenthrin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bromophos Ethyl	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorpyrifos	0.02	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p,p-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p,p-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p,p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o,p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan Sulfate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Lindane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Oxychlorane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			WM02-0.0	WM02-0.5	WM02-1.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013733	L24- Ma0013734	L24- Ma0013735	L24- Ma0013737
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
OCOP in Soil						
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Fenitrothion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia-N						
Ammonia-N	10	mg/kg	37	36	39	52
Chromium (VI)						
Chromium (VI)	1	mg/kg	< 1	< 1	< 1	< 1
Filterable Reactive Phosphorus						
Filterable Reactive Phosphorus	1	mg/kg	< 1	< 1	< 1	1.1
Nitrate-N						
Nitrate-N	1	mg/kg	15	13	2.2	< 1
Nitrite-N						
Nitrite-N	1	mg/kg	15	13	2.2	< 1
NOx-N						
NOx-N	1	mg/kg	< 1	< 1	2.4	< 1
Total Kjeldahl Nitrogen						
Total Kjeldahl Nitrogen	10	mg/kg	1200	700	86	5200
Total Nitrogen						
Total Nitrogen	10	mg/kg	1200	700	88	5200
Phosphorus						
Phosphorus	1	mg/kg	190	45	5.3	610
Heavy Metals						
Arsenic						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Beryllium						
Beryllium	2	mg/kg	< 2	< 2	< 2	< 2
Boron						
Boron	10	mg/kg	< 10	< 10	< 10	< 10
Cadmium						
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Cobalt						
Cobalt	5	mg/kg	< 5	< 5	< 5	< 5
Copper						
Copper	1	mg/kg	2.9	< 1	< 1	6.5
Lead						
Lead	1	mg/kg	< 1	< 1	< 1	4.1
Manganese						
Manganese	5	mg/kg	< 5	< 5	< 5	14
Mercury						
Mercury	0.02	mg/kg	0.03	0.03	0.03	0.05
Nickel						
Nickel	1	mg/kg	< 1	< 1	< 1	< 1
Selenium						
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Zinc						
Zinc	5	mg/kg	5.4	< 5	< 5	8.4
Sample Properties						
% Moisture	1	%	< 1	2.6	20	6.6

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013738	L24- Ma0013753	L24- Ma0013754	L24- Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	-	-
TRH C10-C14	20	mg/kg	< 20	-	-	-
TRH C15-C28	50	mg/kg	< 50	-	-	-
TRH C29-C36	50	mg/kg	< 50	-	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	-
BTEX						
Benzene						
Benzene	0.1	mg/kg	< 0.1	-	-	-
Toluene						
Toluene	0.1	mg/kg	< 0.1	-	-	-
Ethylbenzene						
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	-
m&p-Xylenes						
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013738	L24- Ma0013753	L24- Ma0013754	L24- Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
BTEX						
o-Xylene	0.1	mg/kg	< 0.1	-	-	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	-
BTEX						
4-Bromofluorobenzene (surr.)	1	%	79	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-	-	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-	-	-
TRH C6-C10	20	mg/kg	< 20	-	-	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	-	-	-
TRH >C16-C34	100	mg/kg	< 100	-	-	-
TRH >C34-C40	100	mg/kg	< 100	-	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	-
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	-	-	-
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
beta-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
delta-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
Bifenthrin	0.2	mg/kg	< 0.2	-	-	-
Bromophos Ethyl	0.05	mg/kg	< 0.05	-	-	-
Chlordane	0.01	mg/kg	< 0.01	-	-	-
Chlorpyrifos	0.02	mg/kg	< 0.02	-	-	-
Dieldrin	0.01	mg/kg	< 0.01	-	-	-
p,p-DDD	0.01	mg/kg	< 0.01	-	-	-
p,p-DDE	0.01	mg/kg	< 0.01	-	-	-
p,p-DDT	0.01	mg/kg	< 0.01	-	-	-
o,p-DDT	0.01	mg/kg	< 0.01	-	-	-
Endosulfan I	0.01	mg/kg	< 0.01	-	-	-
Endosulfan II	0.01	mg/kg	< 0.01	-	-	-
Endosulfan Sulfate	0.01	mg/kg	< 0.01	-	-	-
Endrin	0.01	mg/kg	< 0.01	-	-	-
Heptachlor	0.01	mg/kg	< 0.01	-	-	-
Heptachlor Epoxide	0.01	mg/kg	< 0.01	-	-	-
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	-	-	-
Lindane	0.01	mg/kg	< 0.01	-	-	-
Methoxychlor	0.2	mg/kg	< 0.2	-	-	-
Oxychlordane	0.01	mg/kg	< 0.01	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.05	mg/kg	< 0.05	-	-	-
Fenitrothion	0.1	mg/kg	< 0.1	-	-	-
Malathion	0.1	mg/kg	< 0.1	-	-	-
Trifluralin	0.2	mg/kg	< 0.2	-	-	-
Ammonia-N						
Ammonia-N	10	mg/kg	43	-	-	-
Chromium (VI)						
Chromium (VI)	1	mg/kg	< 1	-	-	-
Filterable Reactive Phosphorus						
Filterable Reactive Phosphorus	1	mg/kg	< 1	-	-	-
Nitrate-N						
Nitrate-N	1	mg/kg	3.1	-	-	-

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013738	L24-Ma0013753	L24-Ma0013754	L24-Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Nitrite-N	1	mg/kg	3.1	-	-	-
NOx-N	1	mg/kg	3.2	-	-	-
Total Kjeldahl Nitrogen	10	mg/kg	1100	-	-	-
Total Nitrogen	10	mg/kg	1100	-	-	-
Phosphorus	1	mg/kg	30	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	11	-	-	-
Beryllium	2	mg/kg	< 2	-	-	-
Boron	10	mg/kg	< 10	-	-	-
Cadmium	0.1	mg/kg	< 0.1	-	-	-
Cobalt	5	mg/kg	< 5	-	-	-
Copper	1	mg/kg	< 1	-	-	-
Lead	1	mg/kg	20	-	-	-
Manganese	5	mg/kg	< 5	-	-	-
Mercury	0.02	mg/kg	0.05	-	-	-
Nickel	1	mg/kg	< 1	-	-	-
Selenium	2	mg/kg	< 2	-	-	-
Zinc	5	mg/kg	< 5	-	-	-
Sample Properties						
% Moisture	1	%	25	-	-	-
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	-	5.2	5.2	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	-	3.9	3.9	3.7
Reaction Ratings* ^{S05}	0	comment	-	2.0	2.0	2.0

Client Sample ID			WM01-0.75	WM01-1.0	WM01-1.25	WM01-1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013756	L24-Ma0013757	L24-Ma0013758	L24-Ma0013759
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.4	5.3	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.5	3.5	3.6	3.9
Reaction Ratings* ^{S05}	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-1.75	WM01-2.0	WM01-2.25	WM01-2.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013760	L24-Ma0013761	L24-Ma0013762	L24-Ma0013763
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	5.2	5.4	5.9
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	2.9	2.9	3.4
Reaction Ratings* ^{S05}	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-2.75	WM01-3.0	WM01-3.25	WM01-3.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013764	L24-Ma0013765	L24-Ma0013766	L24-Ma0013767
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.7	5.9	5.8	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.3	3.0	3.1	2.7
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-3.75	WM01-4.0	WM01-4.25	WM01-4.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013768	L24-Ma0013769	L24-Ma0013770	L24-Ma0013771
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.2	6.1	6.0	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	2.6	2.6	2.5
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-4.75	WM01-5.0	WM01-5.25	WM01-5.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013772	L24-Ma0013773	L24-Ma0013774	L24-Ma0013775
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.3	6.1	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.2	2.4	2.4	2.3
Reaction Ratings**S05	0	comment	2.0	2.0	4.0	2.0

Client Sample ID			WM01-5.75	WM01-6.0	WM01-6.25	WM01-6.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013776	L24-Ma0013777	L24-Ma0013778	L24-Ma0013779
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.0	6.1	6.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	1.9	2.3	2.3	2.4
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-6.75	WM01-7.0	WM01-7.25	WM01-7.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013780	L24-Ma0013781	L24-Ma0013782	L24-Ma0013783
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.1	6.7	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.4	2.3	2.3	2.2
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-7.75	WM01-8.0	WM01-8.25	WM01-8.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013784	L24-Ma0013785	L24-Ma0013786	L24-Ma0013787
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.4	6.4	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.4	2.4	2.3	2.1
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-8.75	WM01-9.0	WM01-9.25	WM01-9.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013788	L24-Ma0013789	L24-Ma0013790	L24-Ma0013791
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.2	6.4	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.5	2.3	2.3
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-9.75	WM01-10.0	WM02-0.0	WM02-0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013792	L24-Ma0013793	L24-Ma0013794	L24-Ma0013795
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	5.4	5.5	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.3	3.6	3.2
Reaction Ratings**S05	0	comment	4.0	4.0	2.0	2.0

Client Sample ID			WM02-0.5	WM02-0.75	WM02-1.0	WM02-1.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013796	L24-Ma0013797	L24-Ma0013798	L24-Ma0013799
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.4	6.3	6.4	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.0	4.1	4.5	4.7
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM02-1.5	WM02-1.75	WM02-2.0	WM02-2.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013800	L24-Ma0013801	L24-Ma0013802	L24-Ma0013803
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.9	5.7	6.2	7.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.4	4.3	5.0	3.2
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM02-2.5	WM02-2.75	WM02-3.0	WM02-3.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013804	L24-Ma0013805	L24-Ma0013806	L24-Ma0013807
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.9	7.6	7.2	6.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.4	2.6	2.8	2.8
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	3.0

Client Sample ID			WM02-3.50	WM02-3.75	WM02-4.0	WM02-4.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013808	L24-Ma0013809	L24-Ma0013810	L24-Ma0013811
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.6	6.1	7.2	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.7	2.8	3.1
Reaction Ratings**S05	0	comment	3.0	4.0	4.0	4.0

Client Sample ID			WM02-4.50	WM02-4.75	WM02-5.0	WM02-5.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013812	L24-Ma0013813	L24-Ma0013814	L24-Ma0013815
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.7	5.8	5.2	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.9	2.9	3.1
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-5.50	WM02-5.75	WM02-6.0	WM02-6.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013816	L24-Ma0013817	L24-Ma0013818	L24-Ma0013819
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.4	6.5	6.5	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.8	2.7	2.4
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-6.50	WM02-6.75	WM02-7.0	WM02-7.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013820	L24-Ma0013821	L24-Ma0013822	L24-Ma0013823
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	4.6	7.7	4.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.9	2.5	2.5	2.3
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-7.50	WM02-7.75	WM02-8.0	WM02-8.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013824	L24-Ma0013825	L24-Ma0013826	L24-Ma0013827
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.8	5.0	4.8	6.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.7	2.6	2.3
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-8.50	WM02-8.75	WM02-9.0	WM02-9.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013828	L24-Ma0013829	L24-Ma0013830	L24-Ma0013831
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	4.9	5.0	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.7	2.7	2.8	2.6
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-9.50	WM02-9.75	WM02-10.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013832	L24-Ma0013833	L24-Ma0013834	L24-Ma0013835
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.9	5.2	4.8	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	2.9	2.9	3.1
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	3.0

