Stockton Quarry - Dry Sand Extraction Project

SSD - 52984213

WATER MANAGEMENT PLAN

April 2026

Source: ***Stockton Quarry Dry Sand Extraction Project (Boral, 2024)***

Document Name	Stockton Quarry - Dry Sand Extraction Project SSD - 52984213 WATER MANAGEMENT PLAN

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1.0	8 April 2025	Chris Jones (IEMA) Kristen McMahon (IEMA) April Shearer (IEMA)	Rod Johnson (Boral)	Initial Document
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1 INTRODUCTION

1.1 BACKGROUND

Boral Resources (NSW) Pty Ltd owns and operates Stockton Sand Quarry, located on Coxs Lane, Fullerton Cove, a long-standing operation that extracts and transports sand for use in the building, landscaping and construction markets. The site has an area of approximately 246 hectares (ha) and has been used for the purposes of extractive industries (sand quarrying) since the 1970s. At present, there is an existing quarry located on the windblown (transgressive) sand dunes of Stockton Bight, which transports up to 500,000 tonnes per annum (tpa) of product (the existing windblown project).

SSD-52984213 was approved by the Department of Planning, Housing and Infrastructure (DPHI) on 8 August 2024, relevant to this management plan is in the central portion of the quarry and covers an area of approximately 38 ha. The project site contains the proposed clearance area, which comprises all areas to be disturbed by vegetation clearing and sand extraction operations as well as new entry/exit roads, a two-way haul road, a laydown area, and a pad for a wash plant and water recycling and filter press. The regional site context is shown in **Figure 1**.

The site is accessed via Coxs Lane over an adjacent Crown Reserve (Lot 7300 DP1130730) under licence agreement with the DPHI Crown Lands. Land use surrounding the site is a mix of rural, residential, public recreation and environmental conservation areas. The local site context and site context are shown in **Figure 2** & **Figure 3.**

1.2 PROJECT OVERVIEW

The project involves the extraction of sand above the water table from approximately 26.5 m Australian Height Datum (AHD) (in Stage 1) maintaining a minimum 0.7 m buffer above the water table, using dozer, excavator, haul trucks and front-end loader.

The sand would be extracted from five stages, starting in Stage 1. Due to the quality of sand anticipated to be found in Stage 1, this material would be dry screened before being dispatched. Sand extracted from Stages 2-5 (inclusive) would be processed through a wash plant and water recycling and filter press due to the higher volume of organics likely to be found. There are an estimated 3.1 million tonnes (Mt) of dry sand resource above the water table, within the project site.

Consistent with the originally proposed and exhibited dredge application, the project seeks a site-wide extraction and dispatch limit (i.e. the existing windblown project and the project combined) of no more than 750,000 tpa. Key infrastructure approved via the consent for the site is outlined in

Table 1 and **Table 2** below.

Under this version of the WMP, no extraction will occur below 5 m AHD. This is a conservative operational control that sits above the consented extraction limit of 3.7 m AHD under Condition A8 "*Extractive materials must not be extracted below 3.7 m AHD*". Thereafter, extraction limits will be managed in accordance with the updated Maximum Extraction Depth Management Plan (MEDMP) and Water Management Plan (WMP) as revised groundwater data is reviewed by a hydrogeologist, in line with Condition B26 of SSD-52984213.

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Table 1: Hours of Operation

Activity	Hours of permissible Operation (*Condition A12 of SSD-52984213*)
Construction Work	7 am to 6 pm Monday to Friday 8 am to 1 pm Saturday At no time on Sundays or public holidays
Quarrying operations including loading and dispatch of laden trucks	6:15 am to 6 pm Monday to Friday 6:15 am to 3 pm Saturday At no time on Sundays or public holidays
Maintenance, security, office work, cleaning, etc	May be conducted at any time, provided that these activities are not audible at any residence on privately-owned land

Table 2: Project Summary (EIS, 2023)

Project Element	Project Description
Location	Inland Dunes
Staff	Up to six full time and up to two casual
Total resource	3.1 million tonnes
Consent period	10 years from commencement (or until the current dredge application is approved and commenced)
Production and transport limits	Up to 750,000 tpa (inclusive of the windblown sand operations) until either the current dredge application is approved and commenced or the windblown sand development consent lapses in 2028, after which production/transportation would reduce to up to 500,000 tpa
Extraction method and stages	Stages 1-5 dry extraction using front end loaders
Processing	Stage 1 - as needed dry screen prior to dispatch (dependent on quality) Stages 2-5 - dry extraction (sand of lower quality would be processed through a wash plant and water recycling and filter press prior to being stockpiled)
Vegetation clearing, offsets and rehabilitation	Clearing of 38.14 ha of vegetation with staged offsets to reflect extraction Stages Preliminary clearing/offset stage to allow for a site wide drilling program to commence prior to extraction Standalone rehabilitation strategy comprising progressive stabilisation and rehabilitation of disturbed areas with species endemic to coastal woodland
Site infrastructure and plant	Retain all existing improvements and augment/upgrade to include: • new prefabricated office building • relocation of onsite materials storage (currently in the footprint of proposed Stage 1) • replacement of roofing for the workshop • new 40,000 litre capacity water storage tank for firefighting purposes • new laydown area • new wash plant and water recycling and filter press

1.3 PURPOSE AND SCOPE

This Plan provides a complete framework for groundwater and surface water protection, monitoring and adaptive management for the project in accordance with Development Consent SSD-52984213. The WMP has been developed to provide an overview of water management activities undertaken at the project site. It has been prepared in accordance with Condition B35 of SSD-52984213 and the Environmental Impact Statement (EIS, 2023) which guides the management of water for the project for the duration of construction, operational and closure phases. The WMP, read in conjunction with the MEDMP, provides a management framework under the Environmental Management Strategy (Condition C4 of the consent).

1.3.1 Water Management Objectives

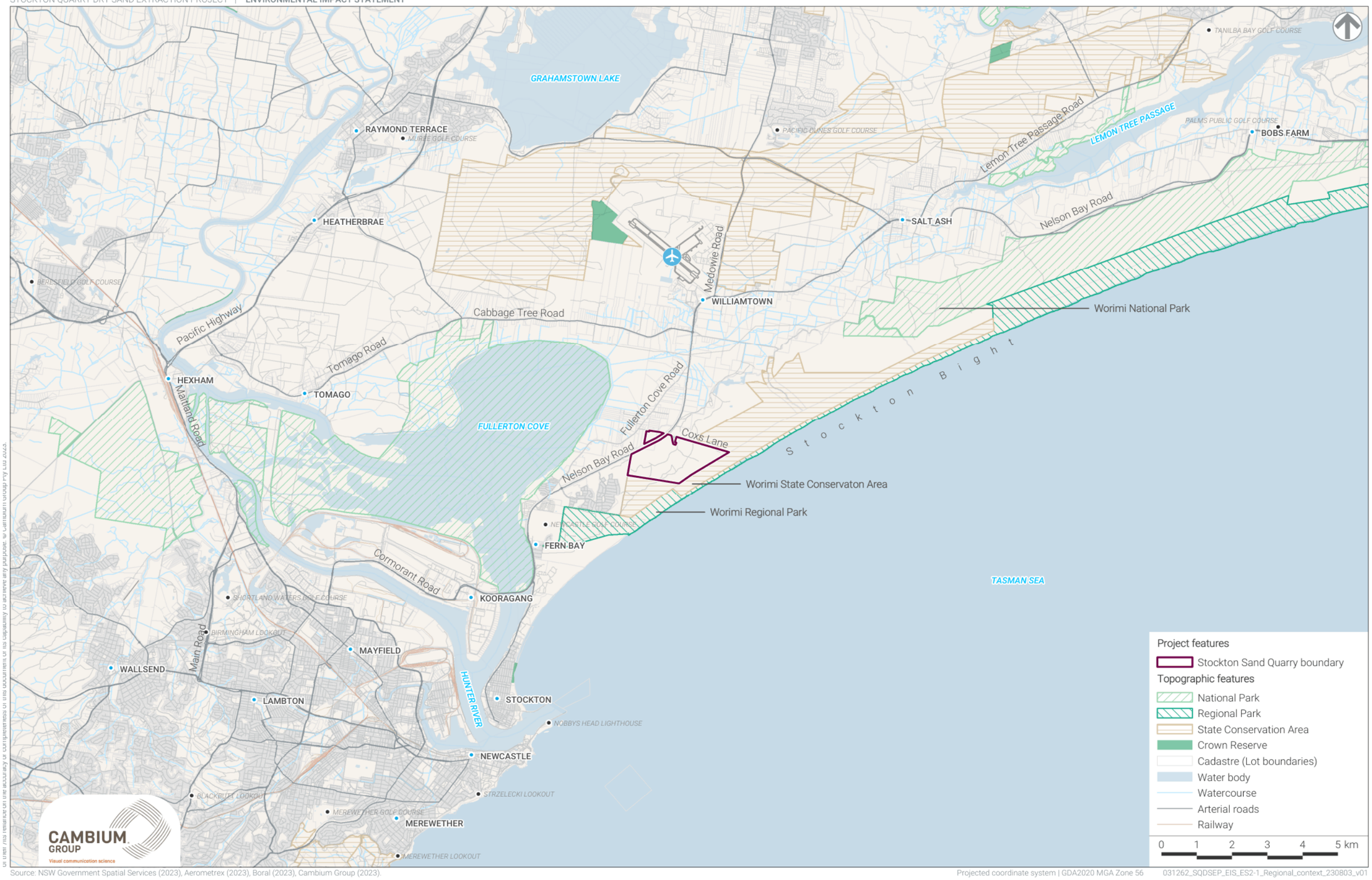
The objective of the water management system is to manage soil and water resources in general accordance with Condition B34 and B35 of SSD-52984213, in a manner that meets the licence and approval conditions and generally minimises the impacts to the water resources of neighbouring properties and the surrounding environment.

1.3.2 Preparation of Water Management Plan by Specialist

Condition B35(b) of SSD 52984213 requires that the WMP is to be prepared by a suitably qualified and experienced person/s. This plan has been prepared by Boral Resources in consultation with:

- *Chris Jones, Principal – Environmental Consultant, Preparation of the Water Management Plan (IEMA), approved by the DPHI.*
- *Kristen McMahon – Environmental Consultant, Preparation of the Water Management Plan (IEMA)*
- *Katarina David – Review of the WMP, Hydrogeologist.*

WMP submission is required to the DPHI for approval within six months of the Development Consent approval in accordance with Condition B35(a). Boral will implement this plan prior to quarrying.



Source: NSW Government Spatial Services (2023), Aerometrex (2023), Boral (2023), Cambium Group (2023).

Projected coordinate system | GDA2020 MGA Zone 56 031262_SQDSEP_EIS_ES2-1_Regional_context_230803_v01

Figure 1: Regional Context (EIS, 2023)

Figure 2
Local context

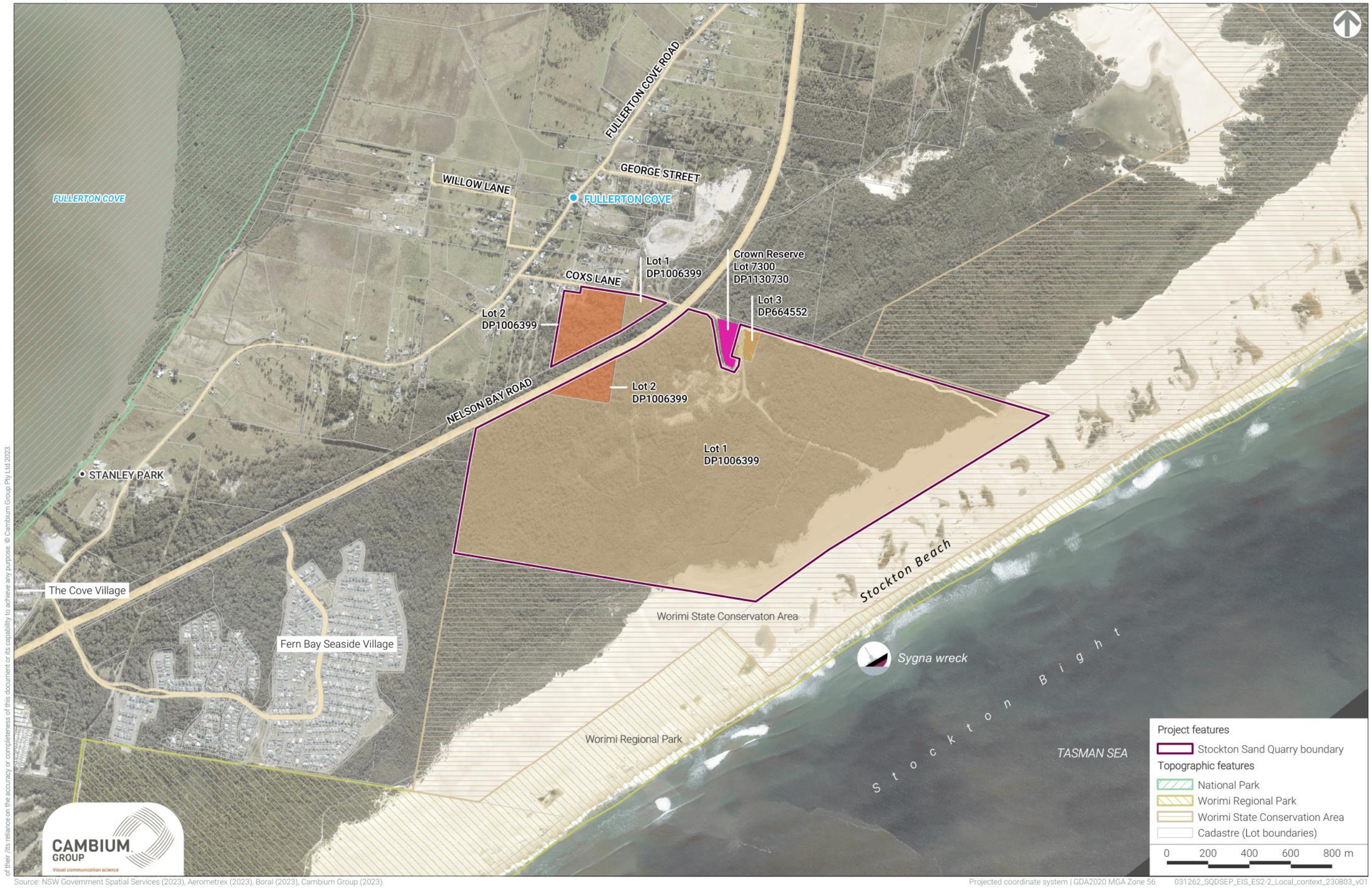
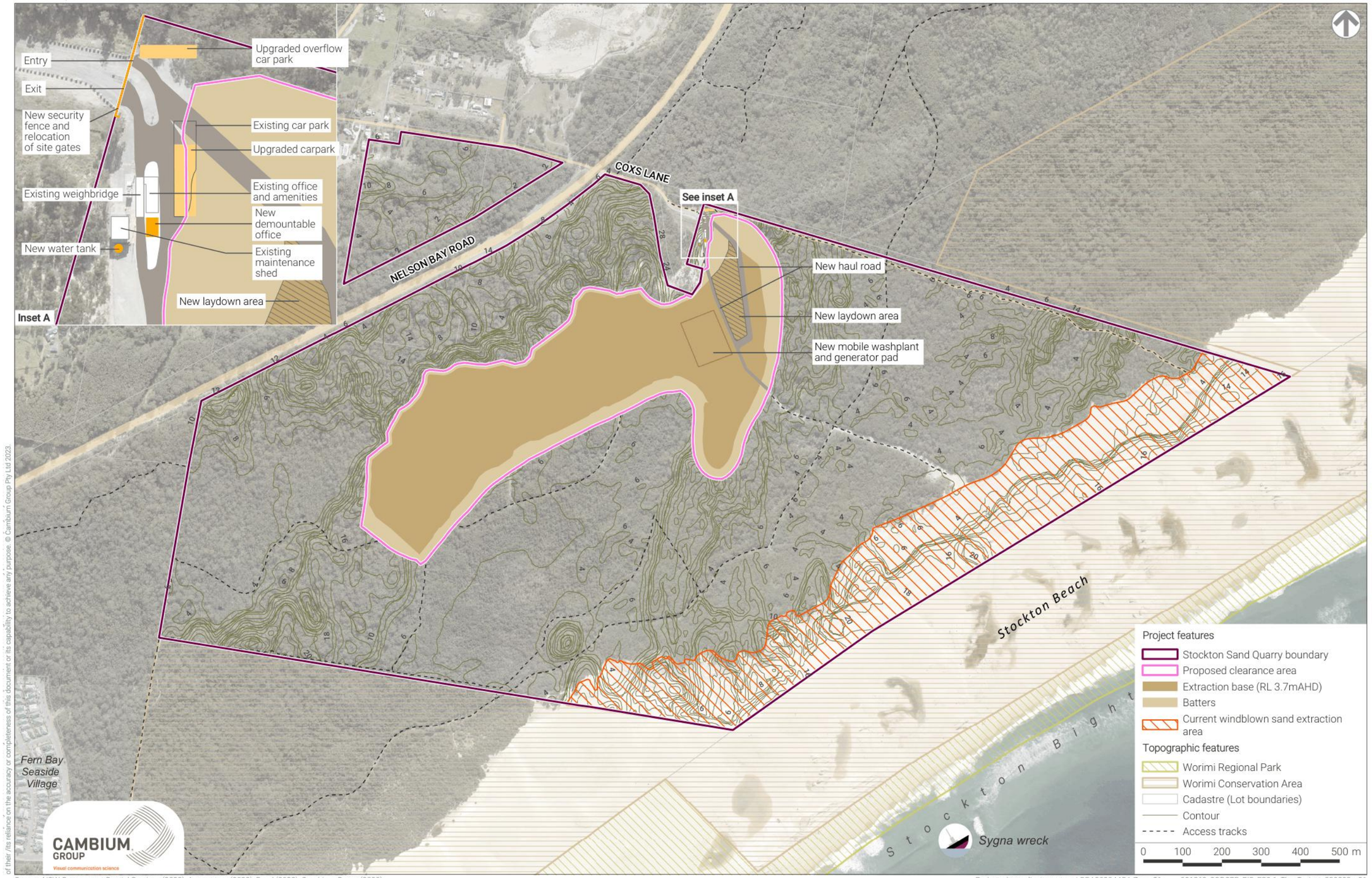


Figure 2: Local Context (EIS,2023)



Source: NSW Government Spatial Services (2023), Aerometrex (2023), Boral (2023), Cambium Group (2023).

Projected coordinate system | GDA2020 MGA Zone 56 031262_SQDSEP_EIS_ES3-1_The_Project_230803_v01

Figure 3: The Project Area (EIS, 2023)

1.4 BORAL COMMITMENT TO WATER MANAGEMENT

The Quarry operates under a Boral integrated Health, Safety, Environment and Quality Management System (HSEQMS). The HSEQMS has commitments that support the Boral Environmental Policy through established standards and procedures. Requiring internal compliance, high levels of environmental performance and continual improvement objectives.

The HSEQMS Water Standard (GRP-HSEQ-8-02) requires each Boral quarry to ensure that activities that may impact on water resources are considered, with measures established around water usage and discharges are mitigated by internal and external requirements. The minimum mandatory requirements under this system are:

- All sites comply with applicable licences, permits, guidelines and standards for water quality.
- All sites identify clean and dirty water flows and shall segregate clean water flows from dirty water flows.
- Recycling and reusing wastewater will be carried out wherever possible to reduce the consumption of potable water.
- All sites shall minimise any offsite discharge, any discharge will be controlled and monitored.

1.5 CONSULTATION

In accordance with the requirement of SSD-52984213 Condition B35 (b) (ii), consultation is required to be undertaken with the DCCEEW Water Group and Hunter Water in the preparation of the WMP. Approval by the DPHI is required prior to commencing quarrying operations.

As per SSD-52984213 Condition A17 consultation must be undertaken with the relevant parties in submitting the document to the Planning Secretary for approval. Documentary evidence and a tabulated summary of the consultation must be submitted with the subject document via the Major Projects Website, including:

(a) dates of the consultation with the identified party, copies of the identified party's response, and a summary of the issues raised;

(b) the outcome of that consultation, including how the issues have been addressed in the subject document; and

(c) details of any disagreement remaining between the party consulted and the Applicant, and how the Applicant has addressed the matters not resolved.

Correspondence associated with this WMP is summarised in **Table 3** and provided in **Appendix A** Additionally, as per Condition B36, quarrying operations within the approved disturbance area must not commence until the WMP is approved by the Planning Secretary.

Table 3: Consultation Summary Table

Date	Agency	Consultation to Authorities	Summary of Feedback (See Appendix A)
8 April 2025	Department of Planning, Housing and Infrastructure (DPHI)	DPHI have been provided with a copy of this management plan to review. The requirement for consultation in Condition B35 (b) (ii), consultation is required to be undertaken with the DCCEEW Water Group and Hunter Water.	Revised comments from DCCEEW and Hunter Water Corporation.
8 April 2025	Department of Climate Change, Energy, the Environment and Water (DCCEEW Water Group)	A copy of the management plan was sent to DECCW Water Group for comment. The document will be updated following comments prior to submission to the DPHI.	DPHI referred to the WMP to DCCEEW and recommendations which included further information and revision for: • Groundwater baseline data • Groundwater modelling • Maximum extraction depth • Trigger action response plan Additional water licensing recommendation
8 April 2025	Hunter Water Corporation (HWC)	A copy of the management plan was sent to Hunter Water Corporation for comment. The document will be updated following comments prior to submission to the DPHI.	Actions and responses in the TARP to be amended.
21 August 2025	DPHI & DCCEEW	A revised copy of the WMP was submitted for comment.	RFI with recommendations sent by DCCEEW to DPHI and Boral regarding the maximum extraction depth, water table data and water supply and licensing.
October 2025	DPHI	A copy of this WMP has been submitted to the DPHI for review after submission in October 2025.	Performance measures require more clarity. Lower level triggers for Worimi conservation lands.
December 2025	DPHI	A copy of this WMP has been submitted to the DPHI for review after submission in December 2025 and received RFI January 2026.	RFI recommendations have been implemented in review with DPHI and Boral regarding general comments, acid sulfate soil clarification, and TARP revision.
January 2026	DPHI	Under Version 6 (March 2026), a copy of this WMP has been submitted to the DPHI for review after submission.	RFI received from DPHI to further sulfate condition requirements / groundwater TARP review and measures for the North Stockton catchment Area.
April 2026	DPHI	RFI issued by DPHI relating to cross-referencing, trigger action response framework, and Hunter Water reporting requirements.	RFI addressed in Version 7 of the WMP, including correction of cross-references, refinement of the Trigger Action Response Plans, clarification of groundwater exceedance and contaminated groundwater management protocols and clarifying direct reporting to Hunter Water.