Client Sample ID			WM03-0.25	WM03-0.5	WM03-0.75	WM03-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013836	L24-Ma0013837	L24-Ma0013838	L24-Ma0013839
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.8	6.2	5.5	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.0	4.3	4.6	4.4
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM03-1.25	WM03-2.0	WM03-2.25	WM03-2.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013840	L24-Ma0013843	L24-Ma0013844	L24-Ma0013845
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	5.2	5.5	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.6	4.4	4.6
Reaction Ratings**S05	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM03-2.75	WM03-3.0	WM03-3.25	WM03-3.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013846	L24-Ma0013847	L24-Ma0013848	L24-Ma0013849
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.8	6.1	6.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.1	3.3	3.0
Reaction Ratings**S05	0	comment	2.0	2.0	4.0	4.0

Client Sample ID			WM03-3.75	WM03-4.0	WM03-4.25	WM03-4.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013850	L24-Ma0013851	L24-Ma0013852	L24-Ma0013853
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.2	7.3	6.7	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.1	2.7	3.0	3.1
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-4.75	WM03-5.0	WM03-5.25	WM03-5.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013854	L24-Ma0013855	L24-Ma0013856	L24-Ma0013857
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.1	7.2	7.8	7.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	3.2	2.5	2.5
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-5.75	WM03-6.0	WM03-6.25	WM03-6.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013858	L24-Ma0013859	L24-Ma0013860	L24-Ma0013861
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.7	7.9	7.0	5.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	2.5	2.9	3.1
Reaction Ratings**S05	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-6.75	WM03-7.0	WM03-7.25	WM03-7.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013862	L24-Ma0013863	L24-Ma0013864	L24-Ma0013865
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.9	6.4	5.2	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.8	3.7	3.1	2.9
Reaction Ratings* ^{S05}	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-7.75	WM03-8.0	WM03-8.25	WM03-8.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013866	L24-Ma0013867	L24-Ma0013868	L24-Ma0013869
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.0	4.7	6.6	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.9	3.4	3.2	3.2
Reaction Ratings* ^{S05}	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-8.75	WM03-9.0	WM03-9.25	WM03-9.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013870	L24-Ma0013871	L24-Ma0013872	L24-Ma0013873
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.7	6.2	5.5	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	3.2	2.9	3.0
Reaction Ratings* ^{S05}	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-9.75	WM03-10.0	Trip Blank
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013874	L24-Ma0013875	L24-Ma0013882
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	-	-	< 20
BTEX					
Benzene	0.1	mg/kg	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	-	-	< 0.3
BTEX					
4-Bromofluorobenzene (surr.)	1	%	-	-	79
Naphthalene^{N02}					
Naphthalene ^{N02}	0.5	mg/kg	-	-	< 0.5

Client Sample ID			WM03-9.75	WM03-10.0	Trip Blank
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24- Ma0013874	L24- Ma0013875	L24- Ma0013882
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Acid Sulfate Soils Field pH Test					
pH-F (Field pH test)*	0.1	pH Units	6.4	5.6	-
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	3.2	-
Reaction Ratings* ^{S05}	0	comment	4.0	4.0	-
Total Recoverable Hydrocarbons					
TRH C6-C10	20	mg/kg	-	-	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	-	< 20

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 08, 2024	14 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 08, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 08, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 08, 2024	14 Days
NEPM 2013 Metals : Metals M12 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Welshpool	Mar 08, 2024	28 Days
OCOP in Soil - Method: ARL003 - OCOP and PCB in Soil	Welshpool	Mar 09, 2024	14 Days
Ammonia-N - Method: ARL304 - Ammonia in Soil and Sediment by Discrete Analyser	Welshpool	Mar 08, 2024	7 Days
Chromium (VI) - Method: ARL051 - Hexavalent Chromium in Soil	Welshpool	Mar 08, 2024	28 Days
Filterable Reactive Phosphorus - Method: ARL120 - Filterable Reactive Phosphorus in Soil	Welshpool	Mar 08, 2024	7 Day
Nitrate-N - Method: ARL314 - NOx in Soil and Sediment by Discrete Analyser	Welshpool	Mar 08, 2024	7 Days
Nitrite-N - Method: ARL312 - Nitrite in Soil and Sediment by Discrete Analyser	Welshpool	Mar 08, 2024	7 Days
Phosphorus - Method: ARL401/403 - Metals in Soil and Sediment by ICPOES/MS	Welshpool	Mar 08, 2024	7 Days
Acid Sulfate Soils Field pH Test - Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests	Welshpool	Mar 06, 2024	7 Days
NOx-N - Method: ARL314 - NOx in Soil and Sediment by Discrete Analyser	Welshpool	Mar 08, 2024	7 Days
Total Kjeldahl Nitrogen - Method: ARL118 - Total Phosphorus and TKN in Soil and Biosolids	Welshpool	Mar 08, 2024	7 Days
Total Nitrogen - Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP	Welshpool	Mar 06, 2024	7 Days
Naphthalene - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 08, 2024	14 Days
Total Recoverable Hydrocarbons - Method: LTM-ORG-2010 TRH C6-C40	Welshpool	Mar 07, 2024	14 Days
% Moisture - Method: ARL135 Moisture in Solids	Welshpool	Mar 06, 2024	14 Days



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rourke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Project Name: BEENUP WIND FARM

Eurofins Analytical Services Manager : Eiden Garrett

Sample Detail						Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																		
1	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013729	X		X	X		X	X	X		X		X		X		X		
2	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013730	X		X	X		X	X	X		X		X		X		X		
3	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013731	X		X	X		X	X	X		X		X		X		X		
4	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013732	X		X	X		X	X	X		X		X		X		X		
5	WM02-0.0	Feb 28, 2024		Soil	L24-Ma0013733	X		X	X		X	X	X		X		X		X		X		
6	WM02-0.5	Feb 28, 2024		Soil	L24-Ma0013734	X		X	X		X	X	X		X		X		X		X		
7	WM02-1.0	Feb 28, 2024		Soil	L24-Ma0013735	X		X	X		X	X	X		X		X		X		X		
8	WM03-0.0	Feb 29, 2024		Soil	L24-Ma0013737	X		X	X		X	X	X		X		X		X		X		
9	WM03-0.5	Feb 29, 2024		Soil	L24-Ma0013738	X		X	X		X	X	X		X		X		X		X		
10	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013741														X				
11	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013742														X				
12	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013743														X				
13	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013744														X				
14	WM02-0.0	Feb 28, 2024		Soil	L24-Ma0013745														X				



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000
Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
15	WM02-0.5	Feb 28, 2024		Soil	L24-Ma0013746													X				
16	WM02-1.0	Feb 28, 2024		Soil	L24-Ma0013747													X				
17	WM02-1.5	Feb 28, 2024		Soil	L24-Ma0013748													X				
18	WM03-0.0	Feb 29, 2024		Soil	L24-Ma0013749													X				
19	WM03-0.5	Feb 29, 2024		Soil	L24-Ma0013750													X				
20	WM03-1.0	Feb 29, 2024		Soil	L24-Ma0013751													X				
21	WM03-1.5	Feb 29, 2024		Soil	L24-Ma0013752													X				
22	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013753									X								
23	WM01-0.25	Feb 26, 2024		Soil	L24-Ma0013754									X								
24	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013755									X								
25	WM01-0.75	Feb 26, 2024		Soil	L24-Ma0013756									X								
26	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013757									X								
27	WM01-1.25	Feb 26, 2024		Soil	L24-Ma0013758									X								
28	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013759									X								
29	WM01-1.75	Feb 26, 2024		Soil	L24-Ma0013760									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
30	WM01-2.0	Feb 26, 2024		Soil	L24-Ma0013761									X								
31	WM01-2.25	Feb 26, 2024		Soil	L24-Ma0013762									X								
32	WM01-2.5	Feb 26, 2024		Soil	L24-Ma0013763									X								
33	WM01-2.75	Feb 26, 2024		Soil	L24-Ma0013764									X								
34	WM01-3.0	Feb 26, 2024		Soil	L24-Ma0013765									X								
35	WM01-3.25	Feb 26, 2024		Soil	L24-Ma0013766									X								
36	WM01-3.50	Feb 26, 2024		Soil	L24-Ma0013767									X								
37	WM01-3.75	Feb 26, 2024		Soil	L24-Ma0013768									X								
38	WM01-4.0	Feb 26, 2024		Soil	L24-Ma0013769									X								
39	WM01-4.25	Feb 26, 2024		Soil	L24-Ma0013770									X								
40	WM01-4.50	Feb 26, 2024		Soil	L24-Ma0013771									X								
41	WM01-4.75	Feb 26, 2024		Soil	L24-Ma0013772									X								
42	WM01-5.0	Feb 26, 2024		Soil	L24-Ma0013773									X								
43	WM01-5.25	Feb 26, 2024		Soil	L24-Ma0013774									X								
44	WM01-5.50	Feb 26, 2024		Soil	L24-Ma0013775									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
45	WM01-5.75	Feb 26, 2024		Soil	L24-Ma0013776									X								
46	WM01-6.0	Feb 26, 2024		Soil	L24-Ma0013777									X								
47	WM01-6.25	Feb 26, 2024		Soil	L24-Ma0013778									X								
48	WM01-6.50	Feb 26, 2024		Soil	L24-Ma0013779									X								
49	WM01-6.75	Feb 26, 2024		Soil	L24-Ma0013780									X								
50	WM01-7.0	Feb 26, 2024		Soil	L24-Ma0013781									X								
51	WM01-7.25	Feb 26, 2024		Soil	L24-Ma0013782									X								
52	WM01-7.50	Feb 26, 2024		Soil	L24-Ma0013783									X								
53	WM01-7.75	Feb 26, 2024		Soil	L24-Ma0013784									X								
54	WM01-8.0	Feb 26, 2024		Soil	L24-Ma0013785									X								
55	WM01-8.25	Feb 26, 2024		Soil	L24-Ma0013786									X								
56	WM01-8.50	Feb 26, 2024		Soil	L24-Ma0013787									X								
57	WM01-8.75	Feb 26, 2024		Soil	L24-Ma0013788									X								
58	WM01-9.0	Feb 26, 2024		Soil	L24-Ma0013789									X								
59	WM01-9.25	Feb 26, 2024		Soil	L24-Ma0013790									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Project Name: BEENUP WIND FARM

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
60	WM01-9.50	Feb 26, 2024		Soil	L24-Ma0013791									X								
61	WM01-9.75	Feb 26, 2024		Soil	L24-Ma0013792									X								
62	WM01-10.0	Feb 26, 2024		Soil	L24-Ma0013793									X								
63	WM02-0.0	Feb 26, 2024		Soil	L24-Ma0013794									X								
64	WM02-0.25	Feb 26, 2024		Soil	L24-Ma0013795									X								
65	WM02-0.5	Feb 26, 2024		Soil	L24-Ma0013796									X								
66	WM02-0.75	Feb 26, 2024		Soil	L24-Ma0013797									X								
67	WM02-1.0	Feb 26, 2024		Soil	L24-Ma0013798									X								
68	WM02-1.25	Feb 26, 2024		Soil	L24-Ma0013799									X								
69	WM02-1.5	Feb 26, 2024		Soil	L24-Ma0013800									X								
70	WM02-1.75	Feb 26, 2024		Soil	L24-Ma0013801									X								
71	WM02-2.0	Feb 26, 2024		Soil	L24-Ma0013802									X								
72	WM02-2.25	Feb 26, 2024		Soil	L24-Ma0013803									X								
73	WM02-2.5	Feb 26, 2024		Soil	L24-Ma0013804									X								
74	WM02-2.75	Feb 26, 2024		Soil	L24-Ma0013805									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Eiden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
75	WM02-3.0	Feb 26, 2024		Soil	L24-Ma0013806									X								
76	WM02-3.25	Feb 26, 2024		Soil	L24-Ma0013807									X								
77	WM02-3.50	Feb 26, 2024		Soil	L24-Ma0013808									X								
78	WM02-3.75	Feb 26, 2024		Soil	L24-Ma0013809									X								
79	WM02-4.0	Feb 26, 2024		Soil	L24-Ma0013810									X								
80	WM02-4.25	Feb 26, 2024		Soil	L24-Ma0013811									X								
81	WM02-4.50	Feb 26, 2024		Soil	L24-Ma0013812									X								
82	WM02-4.75	Feb 26, 2024		Soil	L24-Ma0013813									X								
83	WM02-5.0	Feb 26, 2024		Soil	L24-Ma0013814									X								
84	WM02-5.25	Feb 26, 2024		Soil	L24-Ma0013815									X								
85	WM02-5.50	Feb 26, 2024		Soil	L24-Ma0013816									X								
86	WM02-5.75	Feb 26, 2024		Soil	L24-Ma0013817									X								
87	WM02-6.0	Feb 26, 2024		Soil	L24-Ma0013818									X								
88	WM02-6.25	Feb 26, 2024		Soil	L24-Ma0013819									X								
89	WM02-6.50	Feb 26, 2024		Soil	L24-Ma0013820									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
90	WM02-6.75	Feb 26, 2024		Soil	L24-Ma0013821									X								
91	WM02-7.0	Feb 26, 2024		Soil	L24-Ma0013822									X								
92	WM02-7.25	Feb 26, 2024		Soil	L24-Ma0013823									X								
93	WM02-7.50	Feb 26, 2024		Soil	L24-Ma0013824									X								
94	WM02-7.75	Feb 26, 2024		Soil	L24-Ma0013825									X								
95	WM02-8.0	Feb 26, 2024		Soil	L24-Ma0013826									X								
96	WM02-8.25	Feb 26, 2024		Soil	L24-Ma0013827									X								
97	WM02-8.50	Feb 26, 2024		Soil	L24-Ma0013828									X								
98	WM02-8.75	Feb 26, 2024		Soil	L24-Ma0013829									X								
99	WM02-9.0	Feb 26, 2024		Soil	L24-Ma0013830									X								
100	WM02-9.25	Feb 26, 2024		Soil	L24-Ma0013831									X								
101	WM02-9.50	Feb 26, 2024		Soil	L24-Ma0013832									X								
102	WM02-9.75	Feb 26, 2024		Soil	L24-Ma0013833									X								
103	WM02-10.0	Feb 26, 2024		Soil	L24-Ma0013834									X								
104	WM03-0.0	Feb 26, 2024		Soil	L24-Ma0013835									X								

Perth
 46-48 Banksia Road
 Welshpool
 WA 6106
 +61 8 6253 4444
 NATA# 2377
 Site# 2370

Melbourne
 6 Monterey Road
 Dandenong South
 VIC 3175
 +61 3 8564 5000
 NATA# 1261
 Site# 1254

Geelong
 19/8 Lewalan Street
 Grovedale
 VIC 3216
 +61 3 8564 5000
 NATA# 1261
 Site# 25403

Sydney
 179 Magowar Road
 Girraween
 NSW 2145
 +61 2 9900 8400
 NATA# 1261
 Site# 18217

Canberra
 Unit 1,2 Dacre Street
 Mitchell
 ACT 2911
 +61 2 6113 8091
 NATA# 1261
 Site# 25466

Brisbane
 1/21 Smallwood Place
 Murarrie
 QLD 4172
 T: +61 7 3902 4600
 NATA# 1261
 Site# 20794

Newcastle
 1/2 Frost Drive
 Mayfield West
 NSW 2304
 +61 2 4968 8448
 NATA# 1261
 Site# 25079 & 25289

Auckland
 35 O'Rorke Road
 Penrose,
 Auckland 1061
 +64 9 526 4551
 IANZ# 1327

Auckland (Asb)
 Unit C1/4 Pacific Rise,
 Mount Wellington,
 Auckland 1061
 +64 9 525 0568
 IANZ# 1308

Christchurch
 43 Detroit Drive
 Rolleston,
 Christchurch 7675
 +64 3 343 5201
 IANZ# 1290

Tauranga
 1277 Cameron Road,
 Gate Pa,
 Tauranga 3112
 +64 9 525 0568
 IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
 Perth
 WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:
Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Eiden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
105	WM03-0.25	Feb 26, 2024		Soil	L24-Ma0013836									X								
106	WM03-0.5	Feb 26, 2024		Soil	L24-Ma0013837									X								
107	WM03-0.75	Feb 26, 2024		Soil	L24-Ma0013838									X								
108	WM03-1.0	Feb 26, 2024		Soil	L24-Ma0013839									X								
109	WM03-1.25	Feb 26, 2024		Soil	L24-Ma0013840									X								
110	WM03-2.0	Feb 26, 2024		Soil	L24-Ma0013843									X								
111	WM03-2.25	Feb 26, 2024		Soil	L24-Ma0013844									X								
112	WM03-2.5	Feb 26, 2024		Soil	L24-Ma0013845									X								
113	WM03-2.75	Feb 26, 2024		Soil	L24-Ma0013846									X								
114	WM03-3.0	Feb 26, 2024		Soil	L24-Ma0013847									X								
115	WM03-3.25	Feb 26, 2024		Soil	L24-Ma0013848									X								
116	WM03-3.50	Feb 26, 2024		Soil	L24-Ma0013849									X								
117	WM03-3.75	Feb 26, 2024		Soil	L24-Ma0013850									X								
118	WM03-4.0	Feb 26, 2024		Soil	L24-Ma0013851									X								
119	WM03-4.25	Feb 26, 2024		Soil	L24-Ma0013852									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
120	WM03-4.50	Feb 26, 2024		Soil	L24-Ma0013853									X								
121	WM03-4.75	Feb 26, 2024		Soil	L24-Ma0013854									X								
122	WM03-5.0	Feb 26, 2024		Soil	L24-Ma0013855									X								
123	WM03-5.25	Feb 26, 2024		Soil	L24-Ma0013856									X								
124	WM03-5.50	Feb 26, 2024		Soil	L24-Ma0013857									X								
125	WM03-5.75	Feb 26, 2024		Soil	L24-Ma0013858									X								
126	WM03-6.0	Feb 26, 2024		Soil	L24-Ma0013859									X								
127	WM03-6.25	Feb 26, 2024		Soil	L24-Ma0013860									X								
128	WM03-6.50	Feb 26, 2024		Soil	L24-Ma0013861									X								
129	WM03-6.75	Feb 26, 2024		Soil	L24-Ma0013862									X								
130	WM03-7.0	Feb 26, 2024		Soil	L24-Ma0013863									X								
131	WM03-7.25	Feb 26, 2024		Soil	L24-Ma0013864									X								
132	WM03-7.50	Feb 26, 2024		Soil	L24-Ma0013865									X								
133	WM03-7.75	Feb 26, 2024		Soil	L24-Ma0013866									X								
134	WM03-8.0	Feb 26, 2024		Soil	L24-Ma0013867									X								



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Project Name: BEENUP WIND FARM

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
135	WM03-8.25	Feb 26, 2024		Soil	L24-Ma0013868									X								
136	WM03-8.50	Feb 26, 2024		Soil	L24-Ma0013869									X								
137	WM03-8.75	Feb 26, 2024		Soil	L24-Ma0013870									X								
138	WM03-9.0	Feb 26, 2024		Soil	L24-Ma0013871									X								
139	WM03-9.25	Feb 26, 2024		Soil	L24-Ma0013872									X								
140	WM03-9.50	Feb 26, 2024		Soil	L24-Ma0013873									X								
141	WM03-9.75	Feb 26, 2024		Soil	L24-Ma0013874									X								
142	WM03-10.0	Feb 26, 2024		Soil	L24-Ma0013875									X								
143	WM01-QC1	Feb 26, 2024		Water	L24-Ma0013876		X									X			X		X	
144	WM02-QC1	Feb 28, 2024		Water	L24-Ma0013877		X									X			X		X	
145	WM03-QC1	Feb 29, 2024		Water	L24-Ma0013878		X									X			X		X	
146	WM02-QC2	Feb 29, 2024		Soil	L24-Ma0013879		X															
147	WM03-QC3	Feb 29, 2024		Soil	L24-Ma0013880		X															
148	Sample 1	Feb 29, 2024		Water	L24-Ma0013881					X												
149	Trip Blank	Feb 29, 2024		Soil	L24-Ma0013882										X							
					9	2	3	9	9	1	9	9	9	121	9	1	12	12	9	3	9	3



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail	Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																		
Test Counts	9	2	3	9	9	1	9	9	9	121	9	1	12	12	9	3	9	3

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
- Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
- Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	Colour: Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

- Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	mg/kg	< 20		20	Pass	
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Method Blank						
BTEX						
Benzene	mg/kg	< 0.1		0.1	Pass	
Toluene	mg/kg	< 0.1		0.1	Pass	
Ethylbenzene	mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2		0.2	Pass	
o-Xylene	mg/kg	< 0.1		0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3		0.3	Pass	
Method Blank						
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
Method Blank						
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
Method Blank						
OCOP in Soil						
Aldrin	mg/kg	< 0.01		0.01	Pass	
alpha-BHC (HCH)	mg/kg	< 0.01		0.01	Pass	
beta-BHC (HCH)	mg/kg	< 0.01		0.01	Pass	
delta-BHC (HCH)	mg/kg	< 0.01		0.01	Pass	
Bifenthrin	mg/kg	< 0.2		0.2	Pass	
Bromophos Ethyl	mg/kg	< 0.05		0.05	Pass	
Chlordane	mg/kg	< 0.01		0.01	Pass	
Chlorpyrifos	mg/kg	< 0.02		0.02	Pass	
Dieldrin	mg/kg	< 0.01		0.01	Pass	
p,p-DDD	mg/kg	< 0.01		0.01	Pass	
p,p-DDE	mg/kg	< 0.01		0.01	Pass	
p,p-DDT	mg/kg	< 0.01		0.01	Pass	
o,p-DDT	mg/kg	< 0.01		0.01	Pass	
Endosulfan I	mg/kg	< 0.01		0.01	Pass	
Endosulfan II	mg/kg	< 0.01		0.01	Pass	
Endosulfan Sulfate	mg/kg	< 0.01		0.01	Pass	
Endrin	mg/kg	< 0.01		0.01	Pass	
Heptachlor	mg/kg	< 0.01		0.01	Pass	
Heptachlor Epoxide	mg/kg	< 0.01		0.01	Pass	
Hexachlorobenzene (HCB)	mg/kg	< 0.01		0.01	Pass	
Lindane	mg/kg	< 0.01		0.01	Pass	
Methoxychlor	mg/kg	< 0.2		0.2	Pass	
Oxychlordane	mg/kg	< 0.01		0.01	Pass	
Diazinon	mg/kg	< 0.2		0.2	Pass	
Ethion	mg/kg	< 0.05		0.05	Pass	
Fenitrothion	mg/kg	< 0.1		0.1	Pass	
Malathion	mg/kg	< 0.1		0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Trifluralin	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Ammonia-N	mg/kg	< 10			10	Pass	
Chromium (VI)	mg/kg	< 1			1	Pass	
Filterable Reactive Phosphorus	mg/kg	< 1			1	Pass	
Nitrate-N	mg/kg	< 1			1	Pass	
Nitrite-N	mg/kg	< 1			1	Pass	
NOx-N	mg/kg	< 1			1	Pass	
Total Kjeldahl Nitrogen	mg/kg	< 10			10	Pass	
Phosphorus	mg/kg	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.1			0.1	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 1			1	Pass	
Lead	mg/kg	< 1			1	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.02			0.02	Pass	
Nickel	mg/kg	< 1			1	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	105			70-130	Pass	
TRH C10-C14	%	97			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	108			70-130	Pass	
Ethylbenzene	%	104			70-130	Pass	
m&p-Xylenes	%	106			70-130	Pass	
o-Xylene	%	101			70-130	Pass	
Xylenes - Total*	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	105			70-130	Pass	
TRH C6-C10	%	107			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	110			70-130	Pass	
LCS - % Recovery							
OCOP in Soil							
Aldrin	%	85			60-120	Pass	
Dieldrin	%	107			60-120	Pass	
p,p-DDT	%	117			60-120	Pass	
Endrin	%	86			60-120	Pass	
Heptachlor	%	83			60-120	Pass	
Lindane	%	99			60-120	Pass	
LCS - % Recovery							
Phosphorus	%	105			80-120	Pass	
LCS - % Recovery							