1.6 PROPOSED ACTIVITIES UNDER THIS VERSION OF THE WMP

In accordance with SSD-52984213 Condition A18 (a) and (c), B33 and B35 (d) (iii) Boral proposes a risk-based staged approach in the initial establishment phase of construction and early operations to manage the groundwater level and acid sulfate soil risk outlined in **Table 4**.

Table 4: Proposed Stage Approach - Controls and Activities Under this WMP

Stage	Activities and Controls
Works to be completed under this management plan (Stage 1 and Backfilling)	
Stage 1 Conservative Extraction control	• No extraction will occur below 5 m AHD during the initial phase. • No excavation will occur below the groundwater table. • A groundwater buffer consistent with 99th percentile plus 0.7m will be maintained at all times.
	The 5 m AHD limit is a temporary control until completion of: • Additional borehole installation within the disturbance footprint, • Review of ASS baseline investigation results, • Review of groundwater monitoring data.
Backfilling to 3.7 m AHD	• Ensures compliance with the consented extraction base prior to extraction works. • Does not alter the approved extraction depth.
Groundwater Pumping Operational Supply	• Groundwater pumping will be limited to a maximum of 16 ML/year in the Stage 1 of the project until the ASS sampling and drilling program completed (**Section 1.6.3**). • Use is restricted to dust suppression, firefighting storage and rehabilitation only. • No groundwater dewatering for extraction below the water table will occur under this version of the WMP. • Groundwater may be extracted from licensed supply bores in accordance with approved volumes and monitoring requirements. • Abstraction will not exceed volumes assessed in the Groundwater Impact Assessment for the relevant stage, appropriate approvals and volumes remain within those outlined in the approved WMP.
Future revision and approval of this management plan is required prior to commencing Stage 2 works	
Stage 2 Low-Lying Area Preparation (not under this current management plan)	Prior to extraction within Stage 2 low-lying areas: • Areas below the approved extraction base will be backfilled to a minimum of 3.7 m AHD across the disturbance footprint as previously agreed to with the DPHI. • Final levels will be verified via drone survey and/or registered surveyor. • Extraction compliance levels will be pegged where required • Based on the data obtained by the drilling and monitoring program, the RL will be reviewed in consultation with DPHI. Noting condition A8 of the SSD has a limit of 3.7 m AHD.

1.6.1 Groundwater Protection Controls

- No groundwater dewatering in Stage 1 works that will facilitate extraction below the water table will occur under this version of the plan.

- Operational groundwater extraction occurs from licensed supply bores for dust suppression, firefighting and rehabilitation only, and will be limited to a maximum of 16 ML per annum under WSW and WAL approvals in Stage 1 works. Operational abstraction will not be used to dewater groundwater levels to facilitate deeper extraction.

- Groundwater levels will be monitored in accordance with the WMP. If monitoring identifies groundwater levels approaching the 99th percentile, extraction depths and abstraction rates will be reviewed as per **Section 7.2.1**.

- Water demand increasing beyond Stage 1 (e.g., due to wash plant operation), will require a review of this WMP.

1.6.2 Proposed Drill Hole and Monitoring Bore Network

The proposed drilling program network will comprise of approximately 63 proposed drilling holes across the disturbance area of the site for an acid sulphate soils assessment, of which a suitable monitoring suite will then be reviewed for groundwater level, quality and ASS monitoring after obtaining results. This monitoring suite will be based on hydrogeologist review.

Additional sampling will then be the basis of the updated groundwater 99th percentiles and quality for the installed bores. The results will be incorporated within the update of the ASSMP, WMP and MEDMP, it is predicted that the program will take approximately 3 months to install and 6 to 9 months to obtain results. The management plans will be updated as a result of the bore installation, monitoring and ASS testing.

The TARP will be updated to reflect this risk-based approach in the next review of this management plan, inclusive of data from the newly established borehole monitoring data, acid sulfate results, levels and quality from the bores that are being installed. The WMP must be read in conjunction with the MEDMP, which sets extraction depth protocols. Together, the plans ensure compliance with SSD-52984213 conditions.

1.6.3 Groundwater Extraction Stage 1

Based on hydrogeologists advice, the proposed operational groundwater extraction limit of 16 ML/year during Stage 1 represents a substantial reduction from the extraction volume assessed in the EIS groundwater modelling (130 ML/year). As such, any groundwater drawdown associated with this reduced level of extraction would be reduced relative to the assessed scenario. Groundwater extraction during Stage 1 will be limited to operational uses only (dust suppression, firefighting and rehabilitation) with a low limit of 16 ML/year.

The hydrogeologist advised that, in Stage 1, sand extraction will remain above the water table therefore it will not cause groundwater dewatering. As the sand extraction activities will remain above the groundwater table, no dewatering will occur. Accordingly, and this operational extraction scenario does not introduce a pathway for Acid Sulfate Soil (ASS) exposure.

2 LEGISLATIVE AND OTHER REQUIREMENTS

2.1 DEVELOPMENT CONSENT (SSD-52984213)

SSD-52984213 stipulates the water management requirements for the construction and operational activities of the site. **Table 5** below outlines the relevant conditions including the Statement of Commitments with the sections they are addressed. This WMP incorporates sub plans required by the consent, covering erosion and sediment control, acid sulfate soils and groundwater and should be read in conjunction with the Maximum Extraction Depth Plan.

Table 5: SSD-52984213 Consent Conditions Summary Relevant to WMP

Condition No.	Condition of Development Consent	Referenced in WMP
A1	**OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT** In addition to meeting the specific performance measures and criteria established under this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from preconstruction works or the construction and operation of the development, and any rehabilitation required under this consent.	This WMP
A7	A 0.7 metre buffer must be maintained above the 99th percentile groundwater level as calculated in the EIS and updated during the life of the development.	Section 1.6 Section 7
A8	Extractive materials must not be extracted below 3.7 m AHD.	Section 1.6 Section 7
B31	**WATER SUPPLY** Sufficient water must be available for all stages of the development, and if necessary, the scale of the development must be adjusted to match its available water supply.	Section 3.5 Section 5.4
B32	A report on water extracted from the site each year, including water take under each water licence must be included in the Annual Review.	Section 9.3
B33	Groundwater on the site must not be interfered with unless associated with the construction and use of groundwater monitoring bores or water supply wells	Section 1.6 Section 7
B34	**WATER MANAGEMENT PERFORMANCE MEASURES (PM)** The development must comply with the performance measures in Table 6 (of the SSD).	Section 4
B35	**WATER MANAGEMENT PLAN** A water management plan must be prepared for the development. The plan must: (a) be submitted to the Planning Secretary for approval within six months of commencing development under this consent;	Section 1.3.2
	(b) be prepared: (i) by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Section 1.3.2
	(ii) be prepared with consideration of the 2022 DPHI Guidelines for Groundwater Documentation for SSD/SSI Projects - Technical guideline;	Section 2.6.6
	(iii) be prepared in consultation with the DCCEEW Water Group and Hunter Water;	Section 1.5 Appendix A
	(c) describe the measures to be implemented to ensure that the development complies with the water management performance measures	Table 11 Section 6
	(d) include a: (i) site water balance that includes details of: • sources and security of water supply for the life of the development (including authorised entitlements and licences); • water storage capacity; • water use and management on the site; and • reporting procedures, including the annual preparation of a site water balance	Section 5
	(ii) erosion and sediment control plan;	Table 11

Condition No.	Condition of Development Consent	Referenced in WMP
	(iii) acid sulfate soils management plan that	Section 1.6
	• is consistent with the Commonwealth Department of Agriculture and Water Resources National acid sulfate soils guidance: Guidance for the dewatering of acid sulfate soils in shallow groundwater environments (Shand et al, 2018).	Section 2.6.7
	• includes: − detailed baseline data for ASS groundwater quality indicators from monitoring sites within 200 m of the approved disturbance area. − a monitoring program for ASS groundwater quality indicators in the groundwater table and produced water; and − trigger action response plan for ASS groundwater quality indicators, including a stop pumping action. − a protocol for the management of contaminated groundwater.	Section 3.4.3 Section 6.5 Section 7.1.4 Section 7.3.2
	• provides detailed mitigation measures for the management of exposed ASS.	Section 1.6 Section 6.5 Section 7.1.4
	(iv) groundwater management plan that includes: • detailed baseline data of groundwater levels, yield and quality for groundwater resources and groundwater dependent ecosystems potentially impacted by the development. • a detailed description of the groundwater management system. • groundwater performance criteria, including trigger levels for identifying and investigating potentially adverse groundwater impacts (or trends) associated with the development. • clear and transparent drawdown limits and trigger levels at the boundary of the site and the Worimi Conservation Lands, including a cease pumping trigger level. • a program to monitor and evaluate: − compliance with the performance measures listed in Table 6 and the performance criteria in the plan. − groundwater levels across the site and identify any unauthorised groundwater interference. − impacts on groundwater dependent ecosystems; and − impacts of the project on the North Stockton Catchment Area. • a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development. • a process to notify DCCEEW Water Group, Hunter Water, NPWS and WCL if groundwater triggers are exceeded. • a protocol for providing Hunter Water with groundwater monitoring data; and	Section 3.5 Section 4 Section 7 Section 7.3.1 Section 9.1.3
	(v) a protocol to report on the measures, monitoring results and performance criteria identified above, in the Annual Review referred to in condition C10.	Section 9.1
B36	Quarrying operations within the approved disturbance area must not commence until the water management plan is approved by the Planning Secretary.	Section 1.5
B37	The water management plan, as approved by the Planning Secretary, must be implemented prior to the commencement of quarrying operations within the approved disturbance area	Section 1.5
C4	**MANAGEMENT PLAN REQUIREMENTS** Management plans required under this consent must be prepared in accordance with relevant guidelines, and include: (a) a summary of relevant background or baseline data;	Section 3
	(b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2.1
	(ii) any relevant limits or performance measures and criteria; and	Section 4

Condition No.	Condition of Development Consent	Referenced in WMP
	(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 4
	(c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Section 4
	(d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 4
	(e) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to condition C4(c)	Section 6
	(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 7
	(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 12
	(h) a protocol for managing and reporting any: (i) incident, non-compliance or exceedance of the impact assessment criteria or performance criteria; (ii) complaint; or (iii) failure to comply with statutory requirements;	Section 8
	(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 8.4
	(j) a protocol for periodic review of the plan	Section 12

2.2 EPL REQUIREMENTS (EPL 10132)

The Protection of Environment Operations (POEO) Act 1997 is administered by the Environmental Protection Agency (EPA). The objectives of the POEO Act are to protect, restore and enhance the quality of the environment. The EPA has granted the Environment Protection Licence (EPL) 10132.

2.3 WATER ACCESS LICENCES

Boral has applied for a number of Water Access Licences (WAL's) with a range of allocations, the most recent of which is still to be registered, as outlined in **Table 6** below. The available nominated works have a permitted 16 ML/y extraction currently available. The Surface Water assessment completed by Southeast Engineering and Environmental (2023) stated the bore associated with this was not constructed at the time of assessment. WAL 20AL221416 has been lodged with the NSW Lands Registry Service on 10 November 2023 prior to the expiry date. It has been confirmed by DPHI Water that WAL45028 has been created, although not approved. Boral has been working with Water Regulation (Licensing and Approvals).

Currently, Boral are in the process of obtaining all required WALs and associated approvals, registering the supply bores and submitting applications for the Water Supply Works. Reduced (<16 ML/y) water take will occur in Stage 1, until the revision of this WMP and the appropriate approvals have been obtained. Progress updates detailing WAL's and WSW's will be detailed in the future revisions of this plan.

Table 6: WAL Register

Site Name	WAL No.	WAL Reference No.	Extraction / category	Nominated Works	NW Volume (ML)	Shared / volume (ML/yr)
Stockton Quarry	37223	20AL213136	Aquifer	No WSW nominated	n/a	0
Stockton Quarry	43827	20AL220991	Aquifer	20WA221084	16	100
Stockton Quarry	44499	20AL221243	Aquifer	No WSW nominated	n/a	320*
Stockton Quarry	45028[1]	20AL221416	Aquifer	No WSW nominated	n/a	104*
Total						**524***

[1]***Note:*** *that while the WAL for Reference 20AL221416 has been created, the WAL has not yet been received by Boral.*
**Subject to approval. Boral confirms that the administrative process to renew the previously lapsed Water Supply Work (WSW) approval is underway. The WSW is required to enable extraction under the relevant Water Access Licences held by Boral. Progress updates on the application and supporting documentation will be provided as required. These are administrative placeholders pending approval.*

2.4 HUNTER WATER ACT 1991

The Hunter Water Act 1991 established a State-owned corporation to supply water services in the Hunter region. Under the Hunter Water Act, the North Stockton Catchment Area was declared to be a special area by the Hunter Water (North Stockton Catchment Area) Order 1999 and subsequent Hunter Water (Special Areas) Regulation 2003. Activities within the special area are regulated under the Hunter Water Regulation 2015. The project area is located at the southern edge, just outside of the North Stockton Catchment Area.

While the project area is not in the special area, groundwater flow has the potential to interact with groundwater to the north under the North Stockton Catchment Area. No direct take of groundwater is proposed with the sand extraction. However, consideration of the management of site facilities to prevent potential impacts to water quality is required, discussed further in the Groundwater Assessment (Umwelt, 2023) completed as part of the EIS and management measures are discussed further in **Section 4** and **Section 6**.

2.5 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act (1999) is Commonwealth legislation relating to matters of national environmental significance (MNES). The EPBC Act covers animals, plants, habitats and places, and any potential negative impacts on them are carefully considered before changes in land use or new developments are approved. Direct impacts to flora and fauna species associated with ground disturbance and clearing within the project footprint are captured within the Biodiversity Assessment (Niche, 2023). Sand extraction does not involve intersection or take of groundwater, therefore indirect impact to flora and fauna habitat is unlikely.

2.6 GUIDELINES AND POLICIES

2.6.1 NSW Aquifer Interference Policy (AIP)

The Water Management (WM) Act 2000 regulates the use and interference with groundwater in NSW. Under the WM Act, Water Sharing Plans (WSP) have been established to manage water resources in NSW. The NSW Government's Aquifer Interference Policy (DPI, 2012) explains the requirements for obtaining licences for aquifer interference activities and defines the considerations for assessing whether the interference is considered a minimal impact. The policy outlines the framework for assessing the impacts and the key tests that the project should meet when the approval for aquifer interference is being assessed, including:

- Demonstrating the ability to obtain necessary licences.
- Demonstrating that the minimal impact considerations can be met.
- Proposing remedial actions should the impacts of the approval be greater than predicted.

As stated in Section 16.2.1 of the EIS, Boral (once approvals are in place) intends to take up to 129.25ML/y of water from the Stockton Groundwater Source (SGS), for use in dust suppression (39.25 ML/yr) and sand processing water use (90 ML/yr). Boral's current allocations of 524 ML/yr from the SGS are in excess of the maximum water demand required. Detailed in the EIS, the water extraction from the SGS necessitates an aquifer interference approval under Section 91 of the NSW Water Management Act 2000, the predicted impacts are less than the Level 1 minimal impact considerations as required by the AIP assessment framework.

Minimal impact consideration under the AIP for highly productive groundwater sources requires that no mining activity occurs 200 m laterally from the top of high bank or 100m vertically beneath (or the three dimensional extent of the alluvial water source, whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply". Neither of these instances will occur under the proposed sand extraction.

Further, in agreement with the AIP consideration has been given to relevant distance restriction requirements specified in the North Coastal Sands Groundwater source (Stockton groundwater source). There are no bores proposed near high priority groundwater dependent ecosystems, and bores will not be installed within 40 m from the top of high bank of a river or stream. There are no contamination sources on site, nor are the bores planned within acid sulfate soils, or groundwater dependent culturally significant sites. The Worimi Conservation Area in the vicinity of the site includes Worimi National Park, and approved production bores supporting the proposed extraction volumes (20 to 100 ML/year) will not be placed within 400 m of the National Park boundary.

2.6.2 NSW Water Extraction Monitoring Policy

The NSW Water Extraction Monitoring Policy outlines the procedures necessary to ensure that accurate measurement of water extractions is undertaken and that licence conditions and the objectives of WSP are being met. Monitoring is undertaken at the source level, as well as an individual licence level. At the individual level, monitoring is generally undertaken using a variety of flow metering approaches or through secondary measures such as electricity consumption or as a pumping diary. All monitoring will be undertaken in line with licence requirements as stipulated in the NSW Non-urban Water Metering Policy.

2.6.3 NSW State Rivers and Estuaries Policy

The NSW State Rivers and Estuaries Policy (NSW Water Resources Council, 1993) contains statewide objectives for the protection and enhancement of watercourses. The proposed surface water management should be consistent with the NSW State Rivers and Estuaries Policy objectives which are to:

- Manage the rivers and estuaries of NSW in ways which slow, halt or reverse the overall rate of degradation in their systems.
- Ensure the long-term sustainability of their essential biophysical functions.
- Maintain the beneficial use of these resources.

The site has no direct impact on nearby rivers or estuaries. There is a broader connection via the groundwater table to local estuaries. Impacts on the groundwater resource are managed through the Water Act and WM Act, and any approvals through these Acts would meet the objectives of the NSW State Rivers and Estuaries Policy, as stated in the Surface Water Assessment (Southeast Engineering and Environmental, 2023).

2.6.4 National Water Quality Management Strategy / ANZECC Guidelines.

The National Water Quality Management Strategy (NWQMS) provides guidance on water quality planning and management at a federal level. From that framework, the NSW government has set out policies and objectives for water quality management over the state. Water Quality Objectives (WQOs) have been established for catchments throughout NSW, using the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines to set trigger values for a range of parameters, based on the water use, for example, protecting aquatic ecosystems or providing drinking water. These trigger values may be refined based on local catchment conditions, monitoring and research. In this case, direct discharge to surface waters will not occur as part of the Project. Many of the WQOs for aquatic ecosystems set out for the Hunter River catchment for surface waters will also be relevant for the protection of groundwater quality.

2.6.5 Erosion and Sediment Control Guidelines

Given the site geology, surface water runoff from the in-situ landscape is negligible. Erosion risks are confined to construction with imported material such as the access road and hardstand areas. Movement of sediment in runoff that is not controlled through erosion and sediment management would be confined to adjacent sandy areas with high infiltration within the site. Erosion and sediment management and mitigation measures can be found in **Section 4**. Erosion and sediment controls will be designed in accordance with Landcom's Managing Urban Stormwater: Soils and Construction (2004), as per requirements of the EIS.

2.6.6 Groundwater Technical Guideline

This Water Management Plan has been prepared having regard to the NSW Department of Planning and Environment (2022) Technical Guideline for Groundwater Impact Assessment and Management for SSD/SSI Projects, including requirements for baseline data, conceptual hydrogeological modelling, monitoring, trigger action response mechanisms and adaptive management.

2.6.7 Commonwealth Department of Agriculture and Water Resources

In accordance with SSD-52984213 Condition B35 (d) (ii) the Commonwealth Department of Agriculture and Water Resources (2018) guidance on the dewatering of acid sulfate soils is recognised as national best practice and has informed the development of the ASS management approach for the project. The WMP objectives regarding acid sulfate soil management at the site is based on the precautionary principles including avoidance of groundwater drawdown where practicable, staged progression of excavation, establishment of representative baseline groundwater quality conditions, comprehensive monitoring of early warning indicators, and enforceable trigger-based responses. Management measures escalate from investigation and increased monitoring to restriction or cessation of extraction where required, with adaptive refinement of controls and treatment applied only if monitoring demonstrates it is necessary.

3 BASELINE ENVIRONMENT

3.1 CLIMATE

3.1.1 Rainfall

Rainfall and climate data is publicly available from the Scientific Information for Landowners (SILO) database. The SILO database provides the most complete long-term dataset and is therefore the most useful for assessing long term rainfall trends. SILO data has been obtained from the Williamtown RAAF site station (Latitude -32.7939, Longitude 151.8364) and used to calculate longer term data trends from 1957 to 2023, as summarised in **Table 7** below, it shows that monthly rainfall varies (on average) between 61 mm and 131 mm, with a yearly average of 1,130 mm (SILO, 2023).

Rainfall is higher in late summer and winter and lower in spring and early summer. The SILO database also shows that the total actual evapotranspiration (Morton) of 949 mm per year is exceeded by the yearly rainfall total. Evapotranspiration is lower in winter than summer and on average higher rainfall from March through to August.