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals										
Arsenic				%	114			80-120	Pass	
Beryllium				%	88			80-120	Pass	
Boron				%	87			80-120	Pass	
Cadmium				%	92			80-120	Pass	
Cobalt				%	90			80-120	Pass	
Copper				%	94			80-120	Pass	
Lead				%	89			80-120	Pass	
Manganese				%	88			80-120	Pass	
Mercury				%	94			80-120	Pass	
Nickel				%	89			80-120	Pass	
Selenium				%	96			80-120	Pass	
Zinc				%	88			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					Result 1					
TRH C6-C9	L24-Ma0017035	NCP	%	107				70-130	Pass	
TRH C10-C14	L24-Ma0012765	NCP	%	114				70-130	Pass	
Spike - % Recovery										
BTEX					Result 1					
Benzene	L24-Ma0017035	NCP	%	102				70-130	Pass	
Toluene	L24-Ma0017035	NCP	%	99				70-130	Pass	
Ethylbenzene	L24-Ma0017035	NCP	%	107				70-130	Pass	
m&p-Xylenes	L24-Ma0017035	NCP	%	103				70-130	Pass	
o-Xylene	L24-Ma0017035	NCP	%	109				70-130	Pass	
Xylenes - Total*	L24-Ma0017035	NCP	%	105				70-130	Pass	
Spike - % Recovery										
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					Result 1					
Naphthalene	L24-Ma0017035	NCP	%	104				70-130	Pass	
TRH C6-C10	L24-Ma0017035	NCP	%	102				70-130	Pass	
Spike - % Recovery										
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					Result 1					
TRH >C10-C16	L24-Ma0012765	NCP	%	108				70-130	Pass	
Spike - % Recovery										
Heavy Metals					Result 1					
Beryllium	L24-Ma0013735	CP	%	85				75-125	Pass	
Boron	L24-Ma0013735	CP	%	79				75-125	Pass	
Cadmium	L24-Ma0013735	CP	%	89				75-125	Pass	
Cobalt	L24-Ma0013735	CP	%	90				75-125	Pass	
Copper	L24-Ma0013735	CP	%	89				75-125	Pass	
Lead	L24-Ma0013735	CP	%	90				75-125	Pass	
Manganese	L24-Ma0013735	CP	%	89				75-125	Pass	
Mercury	L24-Ma0013735	CP	%	91				75-125	Pass	
Nickel	L24-Ma0013735	CP	%	88				75-125	Pass	
Zinc	L24-Ma0013735	CP	%	89				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					Result 1	Result 2	RPD			
TRH C6-C9	L24-Ma0017034	NCP	mg/kg	< 20	< 20	<1		30%	Pass	

Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	L24-Ma0017034	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total*	L24-Ma0017034	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	L24-Ma0017034	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	L24-Ma0017034	NCP	mg/kg	< 20	< 20	<1	30%	Pass
Duplicate								
OCOP in Soil				Result 1	Result 2	RPD		
Aldrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
alpha-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
beta-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
delta-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Bifenthrin	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Bromophos Ethyl	L24-Ma0013729	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Chlordane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Chlorpyrifos	L24-Ma0013729	CP	mg/kg	< 0.02	< 0.02	<1	30%	Pass
Dieldrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
p,p-DDD	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
p,p-DDE	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
p,p-DDT	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
o,p-DDT	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan I	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan II	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan Sulfate	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor Epoxide	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Hexachlorobenzene (HCB)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Lindane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Methoxychlor	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Oxychlordane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Diazinon	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ethion	L24-Ma0013729	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Fenitrothion	L24-Ma0013729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Malathion	L24-Ma0013729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Trifluralin	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Duplicate								
Total Kjeldahl Nitrogen				Result 1	Result 2	RPD		
Total Kjeldahl Nitrogen	L24-Ma0013729	CP	mg/kg	370	430	14	20%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Selenium	L24-Ma0015257	NCP	mg/kg	< 2	< 2	<1	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	L24-Ma0013733	CP	%	< 1	< 1	<1	30%	Pass
Duplicate								
Phosphorus				Result 1	Result 2	RPD		
Phosphorus	L24-Ma0013734	CP	mg/kg	45	43	4.6	30%	Pass

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	L24-Ma0013734	CP	mg/kg	< 2	< 2	<1	30%	Pass
Beryllium	L24-Ma0013734	CP	mg/kg	< 2	< 2	<1	30%	Pass
Boron	L24-Ma0013734	CP	mg/kg	< 10	< 10	<1	30%	Pass
Cadmium	L24-Ma0013734	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Cobalt	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass
Copper	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass
Lead	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass
Manganese	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass
Nickel	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass
Zinc	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD		
TRH C10-C14	L24-Ma0013737	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C15-C28	L24-Ma0013737	CP	mg/kg	180	220	19	30%	Pass
TRH C29-C36	L24-Ma0013737	CP	mg/kg	190	200	7.9	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
TRH >C10-C16	L24-Ma0013737	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	L24-Ma0013737	CP	mg/kg	310	350	12	30%	Pass
TRH >C34-C40	L24-Ma0013737	CP	mg/kg	100	120	16	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia-N	L24-Ma0013738	CP	mg/kg	43	44	<1	20%	Pass
Filterable Reactive Phosphorus	L24-Ma0013738	CP	mg/kg	< 1	< 1	<1	20%	Pass
Nitrate-N	L24-Ma0013738	CP	mg/kg	3.1	3.4	8.2	20%	Pass
Nitrite-N	L24-Ma0013738	CP	mg/kg	3.1	3.4	8.2	20%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013753	CP	pH Units	5.2	5.1	pass	20%	Pass
Reaction Ratings*	L24-Ma0013753	CP	comment	2.0	2.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013763	CP	pH Units	5.9	5.8	pass	20%	Pass
Reaction Ratings*	L24-Ma0013763	CP	comment	2.0	2.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013773	CP	pH Units	6.3	6.3	pass	20%	Pass
Reaction Ratings*	L24-Ma0013773	CP	comment	2.0	2.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013783	CP	pH Units	6.3	6.2	pass	20%	Pass
Reaction Ratings*	L24-Ma0013783	CP	comment	4.0	4.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013793	CP	pH Units	5.4	5.4	pass	20%	Pass
Reaction Ratings*	L24-Ma0013793	CP	comment	4.0	4.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013803	CP	pH Units	7.2	7.0	pass	20%	Pass
Reaction Ratings*	L24-Ma0013803	CP	comment	2.0	2.0	pass	30%	Pass
Duplicate								
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD		
pH-F (Field pH test)*	L24-Ma0013813	CP	pH Units	5.8	5.8	pass	20%	Pass
Reaction Ratings*	L24-Ma0013813	CP	comment	4.0	4.0	pass	30%	Pass

Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013823	CP	pH Units	4.5	4.4	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013823	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013833	CP	pH Units	5.2	5.0	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013833	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013843	CP	pH Units	5.2	5.2	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013843	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013855	CP	pH Units	7.2	7.1	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013855	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013865	CP	pH Units	5.6	5.6	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013865	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013875	CP	pH Units	5.6	5.9	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013875	CP	comment	4.0	4.0	pass	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q05	The matrix spike concentration is less than five times the background concentration in the sample - therefore the spike recovery cannot be determined
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Elden Garrett	Analytical Services Manager
Douglas Todd	Senior Analyst-Metal
Douglas Todd	Senior Analyst-Sample Properties
John Horwood	Senior Analyst-Volatile
Kim Rodgers	Senior Analyst-Sample Properties
Lauren Killin	Senior Analyst-Inorganic
Patrick Patfield	Senior Analyst-Organic
Patrick Patfield	Senior Analyst-Volatile
Paul Nottle	Senior Analyst-Organic
Rhys Thomas	Senior Analyst-Asbestos
Sam Becker	Senior Analyst-Inorganic
Sean Sangster	Senior Analyst-Metal



Kim Rodgers
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Edvinder Singh**

Report **1084676-S**
Project name **BEENYUP WIND FARM**
Received Date **Apr 03, 2024**

Client Sample ID			WM01 - 0.0	WM01 - 1.0	WM01 - 10.0	WM01 - 2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011899	L24- Ap0011900	L24- Ap0011901	L24- Ap0011902
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.4	5.2	5.2	5.3
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	11	10	10	8.6
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.018	0.017	0.016	0.014
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	1.8	1.2	26	2.4
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	23	16	340	32
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.038	0.026	0.55	0.051
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	3.0	3.4	2.4	3.7
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	0.53	0.05
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	330	32
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	320	23
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	0.52	0.04
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	0.014	0.006
Peroxide Extractable Sulfur	0.005	% S	0.019	0.009	0.54	0.043
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.019	0.009	0.53	0.037
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	12	5.6	330	23
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.030	0.010	< 0.005	< 0.005
Calcium - Peroxide	0.005	% Ca	0.033	0.012	0.007	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.007	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.006	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	3.4	< 0.005

Client Sample ID			WM01 - 0.0	WM01 - 1.0	WM01 - 10.0	WM01 - 2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011899	L24- Ap0011900	L24- Ap0011901	L24- Ap0011902
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.006	0.010
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.009	0.011
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	23	16	340	32
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	0.03	0.55	0.05
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	1.8	1.2	26	2.4
Extraneous Material						
<2mm Fraction	0.005	g	68	54	15	83
>2mm Fraction	0.005	g	0.72	0.48	0.63	1.5
Analysed Material	0.1	%	99	99	96	98
Extraneous Material	0.1	%	1.1	0.9	3.9	1.7

Client Sample ID			WM01 - 3.0	WM01 - 4.0	WM01 - 5.0	WM01 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011903	L24- Ap0011904	L24- Ap0011905	L24- Ap0011906
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	5.2	4.9	5.2
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	8.5	6.8	17	6.2
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.014	0.011	0.027	0.010
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	1.0	4.6	10	10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	14	61	140	130
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.022	0.098	0.22	0.22
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	4.3	3.2	2.9	2.7
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	0.11	0.27	0.25
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	19	66	170	160
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	10	60	150	150
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	0.10	0.24	0.24
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.006	< 0.005	0.021	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.014	0.087	0.22	0.21
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.008	0.087	0.20	0.21
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	5.0	54	120	130