Table 7: SILO Climate Data Summary (1957-2023) EIS, 2023

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Site Data Average	97	114	131	114	107	124	74	66	61	77	84	81	1130
SILO Average Rainfall	203	163	142	106	79	68	77	104	135	165	182	211	1637
SILO Average Evaporation	198	160	140	106	78	68	78	103	133	162	179	204	1610
SILO average actual EVT Morton	139	117	101	62	33	21	23	39	65	96	117	135	949

3.2 TOPOGRAPHY AND HYDROLOGY

3.2.1 Topography

The topography in the project site ranges from approximately 26.5 m AHD to approximately 5 m AHD, as detailed from the EIS.

3.2.2 Hydrology

As stated in the Groundwater Assessment completed by Umwelt for the EIS, there are no mapped watercourses within the project area or immediate surrounds. The South Pacific Ocean is present approximately 900 m east of the project area, and Fullerton Cove approximately 2 km to the west and the Hunter River approximately 4 km to the south-west and Tilligerry Creek approximately 3 km north to north-east. Following high intensity rainfall water can pond at the surface; however, there is no surface flow from site (Southeast Engineering and Environmental, 2023). This is due to the high infiltration rates of the sands

and influence of vegetation on evapotranspiration.

3.3 LAND USE

Land use surrounding the site is a mix of rural, residential, public recreation and environmental conservation areas. To the north-west of Nelson Bay Road is the rural residential area of Fullerton Cove, which comprises a mix of residential and commercial premises. These properties are separated from the quarry by Nelson Bay Road, with the closest approximately 480 m from the entrance to the quarry. A new residential development at Fern Bay (Fern Bay Seaside Village) is approximately 1.5 km to the west-south-west of the quarry.

Most of the environmental conservation areas near the site are Crown land and extend along the Stockton Bight beach and dune system, including the Worimi Conservation Area and beyond that the Worimi Regional and National Parks (collectively referred to as the Worimi areas). The beach and dune area are used for recreation including fishing, four-wheel driving, quad bike riding, hiking and horse riding. The main public access to Stockton Bight dunes and beach is via Lavis Lane, approximately 3 km to the north of the site.

3.4 GEOLOGY AND SOILS

3.4.1 Geology

The groundwater assessment for the EIS by Umwelt (2023) details the geology within the site is mainly composed of coastal dune deposits with mobile coastal dunes along the south-eastern edge. The difference between the two being that the mobile deposits are free of vegetation. The proposed excavation area is entirely within the area of vegetated, non-mobile deposits. The Holocene age Tilligerry Mud Member is present to the north-west of site, associated with shallow estuarine and swamp deposits. Underlying the dunes are the Tomago Sand Beds that form an ‘inner barrier’ dune system. The formations Tomago Sand Beds are not penetrated by any bores at site. The Tomago Sand Beds overlie the Pleistocene age Medowie Clay Member that comprises low permeability clays and silts.

3.4.2 Soils

The site contains three soil landscapes, described as Stockton Beach soil landscape, Boyces Track soil landscape and Hawks Nest soil landscape. Most of the project site is confined to the Boyces Track soil landscape unit, with the central southern portion of the project site encompassing the Hawks Nest soil landscape unit. Details of soils are included in the Boral Rehabilitation Management Plan (RMP).

3.4.3 Acid Sulfate Soils

An assessment by SAGE Environmental Solutions (2023) of ASS or potential acid sulfate soils (PASS) was conducted to outline part of the baseline data suite. The EIS assessment concluded that the design and implementation of dry sand extraction above the water table, with a minimum extraction level of 3.7 m AHD, represented a low ASS/PASS risk scenario. Results of the surrounding disturbance footprint bores outlined very low potential to impact to the environment with respect to ASS or PASS in the samples assessed. The assessment undertaken involved laboratory and field analysis of 632 soil samples collected from 11 boreholes extending well below the water table, across two investigation campaigns, with results indicating that soils were classified as ‘not acid sulfate soils’ or ‘no risk non-reactive’, and only 0.3% of samples recorded a pHFOX <2.5 and 5% recorded a pHFOX ≤3.0, confirming a low risk of actual or potential acid sulfate soils of the samples taken. Field pH values ranged from approximately 4.5 to 7, with no groundwater or soil samples exhibiting characteristics of actual acid sulfate soils.

As outlined in **Section 1.6** of this plan continued acid sulfate soil monitoring is being conducted detailing ASS risk indicators from sites within 200m of the approved disturbance area as per SSD-52984213 Condition B35 (d) (iii), with samples being collected from the drilling program and borehole installation program. The

results will be provided in the revision of this WMP, and a maximum of 16 ML/y in Stage 1 will occur until further revision of this plan. Acid sulfate soils including the management of contaminated groundwater and mitigation measures can be found in **Section 6.5** and **Section 7.3.2** of this WMP.

3.5 GROUNDWATER SOURCES AND YIELD

As per condition B35 (d) (iv) groundwater management plan requirements, the Stockton Sandbeds and transgressive dune sands are the main aquifer at the quarry and comprise part of the Stockton Groundwater Source for the North Coast Coastal Sands Groundwater Sources. Underlying and hydraulically connected with the Stockton Sandbeds are the Tomago Sandbeds of the Tomago Groundwater Source, **Table 8** outlines the Stockton groundwater source summary.

Majority of the bores installed within the Stockton Groundwater Source belong to Hunter Water Corporation. The review of bore logs and groundwater work summary report does not provide any information on the yield of these bores. Literature values for hydraulic properties of the Stockton Sands (Hydrosimulation, 2016) record hydraulic conductivity ranging from 10- 20 m/day, specific yield of 0.15 and porosity between 0.3 - 0.33. Based on this information, historical hydraulic testing information, given that the source is used for water supply and it is assumed that the groundwater yield exceeds 5 L/s.

Table 8: Stockton Groundwater Source Summary (EIS, 2023)

Groundwater Component	Annual Volume (ML/y)
Total recharge	21,000
Planned Environmental Water	7,000
Long Term Average Annual Extraction Limit (LTAAEL)	14,000
Basic Landholder Rights	254
Aquifer Access Licence	1,827.5 shares at 1ML/share

3.6 CONCEPTUAL ECOHYDROLOGICAL MODEL

Extraction will be undertaken at the surface above the groundwater table. Statistical analysis of groundwater level data from monitoring bores around the site has been undertaken (Umwelt, 2023) with a suggested extraction depth program for quarrying operations to remain 0.7m above the 99th percentile groundwater level (DPIE, 2021) to the shallow groundwater water table. The Conceptual Ecohydrological Models (CEM) developed for the site indicate that sand extraction is unlikely to directly impact groundwater. The models, developed from long-term monitoring of groundwater levels and chemistry as well as borehole logs, show that the site consists of a single hydrogeological stratigraphical unit (HSU) comprising porous, unconsolidated sand extending to a depth of at least 30 meters. This high-porosity sand allows groundwater to move through the pores between sand grains.

Groundwater flow at the site flows from the east-south-east towards the west-north-west, towards Fullerton Cove, which is consistent with natural flow patterns and does not indicate high salinity levels from coastal recharge. Recharge occurs primarily through direct rainfall infiltration, especially where vegetation is sparse.

Additionally, there are no surface water bodies within the extraction area, so there is no interaction between

groundwater and surface water. Monitoring data reveal that the groundwater is fresh with minimal seasonal or long-term variations in quality. Given that the sand extraction occurs above the water table and considering the high hydraulic conductivity of the site, it is concluded that the extraction process is unlikely to directly intercept or adversely impact groundwater. Schematic representations (cross sections) of the CEM are presented in **Figure 4**, **Figure 5** & **Figure 6**. The figures show the proposed extraction area, which is maintained above the water table, and further demonstrate that sand extraction is unlikely to directly intercept groundwater.

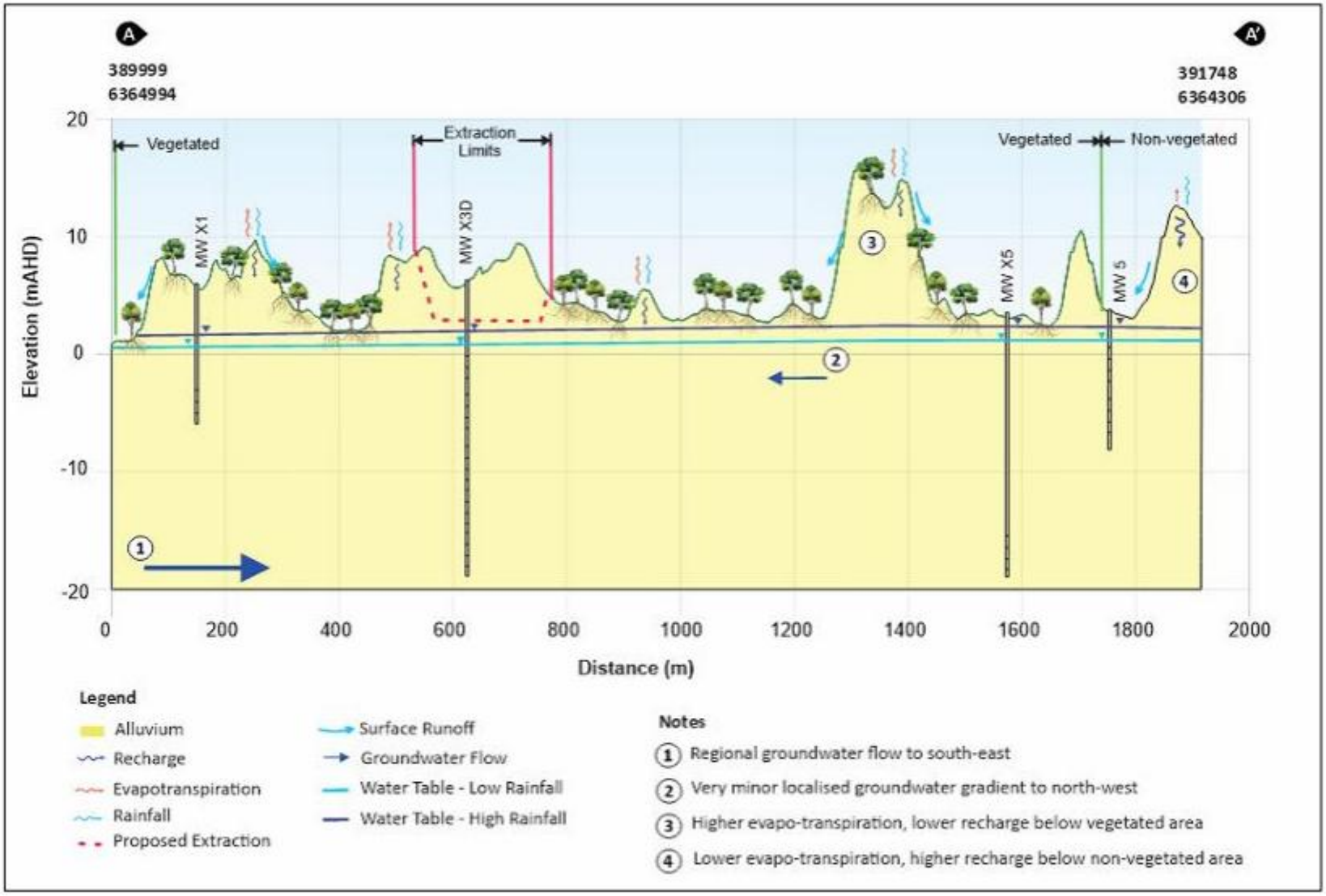


Figure 4: Conceptual Ecohydrological Model – Section A (Umwelt, 2023)

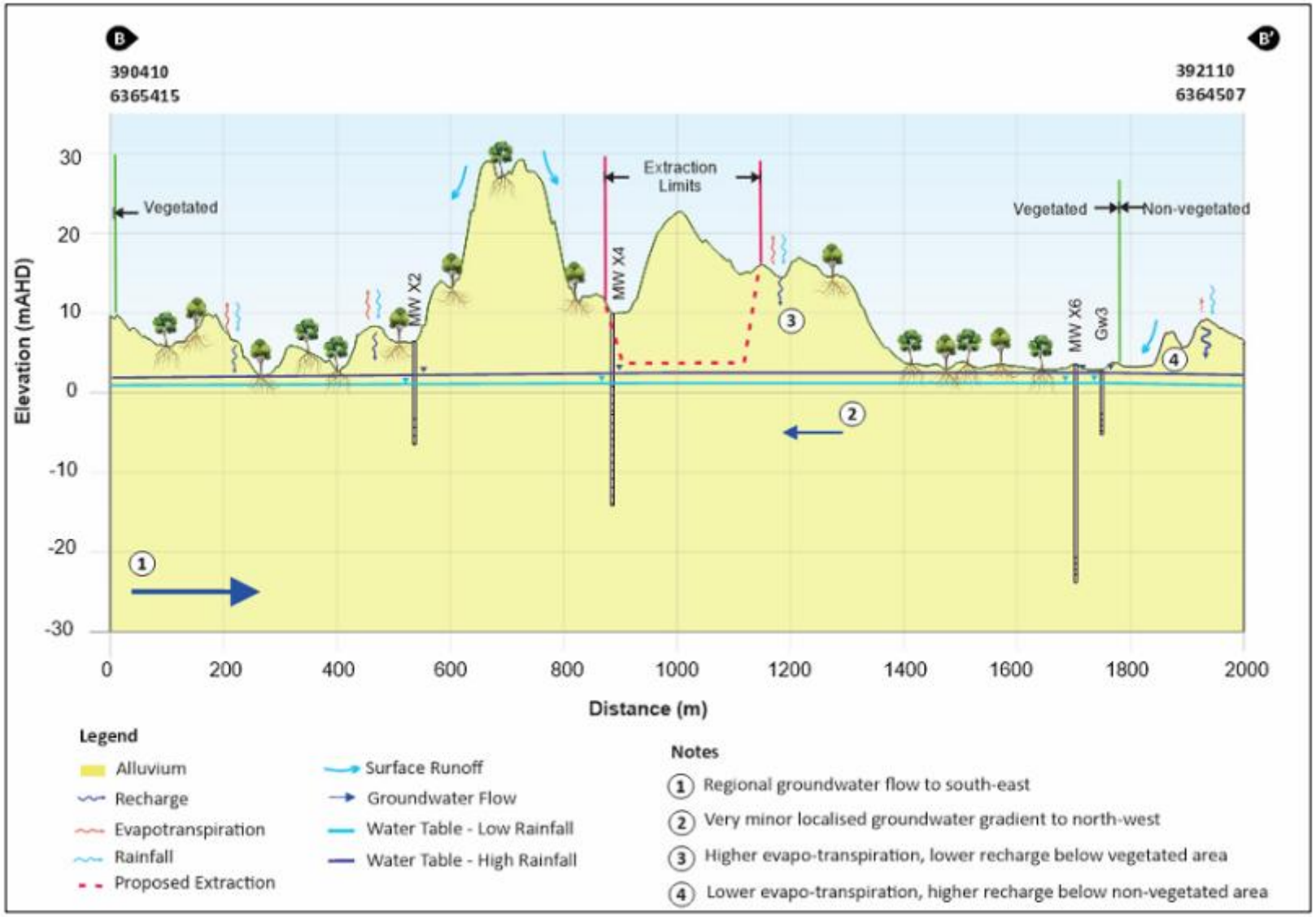


Figure 5: Conceptual Ecohydrological Model – Section B (Umwelt, 2023)

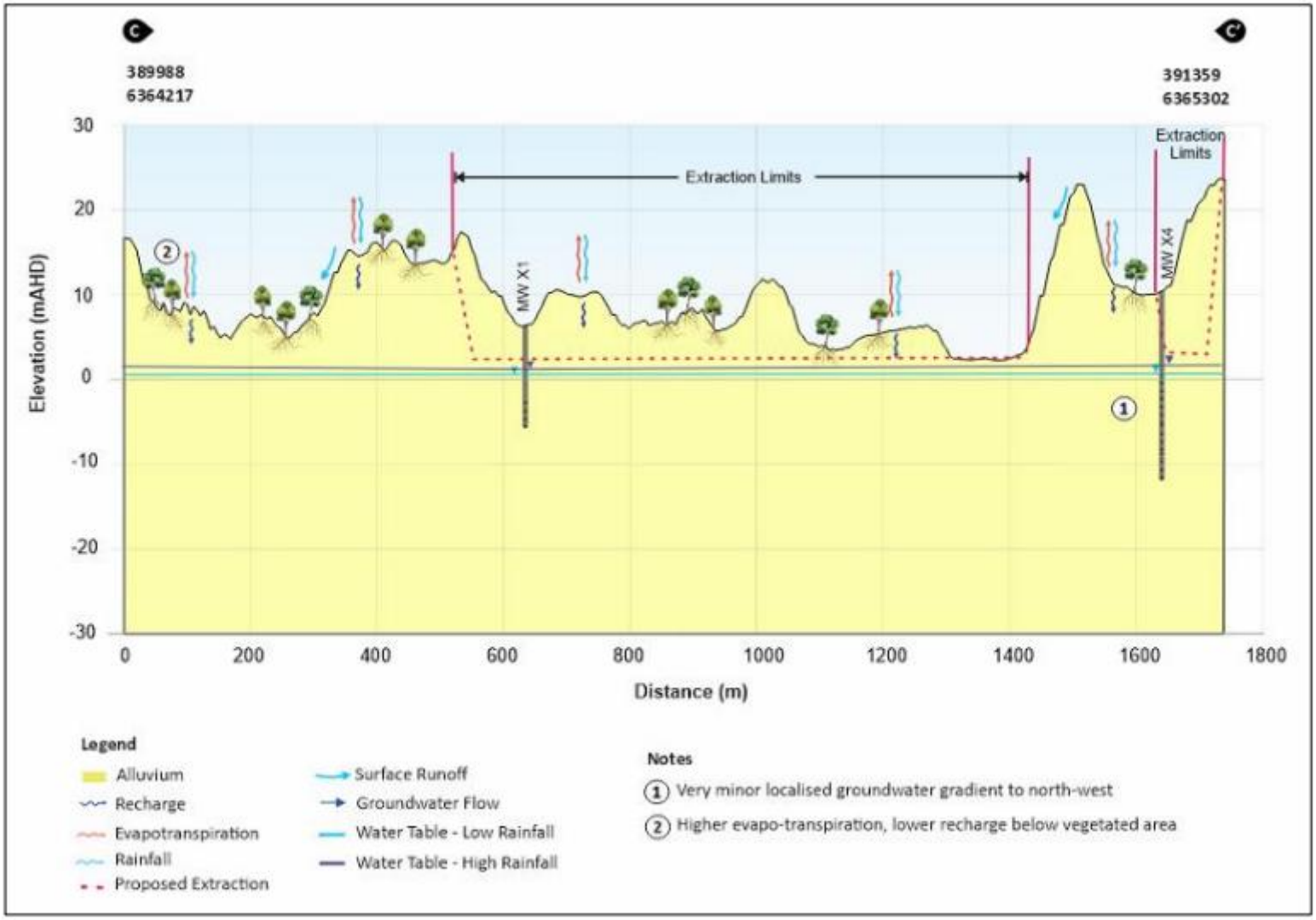


Figure 6: Conceptual Ecohydrological Model – Section C (Umwelt, 2023)

3.7 GROUNDWATER LEVELS

The groundwater assessment undertaken (EIS, 2023) to support the Stockton Dry Sand Project reports the groundwater levels were relatively low prior to 2021 and there was a general increase occurring in late 2020. The response to rainfall is rapid, indicating rapid infiltration. Seasonally the groundwater levels are higher in the summer months corresponding to the higher rainfall in summer. The groundwater elevation ranges from 0.9 mAHD to 1.1 mAHD for the low level and 2.9 mAHD to 3.08 mAHD for the high level. Reported depths to groundwater range from 0.2 m (GW2) to 17 m (MW1).

The local groundwater flows from south-east to north-west, away from the coast and towards Fullerton Cove and Tilligerry Creek. It is noted that the gradient for both low and high levels is approximately 0.2 m per 800 m in the area of the planned excavation. This is a very slight gradient, though this steepens to the far north-west of the area near to bore MW X1. It is interpreted in the assessment that this gradient and groundwater flow direction is localised and that the main regional groundwater flow direction is towards the coast. As stated in the groundwater assessment (Umwelt, 2023) for the site, it is not anticipated to intercept the groundwater and will therefore not affect the groundwater levels or flow. The nearest registered third-party groundwater bore is located approximately 375 m from the project boundary and is not predicted to experience measurable drawdown based on modelling undertaken for the EIS.

Condition A7 of SSD-52984213 requires a minimum 0.7 m buffer to be maintained above the 99th percentile groundwater level, as calculated in the EIS and updated over the life of the development. For management purposes under this version of the WMP, the 95th percentile is used only as an early warning indicator within the Trigger Action Response Plan (TARP), while the 99th percentile plus 0.7 m remains the compliance basis for extraction depth controls. The 99th percentile groundwater levels and corresponding 99th percentile + 0.7 m levels for the existing monitoring bores are presented in **Table 9**. Groundwater monitoring, trigger levels and exceedance criteria are provided in **Section 6** and **Section 7** of this plan.

Once the drilling program has been completed and sufficient monitoring data has been collected from the additional bores within and surrounding the disturbance footprint, the groundwater dataset will be reviewed by a suitably qualified hydrogeologist and the bore-specific trigger levels, including 99th percentile groundwater levels, will be updated in the next revision of the WMP and associated plans, where required.

Table 9: Groundwater Elevation Data in mAHD (Umwelt EIS, 2023)

Location	Min	Max	Mean	Standard Deviation	Median	95th %ile	99th %ile	99th %ile + 0.7m buffer (m AHD)
GW1	1.26	3.09	2.53	0.35	2.57	3.03	3.08	3.78
GW2	1.15	3.09	1.92	0.51	1.85	2.92	3.03	3.73
GW3	1.12	3.15	1.84	0.44	1.76	2.66	2.90	3.60
GW4	1.05	3.01	1.70	0.44	0.61	2.63	2.89	3.59
MWX1	0.62	2.31	1.35	0.39	1.43	2.08	2.23	2.93
MWX2	0.91	2.95	1.74	0.52	1.83	2.76	2.86	3.56
MWX3D	0.68	3.01	1.68	0.52	1.73	2.80	2.89	3.59
MWX3S	0.97	3.01	1.70	0.50	1.74	2.77	2.90	3.60
MWX4D	1.04	3.03	1.85	0.54	1.91	2.9	3.00	3.70
MWX4S	1.03	3.02	1.84	0.54	1.90	2.87	3.00	3.70
MWX5	1.16	3.14	1.87	0.47	1.94	2.89	2.92	3.62
MWX6	1.19	3.2	1.95	0.48	1.99	2.91	2.97	3.67
MWX7	1.03	3.02	1.84	0.54	1.90	2.87	3.00	3.70

Note: Percentile values are based on Umwelt (2023). Minor inconsistencies in legacy datasets have been standardised to align with the broader monitoring network and hydrogeological conditions. Values will be refined following additional monitoring data.

3.8 GROUNDWATER QUALITY / CHEMISTRY

Groundwater samples are currently collected on a quarterly basis for groundwater quality, with field analysis of pH and Electrical Conductivity (EC) and laboratory analysis of major ions, TDS, total alkalinity, nitrate, total phosphorus and metals. Since 2007 the bores on site have recorded relatively freshwater quality generally ranges between 200 µS/cm and 1,000 µS/cm. The overall trends in EC show the rise in EC generally corresponds with a period of above average rainfall and may indicate flushing of soil stored salts within the coastal dunes following peak rainfall periods. The pH for most bores is slightly acidic to neutral, with pH between 6 and 7.6. Bores MW5 and MW1 have recorded a general decline in pH compared to results from 2007, with bore MW1 recording the lowest pH of between 5 and 6.5 since 2019. The low pH corresponds with surface water quality monitoring by Jacobs (2023), which indicates a pH for site surface water monitoring locations of between 4.3 to 5 at site SW1, which is near bore MW1 and MW5. This data is considered baseline with the understanding that the quarry operation since 2017 has not extracted sand below groundwater level.

The groundwater assessment states that most bores record iron concentrations of less than 4 mg/L, except for bores MW7 and MW8. Bore MW8 records the highest concentration of iron, or up to around 21 mg/L; however, this has reduced since 2020 to around 6 mg/L in 2023. Bore MW7 records similar trends in iron to bore MW8 but at lower concentrations, with a peak concentration of around 12 mg/L recorded in 2019 that has reduced to around 5 mg/L in 2023. It is also noted that in 2007 bore MW9 recorded higher iron concentrations of up to 8 mg/L, which has reduced to less than 1 mg/L. **Figure 7**, **Figure 8** and **Figure 9** display the concentrations of EC, pH and Fe, additionally seven years of data (2017-2024) are presented in the **Table 10** below.

The figures and table below have been provided for baseline data of bores within the project and surrounding areas, inclusive of the MW and MWX series. Statistical summary of field parameters for MWX monitoring bores based on seven years of monitoring (2017-2024) have been completed and Boral will continue water quality monitoring, with an updated assessment of the applicability of the groundwater quality monitoring program after this time and will be implemented on the review of this plan.

Table 10: MWX Bore Series Field Parameters (2017-2024) Stockton Transgressive Dune Quarry

Bore	MWX1		MWX2		MWX3S		MWX3D		MWX4S		MWX4D		MWX5		MWX6		MWX7	
pH/EC	pH	EC	pH	EC	pH	EC	pH	EC	pH	EC	pH	EC	pH	EC	pH	EC	pH	EC
Minimum	4.76	192	5.27	232	5.14	230	7.06	414	5.39	83	5.39	83	7.2	546	7.12	544	7.04	542
Maximum	5.2	594	5.63	413	5.84	322	7.7	606	6.58	330	6.58	330	7.75	652	7.55	977	7.82	664
Mean	5.0	383	5.4	338	5.4	274	7.3	552	5.9	173	5.9	173	7.5	588	7.4	858	7.5	615
Standard deviation	0.1	96	0.1	44	0.2	26	0.1	41	0.3	58	0.3	58	0.1	24	0.1	88	0.2	27
Median	5.03	389	5.41	341	5.4	273	7.32	555	5.9	168	5.9	168	7.54	587	7.47	886	7.5	627

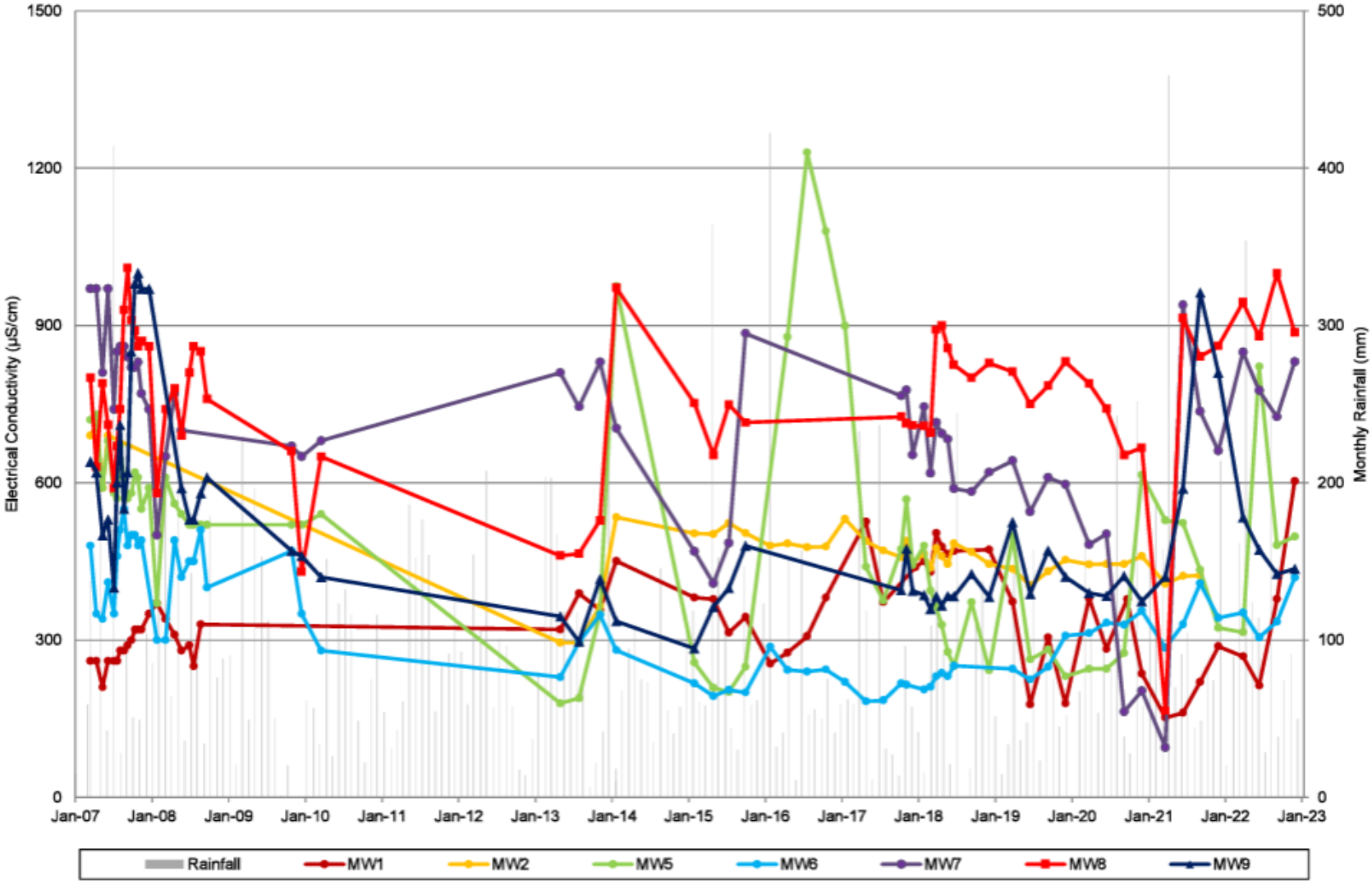


Figure 7: Electrical Conductivity Trends, Jacobs (2023)

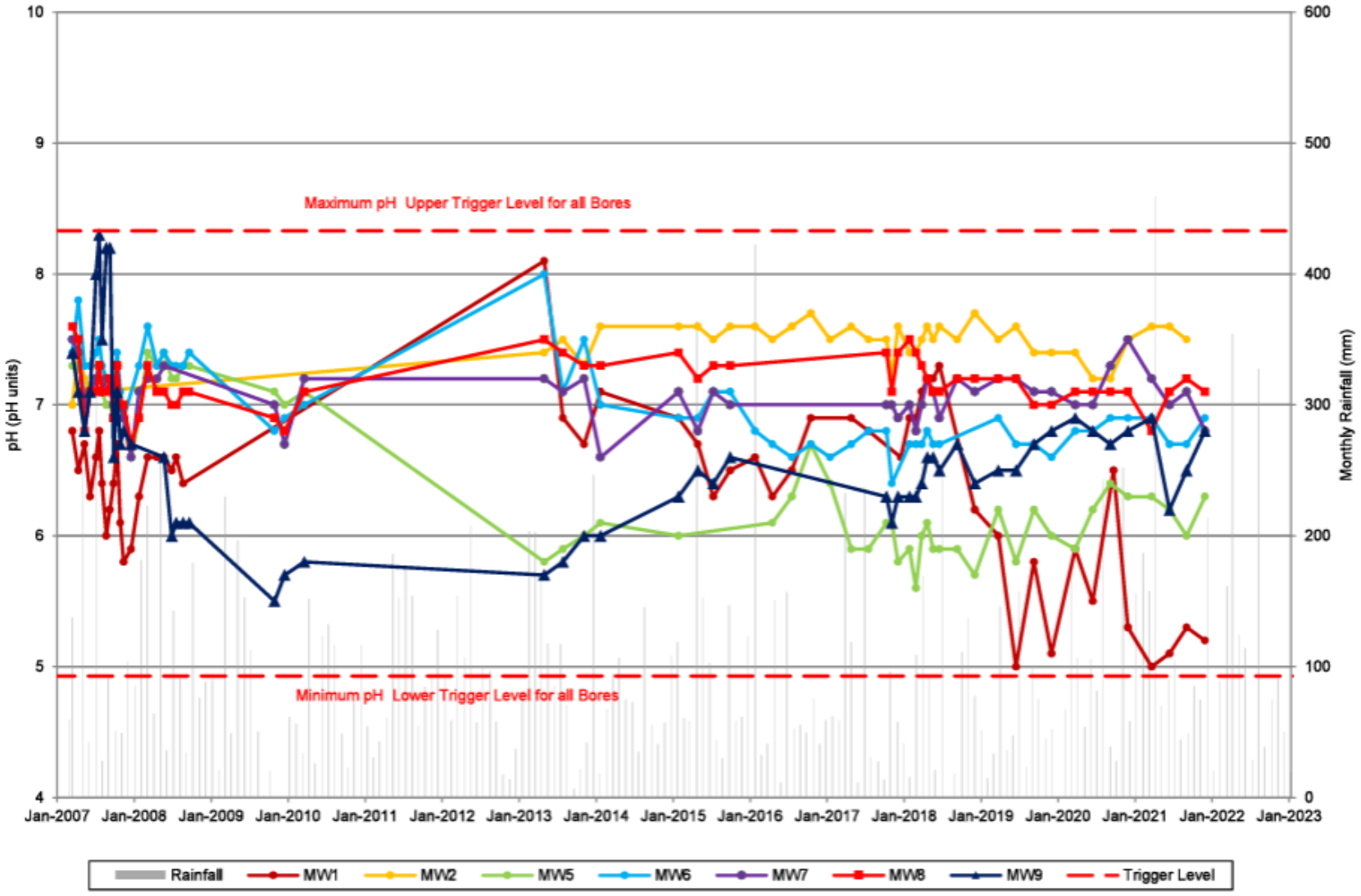


Figure 8: pH Trends, Jacobs (2023)

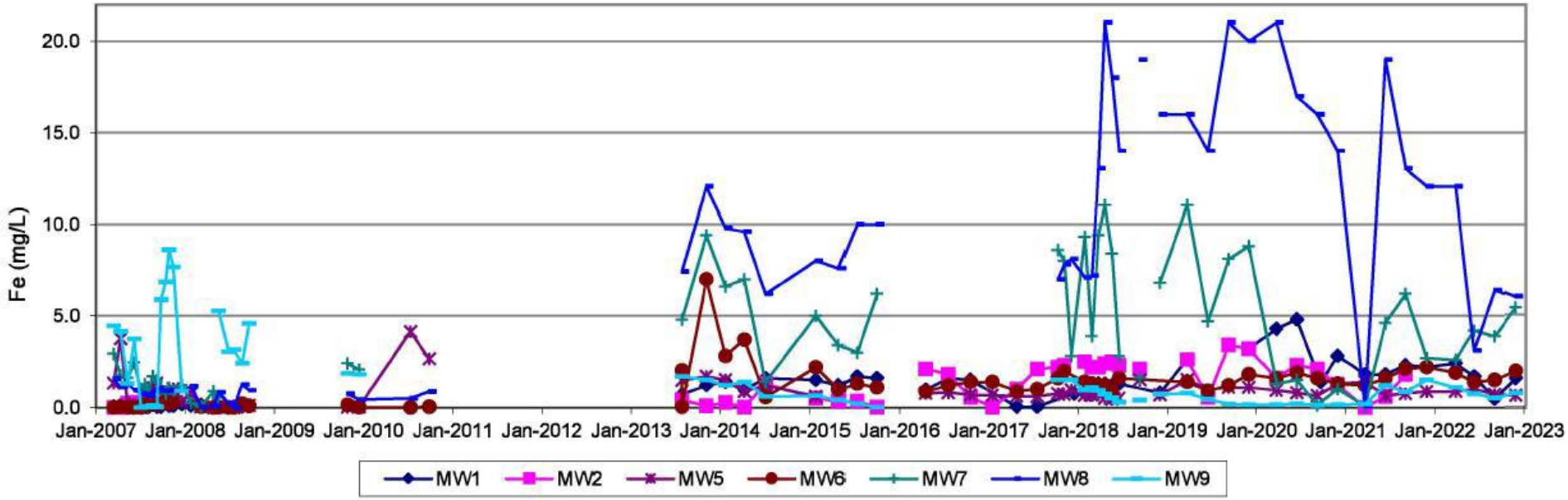


Figure 9: Trends in Iron, Jacobs (2023)

3.9 GROUNDWATER RECEPTORS

3.9.1 Landholder Rights

Under Part 1, Basic landholder rights, the WM Act allows landholders to construct water supply works and extract water for domestic consumption and stock watering as outlined in Division 1. Under Division 2, harvestable rights, landholders may construct water supply works to collect surface flows, and extract certain amounts based on specified calculations on maximum harvestable rights. As no stock or domestic consumption is proposed for the site, Division 1 does not apply. Under Division 2, no surface flows (runoff) are proposed to be collected at the site (as site geology is predominantly sand), therefore harvestable rights are not able to be practically implemented. Third-party basic landholder rights bores and spearpoints identified as close as 375 m, and an irrigation bore approximately 1,000 m from the subject property.

3.9.2 Stockton Groundwater Source Allocation

The site is located over the SGS which is regulated by the WSP for the North Coast Coastal Sands Groundwater Sources 2016. The WSP specifies the planned environmental water provisions, water for basic landholder rights, share components of existing aquifer access licenses and long-term average annual extraction limits for this water source. As of April 2023, 1,827.5 shares have been allocated, leaving approximately 11,919 ML/yr unassigned, which may be made available as controlled allocations.

The WSP provides an estimate of 21,000 ML/year for annual recharge for the SGS. Of this 33% is set aside as planned environmental water allowing for a Long Term Annual Extraction Limit (LTEAL) of 14,000 ML/year under the current WSP. A volume of 254 ML/year is assigned to basic landholder rights (domestic and stock) and 1,008.5 ML/year is assigned to WALs (DPIE, 2016).

3.9.3 Groundwater Dependent Ecosystems

It is noted in the EIS that the site is for dry sand extraction above the water table and so it would not impact groundwater dependent ecosystems (GDEs). As detailed further in the complimentary groundwater assessment completed by Umwelt (2023), the closest known listed GDEs to the site are the Tilligerry Creek Wetlands and Hunter River Wetlands, located over 10 km to the north-east and south-west of the site, respectively. The project would maintain a minimum 0.7 m buffer to the water table. No sand extraction will occur below 5 m AHD under this version of the management plan. As there would be no interception of groundwater as a result of extraction and given the distance to the closest known listed GDEs, there are not expected to be any adverse impacts to GDEs from the project.

Potential terrestrial GDEs, including the swamp (GDE 1) and freshwater wetland (GDE 2), are mapped to the north of the project site, as shown in **Figure 10** below. As part of the GIA, the recommended locations of the proposed supply bores were moved further to the south-east to minimise potential impacts to the GDEs. Numerical groundwater modelling was undertaken to assess the impacts of installing the two pumping bores and extracting 130 ML/year of groundwater split equally between the two bores. The groundwater modelling shows that groundwater levels at GDE1 are predicted to range between 1.2 m AHD to 2.4 m AHD. The model predicted up to a maximum 0.1 m change in groundwater levels from the proposed drawdown. The groundwater modelling does not predict any change in groundwater levels at GDE2. As detailed further in the revised BDAR, changes to hydrology as a result of the negligible predicted changes in groundwater levels are unlikely to result in any significant change to water retention or change in vegetation structure surrounding the watercourses and the project is unlikely to significantly impact any groundwater hydrology that would impact upon GDEs.

It is noted that recommended monitoring bore GW6 has been moved so that it is installed close to the swamp (GDE1) and specific attention will be paid to the groundwater levels and quality in this bore to ensure that there is no impact on the swamp. However, the finalised locations and construction for any proposed sites will be dependent on land accessibility, ground conditions and safety considerations.

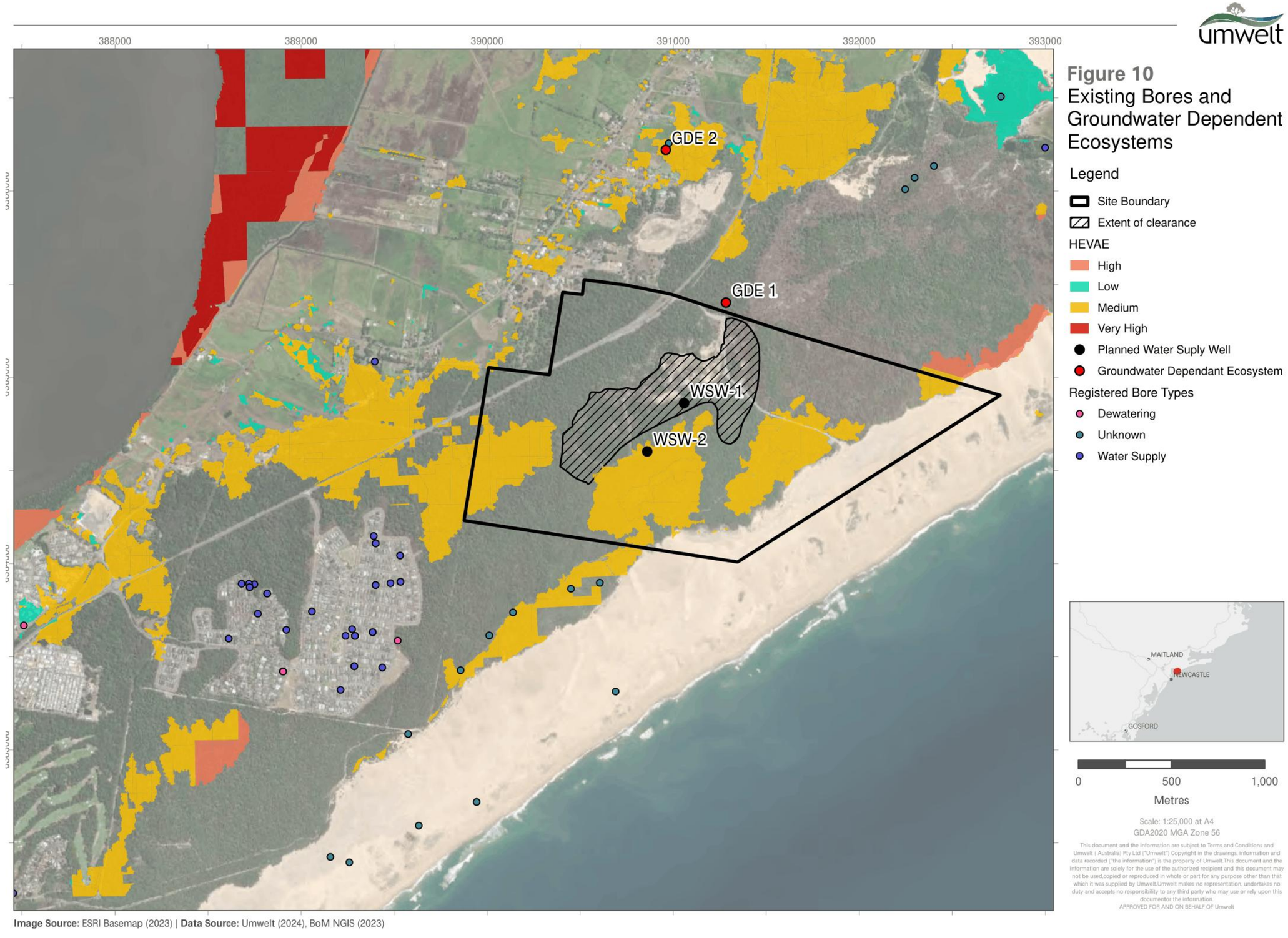


Figure 10: Existing Bores and Groundwater Dependent Ecosystems (Umwelt, 2023)

3.10 SURFACE WATER

As part of the EIS, a surface water assessment was prepared by Southeast Engineering and Environmental (Southeast, 2023) to accompany the EIS. Within the assessment, the project site is a formed basin and has no surface flow connection to adjacent areas, accordingly there would be no discharge of surface water off the project site. Therefore, based on specialist advice, there is no surface water or surface water quality monitoring within, or nearby to the site.