Client Sample ID			WM01 - 3.0	WM01 - 4.0	WM01 - 5.0	WM01 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011903	L24- Ap0011904	L24- Ap0011905	L24- Ap0011906
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Peroxide	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.018	0.010	0.010	0.008
Magnesium - Peroxide	0.005	% Mg	0.018	0.011	0.012	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	14	61	140	130
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.02	0.10	0.22	0.22
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	1.0	4.6	10	10
Extraneous Material						
<2mm Fraction	0.005	g	69	73	22	61
>2mm Fraction	0.005	g	6.5	4.3	< 0.005	3.9
Analysed Material	0.1	%	91	94	100	94
Extraneous Material	0.1	%	8.6	5.6	< 0.1	6.0

Client Sample ID			WM01 - 7.0	WM01 - 8.0	WM01 - 9.0	WM02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011907	L24- Ap0011908	L24- Ap0011909	L24- Ap0011910
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.2	5.1	5.0	7.3
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	6.6	9.8	20	< 2
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.011	0.016	0.033	< 0.003
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	7.7	7.0	8.3	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	100	94	110	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.17	0.15	0.18	< 0.02

Client Sample ID			WM01 - 7.0	WM01 - 8.0	WM01 - 9.0	WM02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011907	L24- Ap0011908	L24- Ap0011909	L24- Ap0011910
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.9	3.2	3.2	3.4
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.20	0.18	0.29	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	130	110	180	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	120	100	160	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.19	0.16	0.26	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	0.007
Peroxide Extractable Sulfur	0.005	% S	0.15	0.13	0.14	0.032
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.15	0.13	0.14	0.025
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	97	84	90	16
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	< 0.005	< 0.005	0.010	0.12
Calcium - Peroxide	0.005	% Ca	< 0.005	< 0.005	0.011	0.14
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	0.018
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	0.014
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	8.9
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.009	0.012	0.029	0.008
Magnesium - Peroxide	0.005	% Mg	0.011	0.014	0.031	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	100	94	110	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.17	0.15	0.18	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	7.7	7.0	8.3	< 1
Extraneous Material						
<2mm Fraction	0.005	g	48	25	26	76
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	5.9
Analysed Material	0.1	%	100	100	100	93
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	7.2

Client Sample ID			WM02 - 1.0	WM02 - 10.0	WM02 - 2.0	WM02 - 2.75
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011911	L24- Ap0011912	L24- Ap0011913	L24- Ap0011914
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.3	4.6	6.1	5.1
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	7.0	76	5.8	6.5
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.011	0.12	0.009	0.010
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	1.0	67	1.0	5.1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	13	900	13	0.11
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.021	1.4	0.022	68
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	4.2	2.2	6.3	2.8
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	1.4	< 0.02	0.15
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	18	900	7.0	94
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	11	820	< 2	87
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	1.3	< 0.02	0.14
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.008	0.093	0.024	0.017
Peroxide Extractable Sulfur	0.005	% S	0.018	1.4	0.037	0.12
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.010	1.3	0.012	0.099
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	6.3	820	7.7	62
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.007	0.027	0.007	0.016
Calcium - Peroxide	0.005	% Ca	0.008	0.11	0.008	0.019
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.083	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.066	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	41	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.026	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.033	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	0.007	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.009	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	5.5	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	13	900	13	68
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.02	1.4	0.02	0.11
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	< 1	67	1.0	5.1

Client Sample ID			WM02 - 1.0	WM02 - 10.0	WM02 - 2.0	WM02 - 2.75
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011911	L24- Ap0011912	L24- Ap0011913	L24- Ap0011914
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	15	10	22	67
>2mm Fraction	0.005	g	< 0.005	< 0.005	1.8	< 0.005
Analysed Material	0.1	%	100	100	92	100
Extraneous Material	0.1	%	< 0.1	< 0.1	7.5	< 0.1

Client Sample ID			WM02 - 3.0	WM02 - 4.0	WM02 - 5.0	WM02 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011915	L24- Ap0011916	L24- Ap0011917	L24- Ap0011918
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	5.2	4.7	4.9
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	12	13	33	19
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.019	0.021	0.054	0.030
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	6.5	14	33	28
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	87	180	440	370
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.14	0.29	0.70	0.60
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	2.9	2.6	2.3	2.2
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.20	0.39	0.81	0.64
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	120	240	510	400
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	110	230	470	380
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.18	0.37	0.76	0.61
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	0.006	0.030	0.019
Peroxide Extractable Sulfur	0.005	% S	0.13	0.28	0.68	0.59
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.12	0.27	0.65	0.57
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	75	170	410	360
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.006	0.018	0.006	0.012
Calcium - Peroxide	0.005	% Ca	0.008	0.020	0.007	0.013
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			WM02 - 3.0	WM02 - 4.0	WM02 - 5.0	WM02 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011915	L24- Ap0011916	L24- Ap0011917	L24- Ap0011918
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.006	0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.4	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	87	180	440	370
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.14	0.29	0.70	0.60
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	6.5	14	33	28
Extraneous Material						
<2mm Fraction	0.005	g	16	28	22	11
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			WM02 - 7.0	WM02 - 8.0	WM02 - 9.0	WM03 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011919	L24- Ap0011920	L24- Ap0011921	L24- Ap0011922
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	4.6	4.4	5.2
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	11	26	110	30
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.017	0.041	0.18	0.048
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	13	23	98	6.3
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	180	300	1300	84
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.29	0.48	2.1	0.13
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	2.4	2.1	1.9	2.5
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.32	0.54	2.2	1.2
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	200	340	1400	720
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	190	310	1300	690
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.30	0.50	2.0	1.1
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.011	0.031	0.13	0.006
Peroxide Extractable Sulfur	0.005	% S	0.28	0.47	2.0	0.092
HCl Extractable Sulfur	0.005	% S	N/A	N/A	0.14	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.27	0.44	1.9	0.086
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	170	270	1200	54

Client Sample ID			WM02 - 7.0	WM02 - 8.0	WM02 - 9.0	WM03 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011919	L24- Ap0011920	L24- Ap0011921	L24- Ap0011922
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	0.023	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	0.017	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	11	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.011	0.007	0.021	0.19
Calcium - Peroxide	0.005	% Ca	0.012	0.008	0.030	0.21
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.009	0.027
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	0.021
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.5	13
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.007	0.030	0.021
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.008	0.033	0.023
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	180	300	1300	84
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.29	0.48	2.1	0.13
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	13	23	98	6.3
Extraneous Material						
<2mm Fraction	0.005	g	12	13	15	110
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	2.0
Analysed Material	0.1	%	100	100	100	98
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	1.7

Client Sample ID			WM03 - 0.25	WM03 - 1.0	WM03 - 10.0	WM03 - 3.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011923	L24- Ap0011924	L24- Ap0011925	L24- Ap0011926
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.1	5.7	4.7	5.8
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	31	16	37	11
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.050	0.026	0.060	0.018
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	9.6	1.8	26	3.0
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	130	24	350	40
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.20	0.039	0.56	0.064

Client Sample ID			WM03 - 0.25	WM03 - 1.0	WM03 - 10.0	WM03 - 3.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011923	L24- Ap0011924	L24- Ap0011925	L24- Ap0011926
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.7	4.8	2.7	4.1
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.32	0.06	0.69	0.09
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	200	35	430	55
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	170	18	390	44
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.27	0.03	0.63	0.07
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.016	0.071	0.021	0.024
Peroxide Extractable Sulfur	0.005	% S	0.17	0.083	0.52	0.070
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.15	0.012	0.50	0.046
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	96	7.7	310	29
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.072	0.012	0.007	< 0.005
Calcium - Peroxide	0.005	% Ca	0.076	0.014	0.009	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.011	< 0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.012	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.2	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	130	24	350	40
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.20	0.04	0.56	0.06
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	9.6	1.8	26	3.0
Extraneous Material						
<2mm Fraction	0.005	g	10	36	33	31
>2mm Fraction	0.005	g	< 0.005	12	< 0.005	2.0
Analysed Material	0.1	%	100	75	100	94
Extraneous Material	0.1	%	< 0.1	25	< 0.1	6.1

Client Sample ID			WM03 - 3.50	WM03 - 5.0	WM03 - 6.0	WM03 - 7.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011927	L24- Ap0011928	L24- Ap0011929	L24- Ap0011930
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.7	5.6	5.0	4.7
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	20	8.9	9.8	100
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.033	0.014	0.016	0.16
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	12	6.0	9.2	48
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	160	80	120	640
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.26	0.13	0.20	1.0
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	2.7	3.8	2.6	3.0
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.33	0.16	0.24	1.4
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	210	100	150	860
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	190	92	140	760
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.30	0.15	0.22	1.2
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	0.011	0.008	0.037
Peroxide Extractable Sulfur	0.005	% S	0.24	0.13	0.19	0.90
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.23	0.11	0.18	0.86
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	140	71	110	540
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.007	0.016	0.010	0.013
Calcium - Peroxide	0.005	% Ca	0.008	0.018	0.011	0.014
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	< 0.005	0.009
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	< 0.005	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	160	80	120	640
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.26	0.13	0.20	1.0
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	12	6.0	9.2	48

Client Sample ID			WM03 - 3.50	WM03 - 5.0	WM03 - 6.0	WM03 - 7.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011927	L24- Ap0011928	L24- Ap0011929	L24- Ap0011930
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	71	12	15	38
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			WM03 - 8.0	WM03 - 9.0	WM03 - 4.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011931	L24- Ap0011932	L24- Ap0011933
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)	0.1	pH Units	4.5	4.7	4.7
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	89	35	26
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.14	0.055	0.041
SPOCAS Suite - WA (Excluding ANC)					
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	42	23	18
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	560	310	240
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.90	0.50	0.39
Potential Acidity - Titrateable Peroxide					
pH-OX	0.1	pH Units	2.6	2.7	2.6
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	1.1	0.61	0.45
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	680	380	280
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	590	350	260
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.95	0.55	0.41
Extractable Sulfur					
Sulfur - KCl Extractable	0.005	% S	0.073	0.028	0.017
Peroxide Extractable Sulfur	0.005	% S	0.83	0.47	0.37
HCl Extractable Sulfur	0.005	% S	0.071	N/A	N/A
Potential Acidity (SPOS)					
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.76	0.44	0.35
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	470	280	220
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	< 0.005	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	< 0.005	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	< 2	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0
Extractable Calcium					
Calcium - KCl Extractable	0.005	% Ca	< 0.005	0.007	0.006
Calcium - Peroxide	0.005	% Ca	0.006	0.008	0.008
Calcium - Acid Reacted	0.005	% Ca	0.006	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	2.9	< 0.005	< 0.005

Client Sample ID			WM03 - 8.0	WM03 - 9.0	WM03 - 4.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011931	L24- Ap0011932	L24- Ap0011933
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Extractable Magnesium					
Magnesium - KCl Extractable	0.005	% Mg	0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.005	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)					
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)					
ANC Fineness Factor		factor	1.5	1.5	1.5
Net Acidity (Including ANC)					
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	560	310	240
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.90	0.50	0.39
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	42	23	18
Extraneous Material					
<2mm Fraction	0.005	g	55	40	16
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
SPOCAS Suite - WA (Excluding ANC)			
SPOCAS Suite - WA (Excluding ANC) - Method: LTM-GEN-7050	Brisbane	Apr 10, 2024	6 Week
Extraneous Material - Method: LTM-GEN-7050/7070	Brisbane	Apr 10, 2024	6 Week



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084676
Phone: 0458 839 200
Fax:

Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	WM01 - 0.0	Feb 26, 2024		Soil	L24-Ap0011899	X	X
2	WM01 - 1.0	Feb 26, 2024		Soil	L24-Ap0011900	X	X
3	WM01 - 10.0	Feb 26, 2024		Soil	L24-Ap0011901	X	X
4	WM01 - 2.0	Feb 26, 2024		Soil	L24-Ap0011902	X	X
5	WM01 - 3.0	Feb 26, 2024		Soil	L24-Ap0011903	X	X
6	WM01 - 4.0	Feb 26, 2024		Soil	L24-Ap0011904	X	X
7	WM01 - 5.0	Feb 26, 2024		Soil	L24-Ap0011905	X	X
8	WM01 - 6.0	Feb 26, 2024		Soil	L24-Ap0011906	X	X
9	WM01 - 7.0	Feb 26, 2024		Soil	L24-Ap0011907	X	X
10	WM01 - 8.0	Feb 26, 2024		Soil	L24-Ap0011908	X	X
11	WM01 - 9.0	Feb 26, 2024		Soil	L24-Ap0011909	X	X
12	WM02 - 0.0	Feb 28, 2024		Soil	L24-Ap0011910	X	X
13	WM02 - 1.0	Feb 28, 2024		Soil	L24-Ap0011911	X	X
14	WM02 - 10.0	Feb 28, 2024		Soil	L24-Ap0011912	X	X



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084676
Phone: 0458 839 200
Fax:

Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
15	WM02 - 2.0	Feb 28, 2024		Soil	L24-Ap0011913	X	X
16	WM02 - 2.75	Feb 28, 2024		Soil	L24-Ap0011914	X	X
17	WM02 - 3.0	Feb 28, 2024		Soil	L24-Ap0011915	X	X
18	WM02 - 4.0	Feb 28, 2024		Soil	L24-Ap0011916	X	X
19	WM02 - 5.0	Feb 28, 2024		Soil	L24-Ap0011917	X	X
20	WM02 - 6.0	Feb 28, 2024		Soil	L24-Ap0011918	X	X
21	WM02 - 7.0	Feb 28, 2024		Soil	L24-Ap0011919	X	X
22	WM02 - 8.0	Feb 28, 2024		Soil	L24-Ap0011920	X	X
23	WM02 - 9.0	Feb 28, 2024		Soil	L24-Ap0011921	X	X
24	WM03 - 0.0	Feb 29, 2024		Soil	L24-Ap0011922	X	X
25	WM03 - 0.25	Feb 29, 2024		Soil	L24-Ap0011923	X	X
26	WM03 - 1.0	Feb 29, 2024		Soil	L24-Ap0011924	X	X
27	WM03 - 10.0	Feb 29, 2024		Soil	L24-Ap0011925	X	X
28	WM03 - 3.0	Feb 29, 2024		Soil	L24-Ap0011926	X	X
29	WM03 - 3.50	Feb 29, 2024		Soil	L24-Ap0011927	X	X
30	WM03 - 5.0	Feb 29, 2024		Soil	L24-Ap0011928	X	X



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name:	Stantec Australia Pty Ltd (WA)	Order No.:		Received:	Apr 3, 2024 5:46 PM
Address:	6F 226, Adelaide Terrace Perth WA 6000	Report #:	1084676	Due:	Apr 11, 2024
Project Name:	BEENYUP WIND FARM	Phone:	0458 839 200	Priority:	5 Day
		Fax:		Contact Name:	Edvinder Singh
Eurofins Analytical Services Manager : Elden Garrett					

Sample Detail					SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794					X	X
31	WM03 - 6.0	Feb 29, 2024		Soil	L24-Ap0011929	X X
32	WM03 - 7.0	Feb 29, 2024		Soil	L24-Ap0011930	X X
33	WM03 - 8.0	Feb 29, 2024		Soil	L24-Ap0011931	X X
34	WM03 - 9.0	Feb 29, 2024		Soil	L24-Ap0011932	X X
35	WM03 - 4.0	Feb 29, 2024		Soil	L24-Ap0011933	X X
Test Counts					35	35

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
- Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
- Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

- Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
LCS - % Recovery								
Actual Acidity (NLM-3.2)								
pH-KCL (NLM-3.1)	%	99			80-120	Pass		
Titrateable Actual Acidity (NLM-3.2)	%	95			80-120	Pass		
LCS - % Recovery								
Extractable Sulfur								
HCl Extractable Sulfur	%	108			80-120	Pass		
LCS - % Recovery								
Actual Acidity (NLM-3.2)								
pH-KCL (NLM-3.1)	%	99			80-120	Pass		
Titrateable Actual Acidity (NLM-3.2)	%	95			80-120	Pass		
LCS - % Recovery								
Extractable Sulfur								
HCl Extractable Sulfur	%	108			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011903	CP	pH Units	5.0	5.1	2.1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011903	CP	mol H+/t	8.5	7.0	19	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011903	CP	% pyrite S	0.014	0.011	19	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011903	CP	pH Units	4.3	4.3	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011903	CP	% pyrite S	0.03	0.03	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011903	CP	mol H+/t	19	19	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011903	CP	% S	0.006	0.005	14	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011903	CP	% S	0.014	0.013	7.7	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011903	CP	% S	0.008	0.008	3.6	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011903	CP	mol H+/t	5.0	4.9	3.6	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Peroxide	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	20%	Pass
Calcium - Acid Reacted	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011903	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011903	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011903	CP	% Mg	0.018	0.018	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011903	CP	% Mg	0.018	0.018	2.8	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011903	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011903	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011903	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011903	CP	factor	1.5	1.5	<1	30%	Pass

Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011913	CP	pH Units	6.1	6.1	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011913	CP	mol H+/t	5.8	5.8	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011913	CP	% pyrite S	0.009	0.009	<1	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011913	CP	pH Units	6.3	6.3	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011913	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011913	CP	mol H+/t	7.0	6.8	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011913	CP	% S	0.024	0.025	2.0	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011913	CP	% S	0.037	0.036	2.8	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011913	CP	% S	0.012	0.011	13	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011913	CP	mol H+/t	7.7	6.8	13	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011913	CP	% Ca	0.007	0.007	3.7	30%	Pass
Calcium - Peroxide	L24-Ap0011913	CP	% Ca	0.008	0.008	2.0	20%	Pass
Calcium - Acid Reacted	L24-Ap0011913	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011913	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011913	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011913	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011913	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011913	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011924	CP	pH Units	5.7	5.7	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011924	CP	mol H+/t	16	15	10	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011924	CP	% pyrite S	0.026	0.024	10	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011924	CP	pH Units	4.8	4.8	1.2	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011924	CP	% pyrite S	0.06	0.05	4.2	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011924	CP	mol H+/t	35	33	4.2	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011924	CP	% S	0.071	0.070	<1	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011924	CP	% S	0.083	0.082	1.8	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011924	CP	% S	0.012	0.012	6.8	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011924	CP	mol H+/t	7.7	7.2	6.8	30%	Pass

Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011924	CP	% Ca	0.012	0.012	1.8	30%	Pass
Calcium - Peroxide	L24-Ap0011924	CP	% Ca	0.014	0.013	5.9	20%	Pass
Calcium - Acid Reacted	L24-Ap0011924	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011924	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011924	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011924	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011924	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011924	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011933	CP	pH Units	4.7	4.7	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011933	CP	mol H+/t	26	25	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011933	CP	% pyrite S	0.041	0.041	<1	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011933	CP	pH Units	2.6	2.6	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011933	CP	% pyrite S	0.45	0.45	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011933	CP	mol H+/t	280	280	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011933	CP	% S	0.017	0.017	1.4	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011933	CP	% S	0.37	0.38	2.5	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011933	CP	% S	0.35	0.36	2.7	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011933	CP	mol H+/t	220	230	2.7	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011933	CP	% Ca	0.006	0.006	<1	30%	Pass
Calcium - Peroxide	L24-Ap0011933	CP	% Ca	0.008	0.009	17	20%	Pass
Calcium - Acid Reacted	L24-Ap0011933	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011933	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011933	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011933	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011933	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011933	CP	factor	1.5	1.5	<1	30%	Pass

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5

Authorised by:

Elden Garrett	Analytical Services Manager
Jonathon Angell	Senior Analyst-SPOCAS



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Edvinder Singh

Report 1084649-S
Project name BEENYUP WIND FARM
Received Date Apr 03, 2024

Client Sample ID			TP01 - 0.0	TP01 - 1.0	TP01 - 2.0	TP02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011751	L24- Ap0011752	L24- Ap0011753	L24- Ap0011754
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.6	5.1	4.7	5.0
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	47	8.9	38	21
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.075	0.014	0.060	0.034
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	4.6	< 1	4.5	2.7
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	61	< 10	61	36
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.098	< 0.02	0.097	0.058
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	2.9	3.5	2.6	2.7
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.13	< 0.02	0.10	0.03
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	84	4.8	63	16
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	37	< 2	25	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.06	< 0.02	0.04	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.008	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.031	< 0.005	0.037	0.024
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.024	< 0.005	0.037	0.024
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	15	< 2	23	15
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.021	< 0.005	0.008	0.041
Calcium - Peroxide	0.005	% Ca	0.027	< 0.005	0.011	0.050
Calcium - Acid Reacted	0.005	% Ca	0.006	< 0.005	< 0.005	0.009
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	0.007
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	2.8	< 0.005	< 0.005	4.4

Client Sample ID			TP01 - 0.0	TP01 - 1.0	TP01 - 2.0	TP02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011751	L24- Ap0011752	L24- Ap0011753	L24- Ap0011754
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.010	< 0.005	0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.011	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	61	< 10	61	36
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.10	< 0.02	0.10	0.06
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	4.6	< 1	4.5	2.7
Extraneous Material						
<2mm Fraction	0.005	g	91	200	160	170
>2mm Fraction	0.005	g	9.6	0.66	2.2	0.44
Analysed Material	0.1	%	91	100	99	100
Extraneous Material	0.1	%	9.5	0.3	1.3	0.3

Client Sample ID			TP02 - 0.75	TP02 - 1.0	TP03 - 0.0	TP03 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011755	L24- Ap0011756	L24- Ap0011757	L24- Ap0011758
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.1	4.8	6.9	5.6
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	22	48	< 2	3.2
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.034	0.076	< 0.003	0.005
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	2.0	4.2	< 1	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	27	56	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.043	0.089	< 0.02	< 0.02
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	3.7	4.2	6.5	4.6
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	0.14	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	20	85	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	38	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	0.06	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.009	0.013	0.024	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.009	0.013	0.018	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	5.5	8.0	12	< 2

Client Sample ID			TP02 - 0.75	TP02 - 1.0	TP03 - 0.0	TP03 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011755	L24- Ap0011756	L24- Ap0011757	L24- Ap0011758
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.005	< 0.005	0.13	0.017
Calcium - Peroxide	0.005	% Ca	0.007	0.006	0.13	0.020
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.006	0.006	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	3.1	2.9	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.009	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	27	56	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	0.09	< 0.02	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	2.0	4.2	< 1	< 1
Extraneous Material						
<2mm Fraction	0.005	g	150	240	150	150
>2mm Fraction	0.005	g	< 0.005	0.47	86	< 0.005
Analysed Material	0.1	%	100	100	64	100
Extraneous Material	0.1	%	< 0.1	0.2	36	< 0.1

Client Sample ID			TP04 - 0.0	TP05 - 0.0	TP06 - 0.0	TP06 - 0.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011759	L24- Ap0011760	L24- Ap0011761	L24- Ap0011762
Date Sampled			Mar 12, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.2	5.3	4.8	5.6
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	18	14	36	3.6
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.028	0.022	0.058	0.006
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	2.7	3.6	5.0	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	37	48	67	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.059	0.076	0.11	< 0.02