3.11 POLY-FLUOROALKYL SUBSTANCES (PFAS)

Royal Australian Airforce (RAAF) Base Williamtown is located approximately 10 km to the north of the Boral site. It is known that there is currently existing PFAS contamination associated with the base. PFAS contaminants have been detected in both groundwater and sediments to the south of the base. The contaminant plume is monitored and reported annually (AECOM, 2016) and (AECOM 2020).

Hydraulic connection between the Tomago Sand Beds and Stockton Sand Beds is limited by the presence of low permeability estuarine clay deposits associated with Tilligerry Creek and the local flow gradient from site towards the creek to the north. While these will act to impede flow and spread of contaminated water into the Stockton Sand Beds, it is noted that PFAS has been detected in the Tilligerry Creek (AECOM, 2016) and even further to the south in 2020 (AECOM, 2020).

It is noted that there is an ongoing monitoring network at the existing adjacent Stockton Transgressive Dune Quarry Development Consent (DA-140-6-2005) owned and operated by Boral, and that the detected PFAS locations are in isolated areas and at low concentrations of <10 µg/L, and often <0.07 µg/L. It is also noted that potential exposure to off-site users is managed by NSW Government Precautionary Advice. However, the Boral site is currently just outside the southern margin of the Williamtown Management Area, though the Department of Defence is working with the relevant NSW Government departments to redefine the Management Zone (AECOM, 2020).

An assessment of the potential water quality hazards surrounding the site including acidity, metals, salinity and contaminants including PFAS. This assessment includes the measures proposed to reduce or manage the hazards and potential interactions on the development and surrounding water users.

From the locality of Salt Ash heading west to Fullerton Cove is an area identified as the Williamtown management area, an area either contaminated or potentially contaminated with PFAS from previous operations at the Williamtown RAAF Base. The NSW EPA has identified Primary, Secondary and Broader Management Zones in which there are recommendations to not use groundwater, bore water of surface water for any purpose in the Primary Management Zone, and to not use groundwater, bore water of surface water for drinking or cooking in the Secondary and Broader Management Zones. The site is located approximately 250 m from the Broader Management Zone in the separate SGS and therefore is not impacted by the EPA requirements in the Primary, Secondary and Broader Management Zones. The zones can be found on the EPA website.

During the risk assessment by Umwelt in Appendix E of the EIS, PFAS / PFOA contaminants were not included in the risk assessment table as the site may be a receptor (of contaminant from the RAAF base) rather than a source, despite this, site will complete the water quality monitoring of PFAS / PFOA, as assessed in the Response to Submissions report.

3.12 RECEPTOR RISK

Potential risks to the receiving environment and downstream down-gradient water users include changes to groundwater levels or quality that could affect groundwater-dependent ecosystems or registered and unregistered water supply bores, however, these risks are considered low and are managed through conservative extraction limits, monitoring, and trigger-based response measures set out in this plan. The groundwater database search identified around 63 registered bores within 5 km of the project area. Thirty-five of the bores are noted as being for water supply, four for irrigation, four for dewatering and the remaining 20 bores have an unknown use.

A high probability Hunter Estuary Vegetation and Ecosystem Assessment (HEVAE) is located approximately 1.5 km to the east of the excavation area. The excavation area is bounded on the southern margins by medium probability HEVAEs and these zones correlate well with the areas of low topography. The groundwater table will be close to surface in these areas. The closest known listed GDEs to site are the Tilligerry Creek Wetlands and Hunter River Wetlands, located over 10 km to the north-east and south-west of the site, respectively (DPIE, 2016).

Groundwater assessment (Appendix E of the EIS) indicates that the main groundwater flow direction will be towards the sea. The identified receptors are medium level HEVAE and several unknown registered bores located to the east of the Project. Therefore, if the groundwater levels are lowered, either by natural or anthropogenic causes, then the ecosystem could be adversely affected. However, the project does not propose to intersect groundwater, and therefore risk for both registered bores with unknown use and for medium level HEVAE is low.

4 PERFORMANCE MEASURES AND CONTROLS REGISTER

Table 11 below identifies performance outcomes that are included where outcome-based criteria is defined or inferred from the Consent, EIS, RTS, or supporting technical assessments. Where quantitative performance criteria are not specified, performance is demonstrated through implementation of management, monitoring and contingency measures.

Table 11: Water Management Performance Measures, Management and Controls Register

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
General Water Management Measures	M1	**Performance Measure:** Minimise the use of clean potable water on the site. **Management Measures from EIS / Best Practice:** • Restrict potable water use to amenities, drinking water and emergency purposes only. • Implement water efficiency measures including flow-restricting fixtures, regular leak inspections, and prompt repair of identified losses. • Monitor potable water consumption and review usage trends as part of routine environmental reporting to identify opportunities for further reduction.	Ongoing	Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
	M2	**Performance Measure:** Maximise water recycling, reuse opportunities. **Management Measures from EIS / Best Practice:** • Design and operate site infrastructure to capture, store and reuse process water where practicable. • Recycle process water back into operations where possible (e.g. washing, dust suppression) to minimise the need for make-up water. • Regularly inspect and maintain water recycling systems to ensure they are operating efficiently and achieving maximum reuse.	Ongoing		
	M3	**Performance Measure:** Design, install, operate, and maintain water management systems in a proper and efficient manner. **Management Measures from EIS / Best Practice:** • Design all water management infrastructure in accordance with relevant guidelines, consent conditions and best practice standards, ensuring systems are fit-for-purpose. • Undertake routine inspections, maintenance and desilting of water management structures to prevent failure, overtopping or uncontrolled discharge • Review system performance following significant rainfall events and implement corrective actions where required.	During construction phase and ongoing		

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
	M4	**Performance Measure:** Identify, minimise and mitigate risks to the receiving environment and downstream water users. **Management Measures from EIS / Best Practice:** • Identify potential water-related risks (e.g. sediment mobilisation, contamination, altered drainage patterns) through baseline assessment and ongoing monitoring. • Implement preventative controls such as sediment basins, erosion controls, buffer zones and spill containment measures to minimise off-site impacts. • Monitor surface water and groundwater (where applicable) to detect changes that could affect the receiving environment or downstream users • Apply trigger action response procedures where monitoring indicates elevated risk or non-compliance. • Notify relevant regulators and stakeholders promptly in the event of any incident that may impact the receiving environment or downstream water users, and implement corrective actions to prevent recurrence.	Ongoing		
Alluvial Waters	M5	**Performance Measure:** Negligible impacts to alluvial aquifers as a result of the development, beyond those predicted in the document/s listed in condition A2(c), including: **Management Measures from EIS / Best Practice:** • Negligible change in groundwater levels • Avoid groundwater interception by maintaining extraction floor control. • Monitor groundwater levels in bores within and surrounding the disturbance area. • Implement Trigger Action response Plan (TARP's) where trigger levels are approached or exceeded. • Regularly review groundwater level data and update the WMP where required.	Ongoing	Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
	M6	**Performance Measure:** negligible change in groundwater quality **Management Measures from EIS / Best Practice:** • Investigate and implement corrective actions if monitoring indicates any deterioration in groundwater quality. • Monitor groundwater quality at representative locations and compare results against baseline conditions. • Implement spill prevention and response procedures for fuels, hydrocarbons and chemicals.		Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
	M7	**Performance Measure:** negligible impact to other groundwater users **Management Measures from EIS / Best Practice:** • Maintain groundwater extraction volumes within licensed limits and assessed scenarios. • Investigate any groundwater-related complaints in a timely manner and implement mitigation where required.		Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
		• Notify relevant regulators if monitoring indicates any unpredicted impacts to neighbouring groundwater users.			
	M8	**Performance Measure:** negligible impact to groundwater dependent ecosystems **Management Measures from EIS / Best Practice:** • Monitor groundwater levels relevant to GDE health and compare results against baseline and predicted conditions. • Implement trigger action response measures, including modification or suspension of extraction activities, if monitoring indicates potential risk to GDE's.		Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
	M9	**Performance Measure:** Maintain appropriate setbacks in accordance with the Aquifer Interference Policy (DPI, 2012) and Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources 2016. **Management Measures from EIS / Best Practice:** • Extraction areas will be maintained within approved disturbance limits through staged sequencing and verification by surveyed pegs. Setbacks will be re-evaluated if groundwater monitoring indicates unpredicted impacts.		Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
Water Use	M10	**Performance Measure:** Annual take of groundwater and surface water (exempt and licensed) is measured and reported against entitlements and/or licenses held. **Management Measures from EIS / Best Practice:** • Extraction volumes will be measured using meters (or equivalent calculation methods where applicable) and reported in the Annual Review. Extraction practices will be reviewed and adjusted if monitoring indicates a risk of exceeding licensed or assessed limits.	Annually	Quarry Manager	SSD-52984213 Table 6 Water Management Performance Measures
Hydrocarbons	M11	**<u>Refueling, hydrocarbon and chemical spills</u>** Fuel storage tanks will be constructed with secondary containment adequately designed and constructed to contain the entire contents of the tank.	Ongoing	Quarry Manager	EIS Section 16.3 and RTS
	M12	A concrete pad will be provided beneath the refuelling areas of the generators and wash plant to contain refuelling spills. This pad will be isolated from surrounding drainage with raised concrete mounds. Spill storage volume should be a minimum of 20L. Additionally, plant and equipment will be maintained to minimise the potential for leakages, while appropriately sized and stocked spill response kits would be provided in strategic areas of the site, and in vehicles.			
	M13	A hydrocarbon spill kit will be provided at the fuel storage area and the wash plant and generator area.			
	M14	All spills will be cleaned up promptly.			
	M15	Potentially hazardous materials such as hydrocarbons would be contained in bunded areas in accordance with relevant Australian Standards, codes and regulations.			
Surface Water Erosion and Sediment Control	M16	Erosion prevention and sediment controls will be implemented through the design of the haul roads and hardstand areas to limit concentrated flow.	During Construction and Ongoing	Quarry Manager	EIS Section 16.3
	M17	Erosion and sediment controls will be inspected following significant rainfall events and maintained as required.	During Construction and Ongoing		

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
	M18	• Haul road design/construction will be undertaken in accordance with the following guidelines: ○ Managing Stormwater: Soils and Construction, Volume 2E – Mines and Quarries (DECC, 2008) ○ Managing Stormwater: Soils and Construction, Volume 1 Blue Book (Landcom 2004); and ○ Managing Urban Stormwater: soils and construction, Volume 1 and Volume 2C: Unsealed roads and 2D: main road construction (DECC 2008). Due to the porous sandy geology of the site, surface water runoff from the in-situ landscape is negligible and erosion risks associated with quarry operations are low. As this is a sand mine there are no proposed sediment dams for the project. Potential erosion and sediment risks are therefore primarily associated with temporary construction activities involving imported materials, including access roads, haul roads and hardstand areas, and controls are focused on these areas during construction and operation. • ESC measures will be inspected following significant rainfall events and maintained as required including haul roads and hardstands. • Disturbance will be staged and progressive rehabilitation undertaken.	During Construction and Ongoing		
Groundwater	M19	**Groundwater triggers and reporting:** Groundwater data will be compared to relevant triggers following each sampling event to identify potential deviations from baseline and predicted conditions.	Monthly	Quarry Manager	EIS Section 7.3 Section 7 of this WMP
	M20	Trigger exceedances will be managed in accordance with Section 7 – Contingency Plan. Trigger levels will be applied for groundwater levels, pH and EC. Trigger levels are proposed as: • 95th percentile of groundwater levels recorded during low rainfall periods (less than 80 mm per month). • 95th percentile of groundwater levels recorded during high rainfall periods (more than 80 mm per month). • 5th percentile of groundwater levels recorded during low rainfall periods (less than 80 mm per month). • 5th percentile of groundwater levels recorded during high rainfall periods (more than 80 mm per month). • EC based on 95th percentile of baseline groundwater data; and • pH based on 5th and 95th percentile of baseline groundwater data. • Toxicants and nutrients trigger level Trigger exceedances will be investigated and managed in accordance with **Section 7** of this plan.	Ongoing		
	M21	**Performance Measure:** Quarry operations and infrastructure are managed to avoid damage or environmental harm during flooding or groundwater inundation events. **Management Measures from EIS / Best Practice:** Groundwater monitoring results and trends will be reviewed on an annual basis and reported in the Annual Review to confirm consistency with predicted impacts. Developed trigger levels are intended to provide early warning and do not represent impact thresholds.	Annually		

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
Flooding and Inundation	M22	All fixed infrastructure such as the weighbridge, offices, diesel generators and wash plant will be located above the maximum flood level of 3.5 m AHD.	During Construction and Ongoing	Quarry Manager	EIS Section 16.3
	M23	During surface extraction processes, machinery and portable screens can be relocated prior to increased groundwater levels. To predict these periods, rainfall and ocean level conditions will be monitored.	Ongoing		
	M24	Groundwater levels will be monitored and rates of movement noted, based on this information the quarry manager will decide on precautionary measures, including removal of machinery from areas where groundwater flooding may occur.	Ongoing		
	M25	Mobile plant will be stored in the maintenance depot when not in use, where practicable.	Ongoing		
	M26	A groundwater inundation management plan will be prepared and implemented that including • monitoring of existing bores, • review flood and storm warnings • specific triggers for the movement of machinery and equipment	Ongoing		Section 7
Potable and Wastewater	M27	Wastewater is treated via a septic system and collected in pump out tanks which are regularly emptied by a contractor and disposed off-site.	Every 7 weeks	Quarry Manager	Surface Water Assessment Section 1.4.3
Water Management	M28	The Environmental Management Strategy (EMS) to be implemented includes a Waste Management Plan that addresses the storage and stockpiling of raw materials, transport of materials to site, and disposal of materials at an appropriately licensed facility.	Operational phase	Quarry Manager	Groundwater Risk Assessment
	M29	Location of site sheds/storage areas and vehicle parking to be identified in EMP away from sensitive areas.	Ongoing	Quarry Manager and all staff	Environmental Management Plan
PFAS/PFOA	M30	PFAS contamination is not mobilised or exacerbated by site activities. PFAS contaminants are not included in the risk assessment table as the site may be a receptor (of contaminant from the RAAF base) rather than a source. PFAS is not expected to be mobilised by site activities. Groundwater monitoring data will be reviewed in the context of regional groundwater trends, including known PFAS sources in the area.	Annually	Quarry Manager and suitably qualified person/s	EIS Appendix, Groundwater Assessment Section 6.1
North Stockton Catchment Area	M31	**Performance Measure:** Quarry activities do not adversely affect the North Stockton Catchment Area or associated groundwater resources. **Management Measures from EIS / Best Practice:** • Implement groundwater trigger levels, monitor groundwater levels and monitor rainfall forecasts • Implement erosion and sediment controls on access roads, haul roads and hardstands. • Monthly, quarterly and annual reviews of data, in line with results and timelines outlined in **Section 6, Table 16** and reporting required timelines outlined in **Section 9**. • Groundwater monitoring data, including routine monitoring results and any exceedances, will be provided to Hunter Water through Annual Review reporting, Water Trigger Investigation Reports, and upon request via wrdevelopments@hunterwater.com.au as requested by Hunter Water.	Ongoing	Quarry Manager	RTS Section 4.2.2

Environmental Aspect	Mitigation ID	Management / Controls	Timing	Responsibility	Reference
	M32	While the North Stockton Catchment Area is not hydraulically downgradient from the Quarry, the potential for groundwater interaction under future operating conditions has been identified. Accordingly, a precautionary monitoring framework will be implemented to assess any potential impacts to this area (refer to **Figure 11**). • Monitoring of selected bores along the northern and northeastern Quarry boundary (MWX2, MWX4D/S and GW2) outlined in **Figure 11** in accordance with the frequency and parameters outlined in **Section 6.** • Application of the same bore-specific trigger levels and TARP framework as described in **Section 7.1** to **Section 7.3**. • Installation and incorporation of additional monitoring bores (where required) to provide **early** warning of potential groundwater level changes associated with Quarry activities. • Monitoring data in line with the site-wide groundwater monitoring program outlined in **Table 16.**	Ongoing	Quarry Manager	RTS Section 4.2.2
Acid Sulfate Soils	M33	**Performance Measure**: Disturbance of acid sulfate soils does not result in adverse impacts to groundwater or surface water quality. **Management Measures from EIS / Best Practice:** The groundwater monitoring program will include the following ASS indicators as part of the water monitoring regime of the installation of the drilling program bores is being completed: • pH • Electrical conductivity • Sulfate • Iron and aluminum • Field observations of colour, odour or turbidity To prevent impacts to groundwater and surface water, if ASS or PASS are confirmed or suspected: • Groundwater and surface water monitoring will be increased in the affected area to manage any pass/ass identified • Ass-related groundwater quality indicators will be reviewed against trigger levels • Extraction or pumping activities to be modified or temporarily ceased if monitoring indicates acidification or metal mobilisation • Any impacted water will be contained and managed in accordance with regulatory requirements • disposal and rehabilitation, where removal of ass material is required: • Material will be managed and disposed of at an appropriately licensed facility, or • Treated and stabilised on site in accordance with specialist advice • Disturbed areas will be progressively stabilised and rehabilitated	During establishment phase	Quarry Manager and suitably qualified person/s	DPHI RFI Request

Figure 11: Monitoring related to the North Stockton Catchment Area

5 WATER BALANCE

5.1 SITE WATER BALANCE

The project's water balance has been developed to meet SSD-52984213 Condition B35(d)(i) of the consent, ensuring all aspects of water use, sources, and management are addressed. The maximum water use is projected to be 129.25 ML/year, covering dust suppression, sand processing, and other site activities. Below is a detailed breakdown of the site's water balance components for all stages. No discharge occurs offsite and all water is retained onsite.

The project water balance has been prepared on a conservative basis, assuming maximum site-wide production and processing demand (up to 129 ML/year prior to 2028 and 89 ML/year thereafter). In practice, Stage 1 of the project will involve dry extraction only, with no requirement for the wash plant. Accordingly, water use in Stage 1 will be limited to dust suppression and office/firefighting purposes.

Boral acknowledges that only a portion of its Water Access Licence (WAL) portfolio has nominated works is currently approved for 16 ML/y. This volume is adequate for Stage 1 operations. Additional nominated works will be secured before wash plant commissioning in Stage 2 to ensure that the full operational water demand is matched by WAL entitlement. This distinction between Stage 1 and subsequent stages demonstrates that the project can operate within its current water supply constraints while maintaining compliance with SSD-52984213 and DCCEEW recommendations for transparent water balance accounting. Groundwater will not be interfered with unless associated with monitoring bores or approved water supply wells.

The project's maximum water use is estimated at 129.25 ML/year, detailed in a site water balance that was prepared to accompany the project's EIS. Section 5 of the Surface Water Assessment developed by Southeast Engineering and Environmental reports that the water balance for the site has the following three separate components:

1. Water use and wastewater generation associated with the **office and weighbridge facility**.

2. Water use associated with **dust suppression** as required over the site.

3. Water use associated with **sand processing** and losses associated with the moisture content of extracted material leaving the site.

Supporting groundwater model prepared for the EIS and RTS (Umwelt 2023, Table 6.3) indicates that the aquifer is in dynamic equilibrium, with average inflows and outflows balanced at ~28 ML/day. The major inflow component is rainfall recharge at approximately 20.4 ML/day (7,440 ML/year). By comparison, the project's maximum demand of 129.25 ML/year represents less than 2% of this annual recharge. This demonstrates that operational water demand is minor relative to natural aquifer processes and provides confidence in the sustainability of the project's water use.

***Note**: this is the site's projected water balance based off the EIS and RTS*

5.1.1 Office and Weighbridge Facilities

A 10 kL rainwater tank will service non-drinking water demand at the office and weighbridge facility. Wastewater, treated via a septic system and collected in pump-out tanks, is removed regularly by a contractor, with approximately 37,000 liters managed annually, capturing around 5,000 liters every 7 weeks outlined in **Figure 12**. The existing system has sufficient capacity to handle current demands, and any additional water needs or wastewater generation can be managed through mains water purchases and increased pump-out frequency if required.

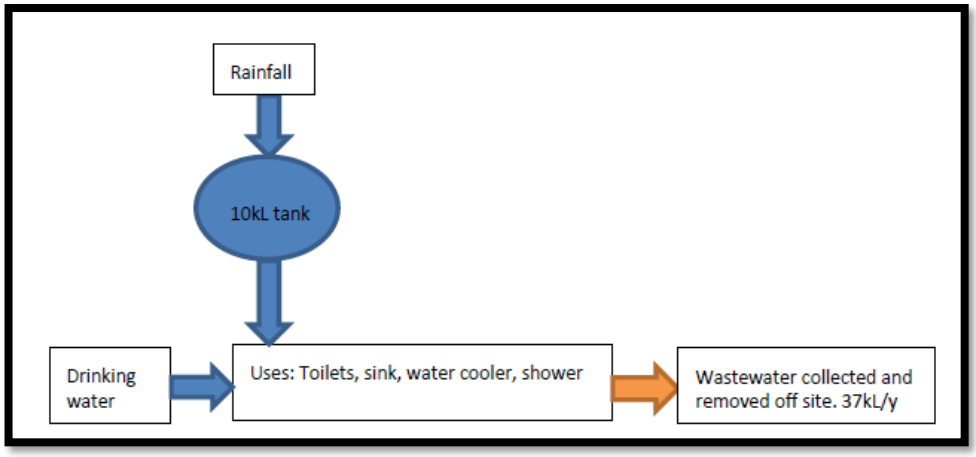


Figure 12: Conceptual Site Office and Weighbridge Facility Water Balance (Southeast Engineering + Environmental, 2023)

5.1.2 Dust Suppression

Water use for dust suppression, influenced by rainfall, wind, and vehicle movements, is required for a 4-hectare area covering Stages 1 to 5 and the operational/laydown area. Including the windblown haul road in a worst-case scenario, water demand is estimated at 39.25 ML/year. After 2028, when windblown access is no longer used, the area will reduce by 2 hectares, lowering the demand to 29.25 ML/year. Stage 1 dust suppression demand will be limited to less than 16 ML/year while approvals for additional water entitlements and nominated works progress.

Table 12 below provides a summary of areas potentially requiring dust suppression.

Table 12: Dust Suppression Areas

Location	Area (ha)
Windblown access, including through Stage 1	3
Stages 2 to 5	0.85
Operational/laydown area	4
Total	**7.85**

5.1.3 Sand Extraction and Processing Water Balance

- The project's maximum water use is estimated at 129.25 ML/year, combining dust suppression (39.25 ML/year) and sand processing (90 ML/year) once approvals are in place and a revised WMP has been approved.
- Boral's water allocations (524 shares) exceed the project's maximum water demand.
- The water balance assumes maximum extraction and full processing of sand, with significant allowances for dust suppression.

- Boral's water allocations are sufficient to meet project demands, even under worst-case scenarios.
- The project's water use complies with the NSW Aquifer Interference Policy requirements.

Water management strategies will include measures to minimise water loss through evaporation and infiltration, particularly in the storage and processing stages. Reuse of water within the wash plant and careful monitoring of moisture content in sand stockpiles will be integral to the management process.

5.1.4 Fire Fighting

To accommodate firefighting demands at the site, a 40,000-litre static rainwater tank is proposed adjacent to the existing maintenance shed. It is understood that any extracted groundwater stored on site will be kept in the tanks.

5.2 WATER SOURCES AND DEMANDS

The site is located over the SGS, regulated by the WSP for North Coast Coastal Sands Groundwater Sources 2016. As of April 2023, 1,827.5 shares have been allocated, leaving around 11,919 ML/year unassigned. The project's water demand is 129.25 ML/year, based on a worst-case extraction rate of 750,000 tpa until 2028, reducing to 500,000 tpa thereafter. Water is required for office use, dust suppression, and material processing once the wash plant is part of the processing (Stage 1 is dry extraction), with Boral's portfolio to be approved equates to 524 shares, more than sufficient for the development's needs. The site complies with the NSW Aquifer Interference Policy, ensuring access to necessary water. Water take is outlined in **Table 13** below.

Table 13: Estimated Project Water Take (Southeast Engineering, 2023)

Stage	Water Use	Maximum Water Use (ML/year)
Stage 1*	Dust suppression	16
Stages 2-5	Dust suppression	39.25
Stages 2-5	Sand processing	90
Total	-	129.25

** Updated with site estimates in October 2025*
Note: A maximum of 16ML/y in Stage 1 will occur until further revision of this plan. This is for dust suppression, fire fighting purposes and rehabilitation only.

5.3 CAPACITY

Water storage facilities on-site will be designed to accommodate the necessary water volumes for both dry and wet sand processing activities, as well as for dust suppression. These facilities will be sufficient to meet peak water demands, including contingencies for maximum extraction rates.

5.3.1 Storage Capacity

The project installation of a 40,000-litre water storage tank for potential firefighting efforts as detailed in Section 5.1.4.

5.4 WATER USE, REUSE AND RETICULATION

The EIS proposes a water recycling plant to optimise water use from the aquifer for sand processing. The plant will include a 200,000-litre clean water tank, a thickener (grey water) tank, a filter press under an open-

sided shelter, a control room, and associated pipes and pumps. Sand from Stages 2-5 will be screened, with water separated and directed to the thickener tank where residual fines and organic material will settle. This slurry will be processed in the filter press, leaving clean water to be reused in the washing process. **Table 14** provides a summary of the site water balance.

Table 14: Summary of Site Water Balance

Site Water Balance Component	Details
Sources and Security of Water Supply	• Water sourced from the Stockton Groundwater Source (SGS) with 524 shares allocated to Boral. • This allocation exceeds the maximum demand (129.25 ML/year), ensuring secure water supply for the project's life. • Unallocated water in the SGS (~11,000 ML/year) provides additional security.
Water Storage Capacity	• On-site storage facilities, including a 10 kL rainwater tank. • 40,000-litre firefighting water tank, ensure sufficient capacity for site operations. • Additional storage for processing and dust suppression water needs will be designed to handle peak demands.
Water Use and Management	• Water use includes 90 ML/year for sand processing. • Dust suppression 39.25 ML/year for dust suppression for an area approx. 7.85ha • Minimal amounts for office and weighbridge facilities. • Water recycling and reuse strategies, including a water recycling plant, will optimise water use on-site.

5.5 GROUNDWATER EXTRACTION MODELLING

The groundwater model (Umwelt, 2023) outlines the potential impacts from groundwater extraction using the WEL package. In the context of groundwater modelling, the WEL package is used to simulate the effects of wells. Two wells were simulated using the model, with the indicative locations each with a discharge of 178 m^3/day which is approximately equal to a total extraction of 130 ML/year. The well locations are indicative only as the bores have not been installed. Currently, Boral are in the process of obtaining the appropriate licences for extraction of groundwater, and no extraction will occur on the site until approvals have been obtained.

Overall, the modelling confirms the project will not significantly affect groundwater flow, ecosystems, or water users, with ongoing monitoring to ensure compliance. Monitoring bores, including one located near GDE 1, will track groundwater levels and quality, with automated loggers and monthly level data checks to verify that drawdown remains within modelled predictions.

5.6 PREDICTED DRAWDOWN

The drawdown impact assessment addresses potential effects on ecosystems and third-party water users. Groundwater modelling predicts localised drawdown, with a maximum of 1.3 m at the extraction bores and up to 0.5 m within 120 m, influenced by the site's low extraction rate, high hydraulic conductivity, and strong recharge. Sensitivity analysis indicates drawdown could extend to approximately 240 m under lower conductivity conditions. Groundwater flow towards the South Pacific Ocean and Tilligerry Creek will remain stable, avoiding seawater intrusion and PFAS/PFOA migration.

Upon approval of required WAL's and WSW's, up to 130 ML/year of groundwater is able to be extracted under licensed bores will be stored in onsite tanks for sand washing, dust suppression, and fire control, with no direct discharge to the environment, used onsite only. Routine PFAS screening is not required under SSD-52984213; however, periodic screening may be undertaken as a precautionary measure, consistent with Hunter Water recommendations and any DPHI or Hunter Water direction. At the nearest groundwater-dependent ecosystem, predicted drawdown is ≤0.1 m, with no measurable effect expected at nearby wetlands or registered private bores **Figure 13**. The modelling confirms that regional groundwater levels and

flows will remain stable, supported by a robust ongoing monitoring program and adaptive management.

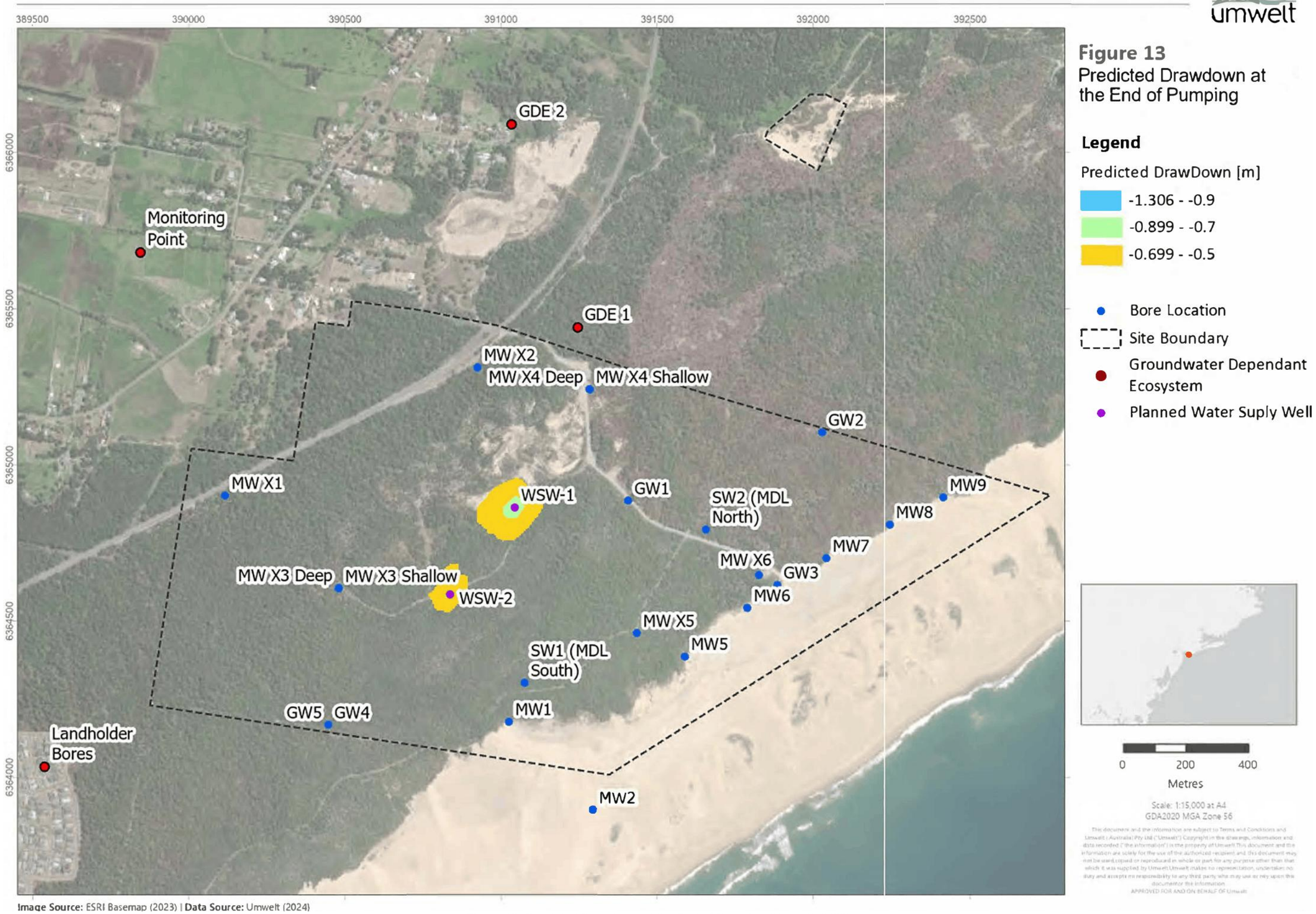


Figure 13
Predicted Drawdown at the End of Pumping

Image Source: ESRI Basemap (2023) | **Data Source:** Umwelt (2024)

Figure 13: Predicted Drawdown at the End of Pumping (Umwelt, 2023)

6 WATER MONITORING PROGRAM

6.1 INSPECTIONS

In accordance with Condition B35 (c) inspections will be conducted monthly or as required i.e., after significant rainfall as part of an environmental inspection program, as per the Environmental Management System (EMS). Real time monitoring from a suitable meteorological station must be operating in close proximity to the site for noise impacts detailed further in the Noise Management Plan, and in addition 'Meteorological Monitoring' Condition B21, with rainfall monitored against groundwater levels when triggered by the TARP outlined further in **Section 7**.

General environmental inspections include:

- All inspections will be documented using inspection checklists.
- Condition and capacity of water storage facilities.
- Integrity of liners, bunds, pipes, and water transfer infrastructure.
- Performance of water reuse and recycling systems.
- Condition of sediment controls and runoff management structures.
- Sand stockpile condition and moisture management.
- Identified issues will be recorded in the site's environmental register and managed in accordance with the EMS corrective action process.
- Where compliance or emerging risks are identified, timely corrective actions will be implemented and tracked to completion.
- Inspection outcomes and any required actions will be reviewed as part of regular environmental reporting and management review processes.

6.2 SURFACE WATER MONITORING

The site is a formed basin with no surface flow connection to adjacent areas. Accordingly, no routine surface water discharge monitoring is required, consistent with the Surface Water Assessment (Southeast Engineering and Environmental, 2023) accompanying the EIS. The following monitoring in accordance with the EIS will be undertaken and reported on in the annual review:

- Metering of all extraction bores on site.
- Metering of water inputs to the sand processing wash plant.
- Fortnightly measurements of moisture content in exported material through stockpile measurements.
- Records of material leaving the site.
- The project does not involve diversion, interception or realignment of any natural watercourses.

6.3 MONTHLY GROUNDWATER LEVEL MONITORING

In accordance with the groundwater assessment (Umwelt, 2023) forming the EIS and the Groundwater Impact Assessment in the RTS (**Appendix B**), the groundwater monitoring program includes measuring groundwater levels with a manual dip meter, as well as the downloading of hourly logger data monthly. Groundwater trigger levels for MWX bores were set using a risk-based approach and historical monitoring data from 2017–2024 and hydrographs from the EIS can be found in **Appendix C**.

The groundwater levels require monitoring around the excavation area to ensure that levels remain consistent with the analysis in the groundwater assessment report. Ongoing groundwater monitoring program will occur with the established bores and the proposed additional bores currently being installed (to be updated in the revision of this WMP). The site groundwater monitoring network comprises the MWX and GW bore series included in this WMP monitoring program. Groundwater levels have been monitored in these, in some cases with data as far back as 1997. The GW series bores were installed in 1997, and the MWX series in 2017. A summary of the bore monitoring details are presented in **Table 15** below and additional bores details will be updated within this plan over the project. The EIS and the accompanying GIA (Umwelt, 2023) recommended that groundwater levels be monitored around the proposed excavation area. Monitoring the groundwater extraction associated with the water supply bores will be incorporated into the program to ensure that levels remain consistent with the analysis in the GIA (Umwelt, 2023).

It should be noted that the recommended monitoring bore (GW6) has been moved so that it is installed close to the swamp (GDE1) and specific attention should be paid to the groundwater levels and quality in this bore to ensure that potential impacts to the swamp are avoided. The monitoring bores will be installed by a minimum Class I certified driller and the installation designed and supervised by a suitably qualified hydrogeologist. The bores will have level loggers installed and the data should be downloaded and checked monthly. Works will also be undertaken to survey the ground elevation at each bore and check the condition of the water supply bores and (where required) clear any blockages or sediment build up.

In addition to the monitoring bores, the volumes extracted from each supply bore will be monitored and recorded as well as the groundwater levels measured in the water supply bores. No extraction will occur until the appropriate approvals have been obtained and updated in the WMP.

Reliable data will be assured through the following QA/QC measures:

- NATA-accredited lab.
- Field duplicates/blanks as required.
- Chain of custody.
- Data validation prior to reporting.

Table 15: Groundwater Level Monitoring Locations, Frequencies and Parameters (EIS RTS, 2024)

ID	Easting	Northing	Ground Elevation	Year Installed	Bore Depth (mgbl)	Screen top (mgl)2	Screen Bottom (mgbl)2	Top of Casing	Water Level	Water Quality	Comment
GW1+	391407	6364885	9.60	1997	8.73	6.2	6.9	0.5	Hourly (L) - Short term	Quarterly - Short term	Logger installed – not used
GW2+	392029	6365103	2.67	1997	3.48	2.9	3.6	0.32	Hourly (L)	Quarterly	Logger installed – data used
GW3+	391885	6364615	3.02	1997	9.02	3.5	4.2	0.98	Hourly (L)	Quarterly	Logger installed – data used
GW4+	390446	6364167	3.24	1997	4.93	4.1	4.8	0.62	Hourly (L)	Quarterly	Logger installed – data used
MWX1+	390115	6364901	6.10	2017	12.03	12.2	9.2	0.7	Hourly (L)	Quarterly	Logger installed – data used
MWX2+	390924	6365311	5.74	2017	11.63	n/a	n/a	0.6	Hourly (L)	Quarterly	Logger installed – data used
MWX3 + Deep	390480	6364605	6.43	2017	25.5	26.0	5.3	0.54	Hourly (L) - Short term	Quarterly- Short term	Logger installed – data used
MWX3+ Shallow	390480	6364604	6.39	2017	11.21	11.4	8.4	0.19	Hourly (L) - Short term	Quarterly - Short term	Logger installed – data used
MWX4 Deep+	391283	6365241	9.90	2017	23.98	24.5	8.7	0.62	Hourly (L) - Short term	Quarterly - Short term	Logger installed – data used
MWX4 Shallow+	391284	6365241	10.21	2017	11.88	12.1	8.9	0.48	Hourly (L) - Short term	Quarterly - Short term	Logger installed – data used
MWX5+	391435	6364461	3.82	2017	23.86	24.2	21.2	0.35	Hourly (L)	Quarterly	Logger installed – data used
MWX6+	391826	6364647	3.15	2017	27.29	27.6	24.6	0.68	Hourly (L)	Quarterly	Logger installed – data used
MWX7+	390509	6365494	4.61	2017	11.24	-	0.5	-	Hourly (L)	Quarterly	Logger installed – data used
GW6	*391277*	*6365332*	*TBC*	*Proposed*	*TBC*	*TBC*	-	-	*Hourly (L)*	*Quarterly*	
GW7	*391465*	*6364840*	*TBC*	*Proposed*	*TBC*	*TBC*	-	-	*Hourly (L)*	*Quarterly*	

ID	Easting	Northing	Ground Elevation	Year Installed	Bore Depth (mgbl)	Screen top (mgl)2	Screen Bottom (mgbl)2	Top of Casing	Water Level	Water Quality	Comment
GW8	*391030*	*6364735*	*TBC*	*Proposed*	*TBC*	*TBC*	*-*	*-*	*Hourly (L)*	*Quarterly*	
GW9	*390715*	*6364550*	*TBC*	*Proposed*	*TBC*	*TBC*	*-*	*-*	*Hourly (L)*	*Quarterly*	
GW10	*390360*	*6364460*	*TBC*	*Proposed*	*TBC*	*TBC*	*-*	*-*	*Hourly (L)*	*Quarterly*	
GW11	*390625*	*6364980*	*TBC*	*Proposed*	*TBC*	*TBC*	*-*	*-*	*Hourly (L)*	*Quarterly*	

Source: *Section 7.2 Umwelt Groundwater Assessment 2023, Appendix E of the EIS & Appendix C (GIA) of the RTS - Table 7.3 Proposed Monitoring Program*
***Note**:*

- *Coordinates in GDA2020 Zone 56 – final locations to be surveyed*
- **Elevation derived from VGT field data records of top of casing elevations and converted for ground elevation*
- *mbgl – meters below ground level*
- *+Bores within current groundwater monitoring program*
- *(L) Bores with loggers.*
- *Short term – refers to bores within the excavation footprint that will be removed with progression of the proposed quarry operations.*
- *The design of the proposed monitoring bores will be based on their elevation and will be finalised once the final locations are determined.*
- *GW6-GW11 proposed bores from RTS Report Table 7.3 Proposed Monitoring Program.*
- *Coordinates, ground elevation, bore depth, screen intervals and top of casing will be surveyed and reported following installation. Until installation, values are marked as TBC to reflect that these bores are not yet constructed. Monitoring frequency and parameters are specified to demonstrate intended compliance with Condition B35.*
- *This management plan will be updated following construction of additional groundwater bores.*

6.4 QUARTERLY GROUNDWATER QUALITY MONITORING

Groundwater quality sampling will be undertaken on a quarterly basis for all bores, in accordance with industry standards, storing data within a central database and routine QA/QC conducted to verify quality of data, all monitoring bores, noting that short-term bores within the extraction footprint will be monitored until they are removed as quarrying progresses. These are bores within the excavation footprint that will be removed with progression of the proposed quarry, providing short term hourly data. The proposed GW series bores (GW6-GW11) will be monitored quarterly for water quality and levels monthly. The bores will be reassessed for monitoring requirement updates accordingly, after additional baseline data is complete, and results updated in the revision of the WMP.

The complete monitoring schedule requirements can be found in **Table 16** below. Field measurements of EC and pH are recorded. All bores will be dipped monthly and logged hourly, all data to be uploaded as they are provided to the central database and reviewed annually. The samples are collected in the laboratory supplied bottles and submitted to a National Association of Testing Authorities (NATA) accredited laboratory with a chain of custody (CoC) form for analysis of:

- Turbidity.
- Total dissolved solids (TDS).
- Chloride and fluoride.
- Major ions: sulfate, calcium, potassium, sodium, magnesium, hardness as CaCO3, bicarbonate (HCO3).
- Alkalinity.
- Nutrients: Filtrable phosphorous and nitrate as N.
- Total and dissolved metals: aluminium, arsenic, barium, cadmium, chromium, copper, iron, manganese, nickel, lead, selenium, zinc and mercury.
- PFAS / PFOA: Routine PFAS/PFOA analysis is not required under SSD-52984213 however, periodic screening may be undertaken as a precautionary measure, consistent with Hunter Water recommendations, to confirm suitability of water for onsite use.

6.5 ACID SULFATE SOILS MONITORING (RISK-BASED APPROACH)

As per Condition B35 (d)(iii) a risk-based Acid Sulfate Soils (ASS) monitoring program will be implemented to verify ASS risk under operational conditions while maintaining conservative groundwater controls. As per **Section 1.6** initial operations will be undertaken using conservative controls and groundwater pumping at a maximum of 16 ML/year during Stage 1. Works will initially be confined to 5 m AHD, therefore, no sand extraction will occur below 5 m AHD under this version of the management plan. Materially reducing the likelihood of groundwater drawdown-related ASS impacts while site-specific baseline data is established. The required 0.7 m buffer above the 99th percentile groundwater level will be maintained. This separation represents the primary groundwater and ASS risk control during early operations.