Client Sample ID			TP04 - 0.0	TP05 - 0.0	TP06 - 0.0	TP06 - 0.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011759	L24- Ap0011760	L24- Ap0011761	L24- Ap0011762
Date Sampled			Mar 12, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	5.7	6.2	2.5	3.9
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.030	0.054	0.050	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.030	0.054	0.050	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	19	34	31	< 2
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.082	0.10	0.099	0.012
Calcium - Peroxide	0.005	% Ca	0.063	0.046	0.11	0.014
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.007	0.007	0.012	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.007	0.013	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	37	48	67	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.06	0.08	0.11	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	2.7	3.6	5.0	< 1
Extraneous Material						
<2mm Fraction	0.005	g	88	140	98	130
>2mm Fraction	0.005	g	37	3.5	1.1	0.53
Analysed Material	0.1	%	70	98	99	100
Extraneous Material	0.1	%	30	2.4	1.1	0.4

Client Sample ID			TP07 - 0.0	TP07 - 1.0	TP08 - 0.0	TP08 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011763	L24- Ap0011764	L24- Ap0011765	L24- Ap0011766
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	6.3	6.0	5.4	5.5
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	2.4	< 2	7.9	5.7
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.004	< 0.003	0.013	0.009
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	3.2	< 1	1.7	1.1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	43	< 10	22	14
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.069	< 0.02	0.035	0.023
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	3.0	4.4	2.9	3.6
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.065	< 0.005	0.023	0.014
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.065	< 0.005	0.023	0.014
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	41	< 2	14	8.6
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.22	0.009	0.030	0.011
Calcium - Peroxide	0.005	% Ca	0.25	0.011	0.034	0.013
Calcium - Acid Reacted	0.005	% Ca	0.034	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	0.027	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	17	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.010	< 0.005	0.006	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.010	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	43	< 10	22	14
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.07	< 0.02	0.04	0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	3.2	< 1	1.7	1.1

Client Sample ID			TP07 - 0.0	TP07 - 1.0	TP08 - 0.0	TP08 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011763	L24- Ap0011764	L24- Ap0011765	L24- Ap0011766
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	130	170	140	180
>2mm Fraction	0.005	g	0.62	0.35	0.10	0.42
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	0.5	0.2	< 0.1	0.2

Client Sample ID			TP08 - 2.0	TP09 - 0.0	TP11 - 0.0	TP11 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011767	L24- Ap0011768	L24- Ap0011769	L24- Ap0011770
Date Sampled			Mar 12, 2024	Mar 12, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.5	5.4	5.9	6.3
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	9.5	20	4.3	< 2
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.015	0.032	0.007	< 0.003
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	3.5	4.3	2.3	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	46	57	31	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.074	0.091	0.049	< 0.02
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	3.8	2.9	3.0	4.8
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.05	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	30	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	20	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.03	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.066	0.059	0.042	0.006
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.059	0.059	0.042	0.006
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	37	37	26	3.7
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.030	0.16	0.087	0.023
Calcium - Peroxide	0.005	% Ca	0.033	0.16	0.096	0.025
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.008	0.009	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.006	0.007	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	4.0	4.6	< 0.005

Client Sample ID			TP08 - 2.0	TP09 - 0.0	TP11 - 0.0	TP11 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011767	L24- Ap0011768	L24- Ap0011769	L24- Ap0011770
Date Sampled			Mar 12, 2024	Mar 12, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.007	0.008	0.007	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.008	0.007	0.008	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	46	57	31	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.07	0.09	0.05	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	3.5	4.3	2.3	< 1
Extraneous Material						
<2mm Fraction	0.005	g	190	82	130	140
>2mm Fraction	0.005	g	0.62	< 0.005	0.40	2.3
Analysed Material	0.1	%	100	100	100	98
Extraneous Material	0.1	%	0.3	< 0.1	0.3	1.6

Client Sample ID			TP11 - 2.0	TP12 - 0.0	TP13 - 0.0	TP13 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011771	L24- Ap0011772	L24- Ap0011773	L24- Ap0011774
Date Sampled			Mar 14, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	6.0	6.7	5.4
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	31	4.6	< 2	4.0
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.049	0.007	< 0.003	0.006
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	12	1.8	1.2	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	160	24	17	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.26	0.039	0.027	< 0.02
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	3.3	6.2	3.2	3.3
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.41	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	260	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	230	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.36	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.006	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.22	0.032	0.080	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.21	0.032	0.080	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	130	20	50	< 2

Client Sample ID			TP11 - 2.0	TP12 - 0.0	TP13 - 0.0	TP13 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011771	L24- Ap0011772	L24- Ap0011773	L24- Ap0011774
Date Sampled			Mar 14, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.014	0.11	0.35	0.007
Calcium - Peroxide	0.005	% Ca	0.016	0.060	0.43	0.008
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.072	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.058	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	36	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.031	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.037	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.008	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.7	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	160	24	17	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.26	0.04	0.03	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	12	1.8	1.2	< 1
Extraneous Material						
<2mm Fraction	0.005	g	240	100	100	150
>2mm Fraction	0.005	g	4.4	< 0.005	1.5	0.70
Analysed Material	0.1	%	98	100	99	100
Extraneous Material	0.1	%	1.8	< 0.1	1.4	0.5

Client Sample ID			TP13 - 2.0	TP14 - 0.0	TP14 - 0.25	TP15 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011775	L24- Ap0011776	L24- Ap0011777	L24- Ap0011778
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.3	5.2	5.4	5.3
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	110	14	5.5	14
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.17	0.023	0.009	0.022
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	13	3.4	< 1	3.0
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	180	45	13	40
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.29	0.072	0.021	0.065

Client Sample ID			TP13 - 2.0	TP14 - 0.0	TP14 - 0.25	TP15 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011775	L24- Ap0011776	L24- Ap0011777	L24- Ap0011778
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.2	2.7	3.1	2.9
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.49	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	310	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	200	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.32	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	0.012
Peroxide Extractable Sulfur	0.005	% S	0.11	0.049	0.012	0.055
HCl Extractable Sulfur	0.005	% S	< 0.005	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.11	0.049	0.012	0.043
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	69	30	7.5	27
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	0.006	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	< 0.005	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	2.8	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.021	0.053	0.016	0.065
Calcium - Peroxide	0.005	% Ca	0.031	0.066	0.019	0.072
Calcium - Acid Reacted	0.005	% Ca	0.010	0.013	< 0.005	0.006
Calcium - Acid Reacted (s-aCa)	0.005	% S	0.008	0.011	< 0.005	0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	4.9	6.6	< 0.005	3.1
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.009	0.006	< 0.005	0.005
Magnesium - Peroxide	0.005	% Mg	0.010	0.007	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	180	45	13	40
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.29	0.07	0.02	0.07
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	13	3.4	< 1	3.0
Extraneous Material						
<2mm Fraction	0.005	g	160	160	160	150
>2mm Fraction	0.005	g	0.58	2.1	4.3	1.9
Analysed Material	0.1	%	100	99	97	99
Extraneous Material	0.1	%	0.4	1.3	2.6	1.3

Client Sample ID			TP15 - 0.75	TP15 - 1.0	TP17 - 0.0	TP17 - 0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011779	L24- Ap0011780	L24- Ap0011781	L24- Ap0011782
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.8	6.1	5.4	5.3
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	3.6	3.2	11	5.6
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.006	0.005	0.018	0.009
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO ₃ /t	< 1	< 1	2.5	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	< 10	< 10	33	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	< 0.02	< 0.02	0.053	< 0.02
Potential Acidity - Titrateable Peroxide						
pH-OX	0.1	pH Units	4.1	4.3	3.0	3.5
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	3.5	3.6	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.009	0.018	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.013	0.025	0.034	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	< 0.005	0.007	0.034	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	< 2	4.4	21	< 2
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.006	0.007	0.036	< 0.005
Calcium - Peroxide	0.005	% Ca	0.007	0.008	0.038	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	< 10	< 10	33	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	< 0.02	< 0.02	0.05	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	< 1	< 1	2.5	< 1

Client Sample ID			TP15 - 0.75	TP15 - 1.0	TP17 - 0.0	TP17 - 0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011779	L24- Ap0011780	L24- Ap0011781	L24- Ap0011782
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	140	150	150	160
>2mm Fraction	0.005	g	9.6	210	1.2	2.0
Analysed Material	0.1	%	94	41	99	99
Extraneous Material	0.1	%	6.3	59	0.8	1.2

Client Sample ID			TP18 - 0.0	TP19 - 0.0	TP19 - 0.50
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011783	L24- Ap0011784	L24- Ap0011785
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit			
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)	0.1	pH Units	5.4	7.1	5.9
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	11	< 2	2.4
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.018	< 0.003	0.004
SPOCAS Suite - WA (Excluding ANC)					
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	1.8	< 1	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	24	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.039	< 0.02	< 0.02
Potential Acidity - Titrateable Peroxide					
pH-OX	0.1	pH Units	3.9	3.2	3.1
Titrateable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02
Titrateable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2
Titrateable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2
Titrateable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02
Extractable Sulfur					
Sulfur - KCl Extractable	0.005	% S	0.018	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.039	0.042	0.007
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A
Potential Acidity (SPOS)					
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.021	0.042	0.007
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	13	26	4.2
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.005	% S	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0
Extractable Calcium					
Calcium - KCl Extractable	0.005	% Ca	0.026	0.26	0.031
Calcium - Peroxide	0.005	% Ca	0.030	0.30	0.034
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.046	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.037	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	23	< 0.005

Client Sample ID			TP18 - 0.0	TP19 - 0.0	TP19 - 0.50
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24- Ap0011783	L24- Ap0011784	L24- Ap0011785
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit			
Extractable Magnesium					
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.010	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.011	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)					
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO ₃	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)					
ANC Fineness Factor		factor	1.5	1.5	1.5
Net Acidity (Including ANC)					
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	24	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	< 0.02	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO ₃ /t	1.8	< 1	< 1
Extraneous Material					
<2mm Fraction	0.005	g	140	110	140
>2mm Fraction	0.005	g	8.5	0.84	0.66
Analysed Material	0.1	%	94	99	100
Extraneous Material	0.1	%	5.8	0.7	0.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
SPOCAS Suite - WA (Excluding ANC)			
SPOCAS Suite - WA (Excluding ANC) - Method: LTM-GEN-7050	Brisbane	Apr 11, 2024	6 Week
Extraneous Material - Method: LTM-GEN-7050/7070	Brisbane	Apr 11, 2024	6 Week



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name:	Stantec Australia Pty Ltd (WA)	Order No.:		Received:	Apr 3, 2024 5:46 PM
Address:	6F 226, Adelaide Terrace Perth WA 6000	Report #:	1084649	Due:	Apr 11, 2024
Project Name:	BEENYUP WIND FARM	Phone:	0458 839 200	Priority:	5 Day
		Fax:		Contact Name:	Edvinder Singh
Eurofins Analytical Services Manager : Elden Garrett					