Targeted ASS sampling will be undertaken within the disturbance footprint following commencement and completion of groundwater bore installation. Samples during installation will be completed with parameters analysed to ASS risk identification and verification, including:

- Sulfate / chloride mass ratio.
- Alkalinity.

- Sulfate / alkalinity.
- Aluminium / calcium.
- Selected trace metals.
- Nutrients.
- Net acidity.

These parameter sampling results will be used to confirm ASS risk levels under operational conditions and will be incorporated into the development of the ASSMP within the revision of the WMP. Future proposed testing and trigger levels will be outlined in the next revision of the ASSMP/WMP and will be risk based, based on the drilling and investigation program.

Table 16: Monitoring Schedule as per Development Consent Conditions

Environmental Aspect	ID	Monitoring	Timing	Responsibility	Source / Reference
Groundwater Quality	WM1	The samples will be analysed for: • Turbidity; • TDS; • Chloride and fluoride; • Major ions: sulfate, calcium, potassium, sodium, magnesium, hardness as CaCO3, bicarbonate (HCO3); • Alkalinity; • Nutrients: filtrable phosphorous and nitrate as N; • Total and dissolved metals: aluminium, arsenic, barium, cadmium, chromium, copper, iron, manganese, nickel, lead, selenium, zinc and mercury; and periodically PFAS, PFOA as directed by Hunter Water and /or DPHI.	Quarterly	Quarry Manager	EIS Section 7.3, RTS Appendix A Appendix D Table D1
	WM2	Ongoing groundwater monitoring will be conducted at the site in accordance with the existing groundwater monitoring program.	Quarterly		
		Additional monitoring locations will be installed to provide additional baseline data to characterise the groundwater regime and for ongoing monitoring over the life of the project, given that several of the existing bores are within the disturbance footprint. (Note: the proposed groundwater monitoring network is presented in Table 7.3 and additional monitoring locations are shown in Figure 7-1 of the Groundwater Impact Assessment – Water Supply Bores (refer Appendix B of the RTS report)	Establishment phase under this version of the WMP		
Groundwater	WM3	**Groundwater monitoring program:** **Groundwater level** monitoring will be conducted at the frequency outlined in Table 7.3 of the Groundwater Impact Assessment – Water Supply Bores (refer Appendix B of the RTS).	Monthly	Quarry Manager	EIS Section 7.3 & Appendix D Table D1
	WM4	**Groundwater level** logger data will be recorded at hourly intervals with data downloaded on a monthly basis at the same time as the water levels are dipped.	Monthly		
	WM5	**Groundwater quality** monitoring will be conducted at the frequency outlined in Table 7.3 of the Groundwater Impact Assessment – Water Supply Bores (refer Appendix B of the RTS).	Quarterly		
	WM6	The existing site groundwater management plan will be updated to reflect the updated monitoring locations and approach.	As required		
	WM7	Groundwater monitoring will be undertaken in accordance with industry standards, with data stored within a central database and routine QA/QC conducted to verify data input.	Monthly		
	WM8	Groundwater sampling will include collection of field parameters for pH, temperature and EC, as well as observations on the colour and odour of the sample noted.			
	WM9	Samples shall be collected in laboratory supplied bottles for analysis.			
	WM10	Field filtering for metals analysis will be undertaken. Samples shall be stored in a chilled esky and submitted to a National Association of Testing	At each sampling event		
	WM11	Authorities (NATA) accredited laboratory with a CoC form for water quality analysis.	Monthly, or as		

Environmental Aspect	ID	Monitoring	Timing	Responsibility	Source / Reference
			required.		
Water Quality and Quantity	WM12	**<u>Water quality and quantity monitoring</u>** Monitoring of water extraction and water use on site will be undertaken to gather an accurate understanding of extractions from the groundwater source, monitoring of extractions for use on site, and the measurement of moisture content of sand material and sand material export.	Ongoing	Quarry Manager	EIS Section 16.3
	WM13	The following monitoring will be undertaken: • Metering of all extraction bores on site; • Metering of water inputs to the sand processing wash plant; • Fortnightly measurements of moisture content in exported material through stockpile measurements and; • Records of material leaving site. Results will be reviewed to confirm consistency with licensed entitlements and reported in the Annual Review.	Reported monthly internally and summary provided in the Annual Review		
Acid Sulfate	WM14	Condition B35 (d) (iii) requires detailed baseline data for ASS groundwater quality indicators from monitoring sites within 200 m of the approved disturbance area. Groundwater quality data and any produced water will be assessed for acid sulfate soil indicators, monitoring sites within 200m of the disturbance area imposed in line with relevant guidelines and including the following parameters: • Sulfate / chloride mass ratio • Alkalinity • Sulfate / alkalinity • Aluminum / calcium • Selected trace metals • Nutrients • Net acidity	Establishment phase under the approved version this WMP while bore installation occurs within the disturbance footprint, escalated if triggered.	Quarry Manager	DPHI RFI Recommendation

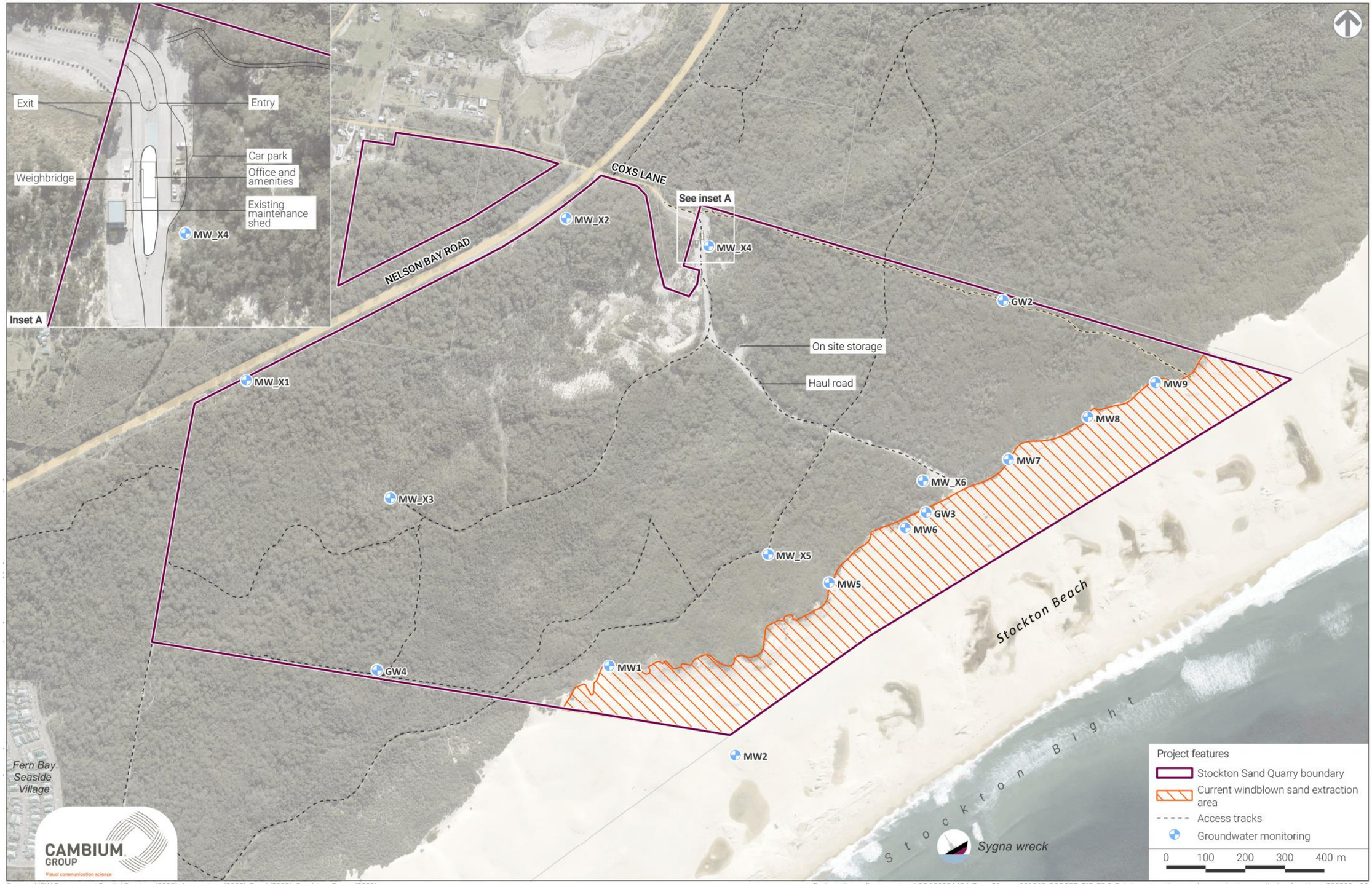


Figure 14: Existing Operations and Groundwater Monitoring Locations (EIS, 2023)

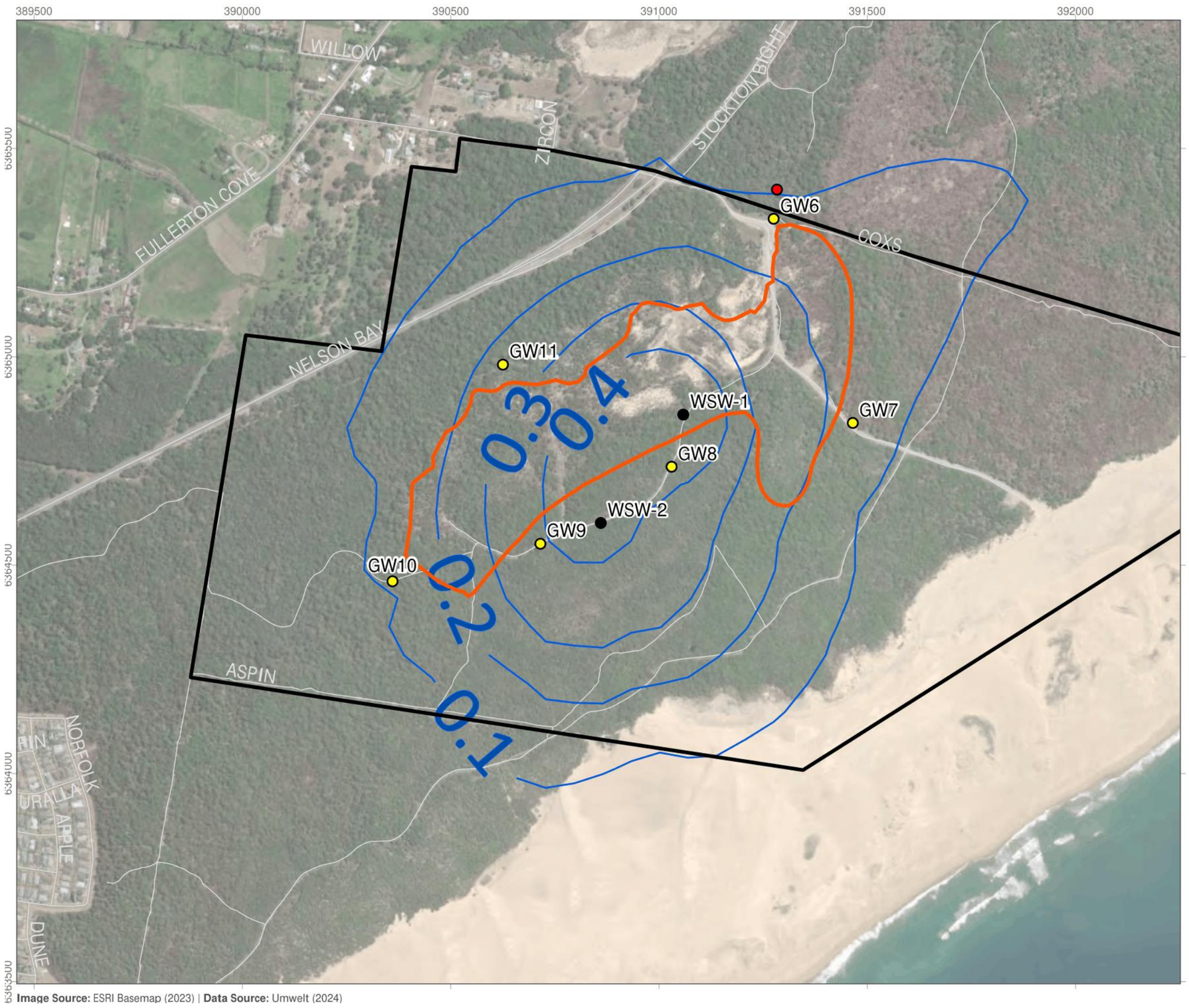


Figure 15
Groundwater
Impact Contours

Legend

- Site Boundary
- Extent of clearance
- Groundwater Drawdown Contour
- Road
- Planned Water Suply Well
- Groundwater Dependant Ecosystem
- Proposed Monitoring Bore

0 200 400

Metres

Scale: 1:12,500 at A4
GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2023) | **Data Source:** Umwelt (2024)

Figure 15: Groundwater Impact Contours (Umwelt, 2023)

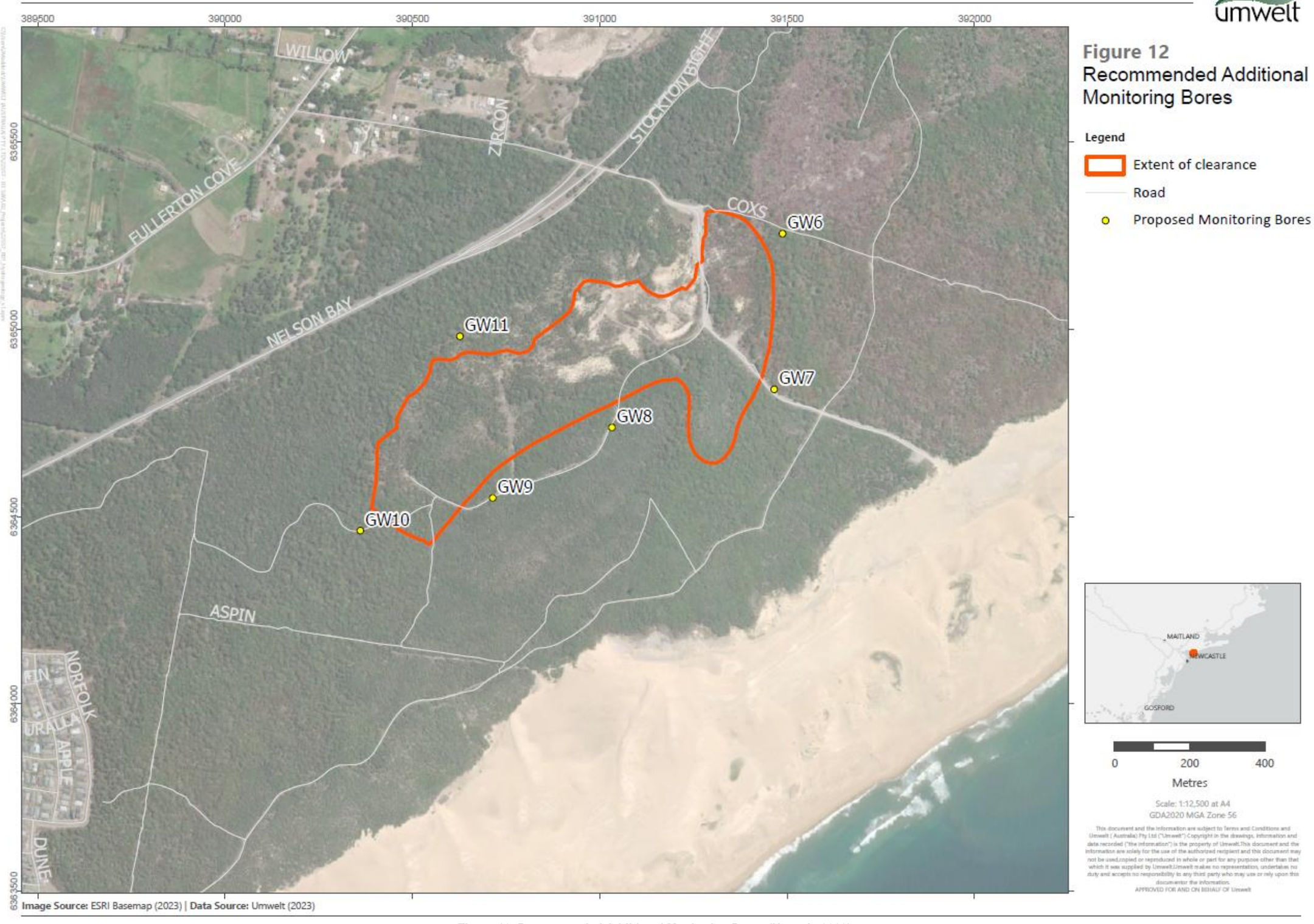


Figure 16: Recommended Additional Monitoring Bores (Umwelt, 2023)

7 CONTINGENCY PLAN

This Contingency Plan establishes the Trigger Action Response Framework for the management of groundwater levels and groundwater quality at the Stockton Quarry. The framework provides a structured and staged response to monitoring results that meet or exceed established trigger levels, ensuring that potential impacts are identified early and managed in accordance with development consent requirements outlined in **Table 17**.

Section 7.1 outlines:

- The methodology and prescribed trigger levels for groundwater levels and water quality parameters.
- The staged assessment and confirmation process applied when trigger levels are reached.
- Precautionary cease-pumping triggers.
- Acid sulfate soil (ASS) management responses during the establishment phase of monitoring under this Water Management Plan.

Section 7.2 presents the Trigger Action Response Plans (TARPs), including the Green (compliant), Orange (alert) and Red (confirmed exceedance) escalation framework.

Section 7.3 outlines the exceedance notification process required under Condition B35, including investigation requirements, escalation procedures and reporting obligations.

Trigger levels are intended to provide early warning of potential changes relative to baseline conditions and predicted impacts. Exceedance of a trigger level does not automatically indicate non-compliance but requires assessment in accordance with the TARP. No routine surface water discharge occurs at the site under the approved operational design. Accordingly, surface water quality monitoring for discharge has not been included in this TARP. Should any unplanned discharge occur, it will be managed in accordance with the site's incident response and water management procedures, including appropriate monitoring where required.

Groundwater

This WMP should be read in conjunction with the Maximum Extraction Depth Management Plan (MEDMP), which provides detailed methodologies and site-specific extraction depth controls. Together, the WMP and MEDMP ensure compliance with Conditions A7, A8, B26, B27, B28 and B35 of SSD-52984213. Refer also to Table 8 of the MEDMP for detailed extraction trigger action responses.

The groundwater data should be compared to relevant triggers following each sampling event. Groundwater trigger level values are outlined in **Table 18** and groundwater quality in **Table 19**. Groundwater levels are strongly dependent on rainfall recharge. Rainfall recharge at the site has a long term trend of wetter and drier season. Wetter season (with monthly rainfall exceeding 80 mm) occurs from January to June and the lower rainfall season occurs from July to December.

This section establishes a Trigger Action Response Plans to manage potential impacts to groundwater and surface water resources. The framework provides a structured and adaptive approach to responding to monitoring results that indicate deviation from baseline conditions or predicted impacts identified in the Environmental Impact Statement (EIS) and supporting technical assessments. Trigger levels are intended to provide early warning of potential impacts and do not represent impact thresholds.

7.1 TRIGGER IMPLEMENTATION AND VALUES

In accordance with SSD-52984213, **Table 17** below outlines the conditions relating to the staged nature and trigger action response planning requirements under this version of the WMP.

The trigger levels described in this section represent early warning thresholds derived from baseline monitoring data and modelling. **Section 7.2** and **Section 7.3** sets out the actions to be taken if these trigger levels are reached or exceeded, including confirmation sampling, investigation and escalation procedures.

Table 17: Trigger Conditions

Condition No.	Trigger Condition
A7.	A 0.7 metre buffer must be maintained above the 99th percentile groundwater level as calculated in the EIS and updated during the life of the development.
A8.	Extractive materials must not be extracted below 3.7 m AHD.
A18.	**STAGING, COMBINING AND UPDATING STRATEGIES, PLANS OR PROGRAMS** A18. With the approval of the Planning Secretary, any strategy, plan or program required by this consent may be: (a) prepared and submitted on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan, or program);
B26.	**SOIL AND WATER** Extraction depth (ii) a trigger action response plan to ensure compliance with conditions A7 and A8;
B35.	**WATER MANAGEMENT PLAN** (d) (iii) acid sulfate soils management plan that: − trigger action response plan for ASS groundwater quality indicators, including a stop pumping action;
	(d) (iv) groundwater management plan that includes: groundwater performance criteria, including trigger levels for identifying and investigating potentially adverse groundwater impacts (or trends) associated with the development;
	(d) (iv) clear and transparent drawdown limits and trigger levels at the boundary of the site and the Worimi Conservation Lands, including a cease pumping trigger level;
	(d) (iv) a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development;

7.1.1 Triggers: Staged for Groundwater Level

For the initial stage of construction and operation, extraction will progress toward 5 m AHD. Therefore, no sand extraction will occur below 5 m AHD under this version of the management plan. This provides a conservative control while additional bores within the disturbance footprint are being installed. Monitoring data to establish bore-specific 99th percentile groundwater levels for all monitoring bores will be reviewed.

The early works approach complies with Conditions A7 and A8 of Development Consent SSD-52984213 and addresses DCCEEW Water Group Recommendation 1.2 (13 June 2025), which requires clear percentile-based and pre-emptive groundwater management triggers.