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set

Brisbane Laboratory - NATA # 1261 Site # 20794 X X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	TP01 - 0.0	Mar 14, 2024		Soil	L24-Ap0011751	X	X
2	TP01 - 1.0	Mar 14, 2024		Soil	L24-Ap0011752	X	X
3	TP01 - 2.0	Mar 14, 2024		Soil	L24-Ap0011753	X	X
4	TP02 - 0.0	Mar 14, 2024		Soil	L24-Ap0011754	X	X
5	TP02 - 0.75	Mar 14, 2024		Soil	L24-Ap0011755	X	X
6	TP02 - 1.0	Mar 14, 2024		Soil	L24-Ap0011756	X	X
7	TP03 - 0.0	Mar 12, 2024		Soil	L24-Ap0011757	X	X
8	TP03 - 1.0	Mar 12, 2024		Soil	L24-Ap0011758	X	X
9	TP04 - 0.0	Mar 12, 2024		Soil	L24-Ap0011759	X	X
10	TP05 - 0.0	Mar 13, 2024		Soil	L24-Ap0011760	X	X
11	TP06 - 0.0	Mar 13, 2024		Soil	L24-Ap0011761	X	X
12	TP06 - 0.50	Mar 13, 2024		Soil	L24-Ap0011762	X	X
13	TP07 - 0.0	Mar 14, 2024		Soil	L24-Ap0011763	X	X
14	TP07 - 1.0	Mar 14, 2024		Soil	L24-Ap0011764	X	X

Perth
 46-48 Banksia Road
 Welshpool
 WA 6106
 +61 8 6253 4444
 NATA# 2377
 Site# 2370

Melbourne
 6 Monterey Road
 Dandenong South
 VIC 3175
 +61 3 8564 5000
 NATA# 1261
 Site# 1254

Geelong
 19/8 Lewalan Street
 Grovedale
 VIC 3216
 +61 3 8564 5000
 NATA# 1261
 Site# 25403

Sydney
 179 Magowar Road
 Girraween
 NSW 2145
 +61 2 9900 8400
 NATA# 1261
 Site# 18217

Canberra
 Unit 1,2 Dacre Street
 Mitchell
 ACT 2911
 +61 2 6113 8091
 NATA# 1261
 Site# 25466

Brisbane
 1/21 Smallwood Place
 Murarrie
 QLD 4172
 T: +61 7 3902 4600
 NATA# 1261
 Site# 20794

Newcastle
 1/2 Frost Drive
 Mayfield West
 NSW 2304
 +61 2 4968 8448
 NATA# 1261
 Site# 25079 & 25289

Auckland
 35 O'Rorke Road
 Penrose,
 Auckland 1061
 +64 9 526 4551
 IANZ# 1327

Auckland (Asb)
 Unit C1/4 Pacific Rise,
 Mount Wellington,
 Auckland 1061
 +64 9 525 0568
 IANZ# 1308

Christchurch
 43 Detroit Drive
 Rolleston,
 Christchurch 7675
 +64 3 343 5201
 IANZ# 1290

Tauranga
 1277 Cameron Road,
 Gate Pa,
 Tauranga 3112
 +64 9 525 0568
 IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
 Perth
 WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084649
Phone: 0458 839 200
Fax:
Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
15	TP08 - 0.0	Mar 12, 2024		Soil	L24-Ap0011765	X	X
16	TP08 - 1.0	Mar 12, 2024		Soil	L24-Ap0011766	X	X
17	TP08 - 2.0	Mar 12, 2024		Soil	L24-Ap0011767	X	X
18	TP09 - 0.0	Mar 12, 2024		Soil	L24-Ap0011768	X	X
19	TP11 - 0.0	Mar 14, 2024		Soil	L24-Ap0011769	X	X
20	TP11 - 1.0	Mar 14, 2024		Soil	L24-Ap0011770	X	X
21	TP11 - 2.0	Mar 14, 2024		Soil	L24-Ap0011771	X	X
22	TP12 - 0.0	Mar 13, 2024		Soil	L24-Ap0011772	X	X
23	TP13 - 0.0	Mar 13, 2024		Soil	L24-Ap0011773	X	X
24	TP13 - 1.0	Mar 13, 2024		Soil	L24-Ap0011774	X	X
25	TP13 - 2.0	Mar 13, 2024		Soil	L24-Ap0011775	X	X
26	TP14 - 0.0	Mar 13, 2024		Soil	L24-Ap0011776	X	X
27	TP14 - 0.25	Mar 13, 2024		Soil	L24-Ap0011777	X	X
28	TP15 - 0.0	Mar 13, 2024		Soil	L24-Ap0011778	X	X
29	TP15 - 0.75	Mar 13, 2024		Soil	L24-Ap0011779	X	X
30	TP15 - 1.0	Mar 13, 2024		Soil	L24-Ap0011780	X	X



ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
+61 3 8564 5000
NATA# 1261
Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Asb)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084649
Phone: 0458 839 200
Fax:

Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail					SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794					X	X
31	TP17 - 0.0	Mar 13, 2024		Soil	L24-Ap0011781	X X
32	TP17 - 0.25	Mar 13, 2024		Soil	L24-Ap0011782	X X
33	TP18 - 0.0	Mar 14, 2024		Soil	L24-Ap0011783	X X
34	TP19 - 0.0	Mar 14, 2024		Soil	L24-Ap0011784	X X
35	TP19 - 0.50	Mar 14, 2024		Soil	L24-Ap0011785	X X
Test Counts					35	35

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
- Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
- Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

- Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
LCS - % Recovery								
Actual Acidity (NLM-3.2)								
pH-KCL (NLM-3.1)	%	101			80-120	Pass		
Titrateable Actual Acidity (NLM-3.2)	%	93			80-120	Pass		
LCS - % Recovery								
Actual Acidity (NLM-3.2)								
pH-KCL (NLM-3.1)	%	103			80-120	Pass		
Titrateable Actual Acidity (NLM-3.2)	%	94			80-120	Pass		
LCS - % Recovery								
Extractable Sulfur								
HCl Extractable Sulfur	%	105			80-120	Pass		
LCS - % Recovery								
Actual Acidity (NLM-3.2)								
pH-KCL (NLM-3.1)	%	103			80-120	Pass		
Titrateable Actual Acidity (NLM-3.2)	%	102			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011751	CP	pH Units	4.6	4.7	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011751	CP	mol H+/t	47	48	4.1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011751	CP	% pyrite S	0.075	0.078	4.1	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011751	CP	pH Units	2.9	2.9	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011751	CP	% pyrite S	0.13	0.14	2.4	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011751	CP	mol H+/t	84	86	2.4	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011751	CP	% S	0.008	0.007	7.2	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011751	CP	% S	0.031	0.031	2.6	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011751	CP	% S	0.024	0.024	1.3	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011751	CP	mol H+/t	15	15	1.3	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011751	CP	% Ca	0.021	0.021	<1	30%	Pass
Calcium - Peroxide	L24-Ap0011751	CP	% Ca	0.027	0.026	1.3	20%	Pass
Calcium - Acid Reacted	L24-Ap0011751	CP	% Ca	0.006	0.005	4.0	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011751	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011751	CP	mol H+/t	2.8	2.6	4.0	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011751	CP	% Mg	0.010	0.010	2.3	30%	Pass
Magnesium - Peroxide	L24-Ap0011751	CP	% Mg	0.011	0.011	1.8	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011751	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011751	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011751	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011751	CP	factor	1.5	1.5	<1	30%	Pass

Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011761	CP	pH Units	4.8	4.8	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011761	CP	mol H+/t	36	36	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011761	CP	% pyrite S	0.058	0.058	<1	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011761	CP	pH Units	2.5	2.5	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011761	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011761	CP	mol H+/t	< 2	< 2	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011761	CP	% S	0.050	0.050	1.4	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011761	CP	% S	0.050	0.050	1.4	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011761	CP	mol H+/t	31	31	1.4	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011761	CP	% Ca	0.099	0.10	<1	30%	Pass
Calcium - Peroxide	L24-Ap0011761	CP	% Ca	0.11	0.12	4.4	20%	Pass
Calcium - Acid Reacted	L24-Ap0011761	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011761	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011761	CP	% Mg	0.012	0.012	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011761	CP	% Mg	0.013	0.014	3.2	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011761	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011761	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011761	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011765	CP	pH Units	5.4	5.3	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011765	CP	mol H+/t	7.9	8.4	6.8	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011765	CP	% pyrite S	0.013	0.013	6.8	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011765	CP	pH Units	2.9	2.9	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011765	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011765	CP	mol H+/t	< 2	< 2	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011765	CP	% S	0.023	0.023	2.4	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011765	CP	% S	0.023	0.023	2.4	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011765	CP	mol H+/t	14	14	2.4	30%	Pass

Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011765	CP	% Ca	0.030	0.029	3.9	30%	Pass
Calcium - Peroxide	L24-Ap0011765	CP	% Ca	0.034	0.033	1.3	20%	Pass
Calcium - Acid Reacted	L24-Ap0011765	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011765	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011765	CP	% Mg	0.006	0.006	5.8	30%	Pass
Magnesium - Peroxide	L24-Ap0011765	CP	% Mg	0.007	0.006	4.1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011765	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011765	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011765	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011770	CP	pH Units	6.3	6.3	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011770	CP	mol H+/t	< 2	< 2	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011770	CP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011770	CP	pH Units	4.8	4.7	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011770	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011770	CP	mol H+/t	< 2	< 2	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011770	CP	% S	0.006	0.005	16	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011770	CP	% S	0.006	0.005	16	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011770	CP	mol H+/t	3.7	3.1	16	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011770	CP	% Ca	0.023	0.023	2.8	30%	Pass
Calcium - Peroxide	L24-Ap0011770	CP	% Ca	0.025	0.025	2.5	20%	Pass
Calcium - Acid Reacted	L24-Ap0011770	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011770	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011770	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011770	CP	factor	1.5	1.5	<1	30%	Pass

Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	L24-Ap0011779	CP	pH Units	5.8	5.8	<1	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011779	CP	mol H+/t	3.6	3.7	2.3	20%	Pass
Titrateable Actual Acidity (NLM-3.2)	L24-Ap0011779	CP	% pyrite S	0.006	0.006	2.3	30%	Pass
Duplicate								
Potential Acidity - Titrateable Peroxide				Result 1	Result 2	RPD		
pH-OX	L24-Ap0011779	CP	pH Units	4.1	4.2	<1	20%	Pass
Titrateable Peroxide Acidity (s-TPA)	L24-Ap0011779	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass
Titrateable Peroxide Acidity (a-TPA)	L24-Ap0011779	CP	mol H+/t	3.5	3.2	<1	20%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	L24-Ap0011779	CP	% S	0.009	0.008	5.1	30%	Pass
Peroxide Extractable Sulfur	L24-Ap0011779	CP	% S	0.013	0.014	6.2	20%	Pass
Duplicate								
Potential Acidity (SPOS)				Result 1	Result 2	RPD		
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011779	CP	mol H+/t	< 2	< 2	<1	30%	Pass
Duplicate								
Extractable Calcium				Result 1	Result 2	RPD		
Calcium - KCl Extractable	L24-Ap0011779	CP	% Ca	0.006	0.006	<1	30%	Pass
Calcium - Peroxide	L24-Ap0011779	CP	% Ca	0.007	0.007	2.1	20%	Pass
Calcium - Acid Reacted	L24-Ap0011779	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (s-aCa)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Calcium - Acid Reacted (a-aCa)	L24-Ap0011779	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Extractable Magnesium				Result 1	Result 2	RPD		
Magnesium - KCl Extractable	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Peroxide	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass
Magnesium - Acid Reacted	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011779	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
ANC Fineness Factor	L24-Ap0011779	CP	factor	1.5	1.5	<1	30%	Pass

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5

Authorised by:

Elden Garrett	Analytical Services Manager
Jonathon Angell	Senior Analyst-SPOCAS



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