The 5 m AHD control provides a conservative operational control to maintain compliance with Condition A7 during Stage 1. Observed 2017 to 2025 maximum groundwater levels (**Table 18**) are approximately 3.20 m AHD, confirming the control remains conservative. This TARP framework satisfies Condition B26(ii) by using site-specific percentile controls where data exist.

Together, these measures ensure continuous compliance with Conditions A7 and A8 and maintain groundwater protection across the site. See **Table 22** for TARP.

Actions: Short-term during site establishment

- Start continuous logging selected bores from the drilling program within the extraction footprint immediately for approximately 12 months Groundwater level and quality data reviewed after sampling occurs, trends documented, and percentiles updated with newly constructed bore data.
- Regular survey verification will be undertaken to ensure extraction remains above 5 m AHD.
- Minimal groundwater pumping for dust suppression, rehabilitation and firefighting purposes only.

Actions: Post establishment of the drilling program

- With updated logger and manual dip data from all bores, calculated site-specific percentiles will be assessed defining groundwater performance benchmarks by a suitably qualified hydrogeologist.
- Adaptive framework to revise targets based on the retained piezometers network to be confirmed, replaced at each stage if inside the direct extraction area.
- Post groundwater data review by hydrogeologist and revision of this management plan.

This long-term transition will require flexibility and is subject to consultation with the regulatory authorities. The maximum recorded groundwater levels for the MWX series surrounding the extraction area are outlined in **Table 18** below. The groundwater trends will be reviewed on an annual basis and reported in the Annual Review. Additional recommended monitoring bores are provided in **Table 15**.

The definitive 99th percentile + 0.7m buffer triggers have not been set for additional bores proposed within the disturbance footprint, and this will be prepared once a sufficient dataset exists (approximately 12 months of monitoring data and/or trend analysis). In lieu of this all bores will adopt extraction to 5 m AHD as a control under this version of the management plan.

Table 18: Maximum Recorded Groundwater Levels MWX Series (mAHD) 2017-2025

Period	MWX1	MWX2	MWX3S	MWX3D	MWX4S	MWX4D	MWX5	MWX6	MWX7
Jan to June	2.31	2.95	3.01	3.01	3.03	3.02	3.14	3.20	3.02
July to Dec	2.20	2.76	2.83	2.83	2.92	2.91	2.92	2.98	2.91

7.1.2 Triggers: Groundwater Quality

Baseline statistics considering 7 years of monitoring for field parameters EC and pH are provided in **Section 3.8**. Based on the baseline data statistics and in agreement with the ANZG (2018) guidelines related to receiving environment and site based approach, the trigger levels are specified at 95th percentile for EC and 5th and 95th percentile for pH (**Table 19**). See **Table 23** for TARP.

Table 19: Groundwater Quality Trigger Values (pH and EC)

Bore ID	pH / EC	5th Percentile (lower trigger)	95th Percentile (upper trigger)
MWX1	pH	4.76	5.2
	EC	-	560
MWX2	pH	5.27	5.6
	EC	-	412
MWX3S	pH	5.14	5.8
	EC	-	322
MWX3D	pH	7.08	7.7
	EC	-	605
MWX4S	pH	5.44	6.5
	EC	-	307
MWX4D	pH	5.44	6.5
	EC	-	307
MWX5	pH	7.20	7.7
	EC	-	641
MWX6	pH	7.21	7.5
	EC	-	967
MWX7	pH	7.18	7.8
	EC	-	653

Table 20: Groundwater Quality Toxicants and Nutrients Triggers

Bore ID	Aluminum (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)	Nitrate as N (mg/L)	Phosphate as P (mg/L)
MWX1	1.38	<0.001	0.062	<0.0001	0.004	0.001	1.1	<0.001	0.019	0.017	0.001	0.024	<0.00005	0.005	0.054
MWX2	0.11	<0.001	0.062	<0.0001	0.001	0.001	0.628	<0.001	0.016	0.017	0.001	0.029	<0.00005	0.005	0.043
MWX3S	0.33	0.003	0.07	<0.0001	0.001	0.002	0.65	<0.001	0.023	0.001	0.001	0.039	<0.00005	0.0786	0.039
MWX3D	0.03	0.001	0.05	<0.0001	0.001	0.002	4.3	<0.001	0.041	0.0034	<0.001	0.026	<0.00005	0.005	0.089
MWX4S	0.032	0.0144	0.08	<0.0001	0.001	0.006	0.11	<0.001	0.023	0.0042	<0.001	0.031	<0.00005	0.1034	0.056
MWX4D	0.02	0.004	0.08	<0.0001	<0.001	0.0124	0.41	<0.001	0.02	0.0034	<0.001	0.027	<0.00005	0.04	0.078
MWX5	0.02	0.004	0.054	0.0001	<0.001	0.001	1.3	<0.001	0.05	0.0034	<0.001	0.022	<0.00005	<0.005	0.078
MWX6	0.03	0.0244	0.054	<0.0001	<0.001	0.71	3.6	0.001	0.43	0.0034	<0.001	0.023	<0.00005	0.005	0.072
MWX7	0.02	0.004	0.08	<0.0001	<0.001	0.0124	0.41	<0.001	0.02	0.002	<0.001	0.027	<0.00005	0.04	0.078

7.1.3 Triggers: Precautionary Cease Pumping

Precautionary cease-pumping triggers apply to the limited operational groundwater pumping proposed under this version of the WMP. Trigger levels are based on predicted drawdown limits derived from groundwater modelling and are intended to protect off-site environmental receptors, including the Worimi Conservation Lands, outlined in **Table 21**.

Table 21: Cease Pumping Trigger Thresholds

Aspect	Level – Monitoring Bore	Level – GDE
Cease pumping trigger presented as drawdown from stable groundwater levels	Monitoring bore (120 m distance from production bore)	Closest GDE
Trigger Value	**0.5 m**	**0.1m**

7.1.4 Triggers: Acid Sulfate Soils

In accordance with Condition B35(d)(iii), this section outlines the management approach for Acid Sulfate Soils (ASS) during the establishment phase of monitoring under this Water Management Plan. Additional groundwater monitoring bores within the disturbance footprint are currently being assessed for ASS indicators. An updated ASS Trigger Action Response Plan (ASS TARP) will be incorporated into this WMP following receipt and review of results from the drilling and investigation program.

Under the current approved operational scenario:

- Extraction will progress toward and be limited to 5 m AHD.
- No excavation will occur below 5 m AHD.
- Groundwater pumping in the establishment phase will remain below 16 ML/year for dust suppression, rehabilitation and firefighting purposes only.

ASS Trigger Indicators

Groundwater monitoring will be assessed for unexpected changes in key ASS indicators, including:

- Decrease in pH.
- Change in electrical conductivity (EC).
- Increase in sulfate.
- Increase in dissolved iron.
- Increase in dissolved aluminium.

Management Responses

Where monitoring indicates potential ASS activation or mobilisation:

- Results will be reviewed by a suitably qualified environmental specialist.
- Confirmation sampling will be undertaken where required.
- Works in the affected area may be temporarily suspended pending investigation.
- Exposed ASS or PASS material will be isolated, covered, treated or neutralised as required in accordance with the NSW Acid Sulfate Soil Manual..
- Further investigation and site-specific management measures will be implemented prior to recommencement of works.

Preventative and Operational Controls

To minimise the risk of ASS disturbance and groundwater mobilisation:

- Extraction will be undertaken in staged sequences to limit the extent and duration of groundwater exposure.
- Approved extraction depths and buffers to the water table will be maintained to avoid groundwater interception.
- Excavation below the approved minimum extraction level will not occur.
- Disturbance will be confined to approved limits, verified by surveyed boundaries.
- Surface water infiltration into exposed areas will be minimised where practicable.
- Progressive rehabilitation will be undertaken to reduce prolonged exposure of potentially reactive materials.

Should future operational scenarios include groundwater pumping, cease-pumping triggers and associated controls, they will be implemented the updated ASSMP/WMP TARP.

7.2 TRIGGER ACTION RESPONSE PLAN

Section 7.1 describes the criteria and basis for development of groundwater trigger levels, including upper trigger levels for key water chemistry parameters derived from baseline monitoring and modelling.

This section outlines the response process to be followed when a trigger level is reached, including confirmation sampling, investigation, escalation and notification requirements.

7.2.1 TARP: Groundwater Levels

Table 22: Trigger Action Response Plan Groundwater Levels (MWX Series)

Trigger / Action / Response	Level - Green	Level – Orange	Level – Red
Trigger	All monitoring bores record groundwater levels below the bore-specific 99th percentile groundwater level (ie., not triggered), and the 0.7 m separation buffer to the extraction floor is maintained, with no sustained rising trend.	Groundwater levels show a rising trend over three consecutive monitoring events (3 months) and are approaching the bore-specific 99th percentile groundwater level (between 95th percentile and 99th percentile).	Groundwater level reaches the bore-specific 99th percentile groundwater level, or monitoring indicates the 0.7 m separation buffer between groundwater and the extraction floor is not maintained.
Action	Continue extraction operations as planned. Maintain monthly monitoring, continue QA/QC and rainfall log correlation. Maintain the 5 m AHD extraction floor control under this version of the WMP.	Hold further extraction in the affected area until confirmed current floor is above 5 m AHD. Increase groundwater monitoring frequency (weekly). Review rainfall conditions, groundwater trends and extraction schedule.	Cease extraction in the affected area immediately. Confirm floor level and backfill if required to reinstate the 5 mAHD extraction control measure. Re-survey floor RL and review groundwater levels prior to recommencing extraction.
Response	Keep monthly internal compliance records and trend plots and include results in Annual Review.	Notify site management of trend, brief operators on restricted zones and precautionary approach.	Notify DPHI, HWC and DCCEEW within 7 days of becoming aware of the potential non-compliance in accordance with the Development Consent. Initiate the groundwater exceedance notification and investigation process in accordance with **Section 7.3.** Continue contingency monitoring weekly until two consecutive readings confirm return to compliant conditions. Consult hydrogeologist. Update risk register.

*Linked with 95th and 99th percentiles outlined in **Table 9***

Note:

- *The TARP ensures groundwater monitoring results are reviewed and responded to in a timely manner to maintain the minimum separation between groundwater levels and the extraction floor required under Condition A7 of the Development Consent.*
- *Triggers are based on rising trends and proximity to the control level, ensuring a preventative rather than reactive response consistent with DCCEEW Recommendation 1.2 (13 June 2025).*
- *Bores with no defined 99th percentile will be calculated when approximately 12 months of data is collected*

7.2.2 TARP: Groundwater Quality

Table 23: Trigger Action Response Plan Groundwater Quality

Trigger / Action / Response	Level - Green	Level – Orange (Alert)	Level – Red (Exceedance)
pH, EC Trigger	pH and EC results within trigger levels set in **Table 19**	• **A single exceedance of trigger level;** • OR a rising/falling trend observed over **three sampling rounds.**	• Confirmed exceedance (exceedance in confirmation sample); • **OR two exceedances within three sampling rounds; OR three consecutive exceedances;** • OR evidence of ASS mobilisation (declining pH with elevated sulfate/metals).
pH, EC Action	Maintain monthly monitoring, continue QA/QC, operational activity and rainfall log for correlation.	• QA/QC review of laboratory and field data. • Confirmation sampling (as practicable). • Review rainfall, tidal and operational factors. • Compare with adjacent/upgradient bores. • ASS mobilisation review (declining pH with elevated sulfate/metals)	• Initiate the groundwater exceedance notification and investigation process in accordance with **Section 7.3** • Increase monitoring frequency if confirmed contamination following the contaminated groundwater management protocol (**Section 7.3.2**). • Engage hydrogeologist/environmental specialist for a full review. • Review extraction sequencing/pumping.
pH, EC Response	Keep monthly internal compliance records and include review and results in the Annual Review.	• Document findings. • Notify site management. • Escalate to Red if repeated exceedance confirmed or review of the data indicates escalation is required.	• **Notify DCCEEW Water Group, Hunter Water, NPWS and WCL within 7 days** of receiving results. • Submit a Water Trigger Investigation Report within 30 days of confirmation of the exceedance. • Continue increased monitoring until two consecutive compliant results recorded.
Toxicants & Nutrients Trigger	Results within trigger levels. **Table 20**	• **Single exceedance above trigger level** • **OR a rising/falling trend observed over three sampling rounds.**	• Confirmed exceedance; • OR evidence of ASS mobilisation (declining pH with elevated sulfate/metals.
Toxicants & Nutrients Action	Continue routine monitoring.	• QA/QC review. • Confirmation sampling. • OR Brief review of geochemical and water level spatial and temporal trends by a hydrogeologist.	• Increase monitoring frequency for affected parameters. • Full specialist review. • Assess need for operational modification or containment measures.
Toxicants & Nutrients Response	Record in Annual Review.	• Document findings and escalate to red TARP level if confirmed. • Undertake any actions as advised by the hydrogeologist.	• **Notify agencies within 7 days of confirmation.** • Investigation report within 30 days of receiving results. • Continue contingency monitoring until compliant results are achieved.

7.2.3 TARP: Cease Pumping

Precautionary cease-pumping triggers levels are based on predicted drawdown as a lower trigger level for drawdown limits derived from the groundwater modelling and cease pumping action for Worimi Conservation Lands outlined in **Table 24** below, aimed at protecting off-site environmental receptors in accordance with Condition B35 (d) (iii).

Table 24: Trigger Action Response Plan Cease Pumping

Trigger / Action / Response	Level - Green	Level – Orange	Level – Red
Drawdown at monitoring bore 120 m distance from production bore	Drawdown <0.5 m of stable groundwater levels.	Rising trend observed over a 3 consecutive sampling periods approaching 0.5 m drawdown but not exceeding it.	Groundwater drawdown exceeding 0.5 m.
Closest GDE monitoring bore proxy	Drawdown <0.1 m of stable groundwater levels.	Rising trend observed over 3 consecutive sampling periods approaching 0.1 m drawdown but not exceeding it.	Groundwater drawdown exceeding 0.1 m.
Action	Maintain monthly monitoring, continue QA/QC and rainfall log correlation.	Increase monitoring frequency (weekly) and review rainfall/forecast conditions and extraction schedule.	Cease pumping immediately.
Response	Keep monthly internal compliance records and trend plots and include results in Annual Review.	Notify site management of trend. Hydrogeologist to review data and precautionary approach.	Notify DPHI and relevant agencies within 7 days of becoming aware. Undertake a hydrogeological review and implement reductions in pumping rates as required. Implement contingency monitoring (weekly) until two consecutive readings confirm return to compliant conditions.

7.3 EXCEEDANCE NOTIFICATION AND INVESTIGATION

7.3.1 Groundwater Exceedance Protocol

In accordance with Condition B35 (d)(iv), this WMP provides;

- *A process to notify DCCEEW Water Group, Hunter Water, NPWS and WCL if groundwater triggers are exceeded.*
- *A protocol for providing Hunter Water with groundwater monitoring data.*

In accordance with Condition B35(d)(iv), this WMP establishes a process to notify DCCEEW Water Group, Hunter Water, NPWS and the Worimi Conservation Lands (WCL) where groundwater triggers are exceeded outlined in **Table 22, Table 23** and **Table 24.**

Trigger Identification

- A single groundwater trigger exceedance will initiate an alert response under the TARP, including QA/QC review and confirmation sampling.
- Confirmation sampling for groundwater quality will be undertaken as soon as practicable, typically within 28 days depending on parameter group.
- Where the exceedance is confirmed, or where repeated exceedances occur prior to confirmation sampling, the notification process below will be activated.

Notification Process

Notification will be made to relevant agencies depending on the nature of the exceedance, including DPHI, DCCEEW Water Group, EPA (if applicable), Hunter Water and other stakeholders as required.
Where groundwater triggers are confirmed to be exceeded and confirmation TARP is in level 'red':

- Notification will be provided to:
    - DCCEEW Water Group.
    - Hunter Water.
    - National Parks and Wildlife Service.
    - Worimi Conservation Lands.
- Notification will be submitted via the Major Projects Portal (or agreed communication pathway) within 7 days of confirmation of the exceedance and received results as per Condition C9 noncompliance notification. The notification will include:
    - Monitoring results.
    - Relevant trigger level.
    - Initial assessment of potential causes.

- Proposed investigation actions.

Investigation Reporting

A Water Trigger Investigation Report will be provided within 30 days of confirmation of the exceedance, outlining:

- Investigation findings.
- Assessment of potential quarry contribution.
- Management measures implemented or proposed.
- Recommendations for ongoing management.

Compliance Reporting

- Monitoring data and non-compliances will be reported in the Annual Review.
- Groundwater exceedances will be reported via the Major Projects Portal.
- Water Trigger Investigation Reports and relevant groundwater monitoring data will be provided directly to Hunter Water at wrdevelopments@hunterwater.com.au, including through Annual Review reporting and upon request.

7.3.2 Contaminated Groundwater Management Protocol

Where potential groundwater contamination is identified through monitoring or field observations, a risk-based assessment will be undertaken to determine the nature and extent of contamination, potential sources, and associated risks. Appropriate management measures will be implemented in accordance with a risk-based framework consistent with the monitoring program (**Section 6**), trigger levels (**Section 7.1**), and Trigger Action Response Plan (**Section 7.2**).

Identification

Potential groundwater contamination will be identified through routine groundwater monitoring, exceedance confirmations and verifications of relevant trigger levels, field observations and laboratory results.

Response Actions

Where contamination is identified or suspected, the following actions will be implemented as applicable, outlined in the TARP's outlined in **Section 7.1** and **7.2**:

- Verification and investigation to confirm the exceedance or observation through validation sampling and data review.
- Operational controls whereby site will modify, restrict, or cease extraction and/or groundwater pumping where there is a risk of increased impacts.
- Containment and management and implement appropriate controls to prevent the migration of impacted groundwater, which may include isolation of affected areas and adaptive site water management measures.
- Specialist input through the engagement of a suitably qualified hydrogeologist or environmental specialist

to assess the extent, cause, and significance of the impact where required.

Notification and Reporting

Relevant agencies will be notified in accordance with consent conditions, the EPL (if applicable), and the site PIRMP where required. Outcomes of investigations and management actions will be documented and in accordance with **Section 9** and/or Water Trigger Investigation reports (**Section 7.3.1**).

Review and Adaptive Management

Management measures will be reviewed and refined based on monitoring results and investigation outcomes to ensure impacts are minimised and do not result in material harm to groundwater resources or dependent receptors.

8 INCIDENT, NON-COMPLIANCE AND COMPLAINT MANAGEMENT

Any environmental incident or non-compliance at the site will be managed in accordance with the consent. Incidents and non-compliances have the following definitions in the SSD52984213. All water-related incidents are reported under the PIRMP requirements and referenced in the Annual Review.

8.1 INCIDENTS MANAGEMENT

8.1.1 Incident Definition

SSD-52984213 defines an incident as:

An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.

Material harm to the environment is defined under Section 147 of the POEO Act and under this consent. Harm is considered material if it:

1. Involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial.

2. Involves actual or potential loss or property damage of an amount exceeding $10,000 (or such other amount as prescribed by regulations). "Loss or damage" includes the reasonable costs and expenses that would be incurred in taking action to prevent, mitigate, or make good the harm caused to the environment.

8.1.2 Incident Notification

Initial Incident notification and reporting will be conducted in accordance with Stockton Quarry's Pollution Incident Response Management Plan (PIRMP) as well as Condition C7, whereby:

"The Department and any other relevant agencies must be notified within 24 hours of an incident occurring. The notification must be made using the Department's Major Projects website and address details of the incident including:

(a) date, time and location of the incident;
(b) a brief description of what occurred and why it has been classified as an incident;
(c) a description of what immediate steps were taken in relation to the incident; and
(d) identifying a contact person for further communication regarding the incident."

8.1.3 Incident Reporting

The Department must be provided with a subsequent incident report in accordance with Appendix 6 of the Consent which states:

1. All incident notifications and reports must be submitted via the Department's Major Projects website.

2. The Applicant must provide notification as required under these requirements, even if the Applicant fails to give the notification required under condition C7 or, having given such notification, subsequently forms the view that an incident has not occurred.

3. Within 7 days (or as otherwise agreed by the Planning Secretary) of the Applicant making the immediate incident notification (in accordance with condition C9), the Applicant is required to submit a subsequent incident report that:

(a) identifies how the incident was detected; identifies when the Applicant became aware of the incident;

(b) identifies any actual or potential non-compliance with conditions of consent;

(c) identifies further action(s) that will be taken in relation to the incident; and

(d) a summary of the incident;

(e) outcomes of an incident investigation, including identification of the cause of the incident;

(f) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and

(g) details of any communication with other stakeholders regarding the incident.

Further details regarding Boral's internal and external incident reporting procedure are included in the latest revision of the PIRMP which is available on the Boral website.

8.2 Non-Compliance Management

8.2.1 Non-Compliance Definition

An occurrence, set of circumstances or development that is a breach of this consent.

Boral will manage any water management incident or non-compliance in accordance with the incident and non-compliance protocols found in the EMS. Boral will:

"Take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur. Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the DPHI describing those options and any preferred remediation measures or other course of action. Implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary, and Submit an incident report within seven days of the original notification."

8.2.2 Non-Compliance Notification

Non-compliance notification and reporting will be conducted in accordance with Condition C9 whereby:

"Within seven days of becoming aware of a non-compliance occurring, the Department must be notified. The notification must:

(a) be in writing and submitted via the Department's Major Projects Website;

(b) identify the development (including the development application number and name);

(c) set out the condition of this consent that the development is non-compliant with, why it does not comply, the reasons for the non-compliance (if known); and

(d) set out what actions have been, or will be, undertaken to address the non-compliance.

***Note:** A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.*

8.3 COMPLAINTS MANAGEMENT AND REPORTING

The site has a complaints hotline, with all community or regulatory complaints logged in a complaints register and investigated and actioned immediately as per EIS 'Environmental Management' and the EMS which includes a detailed complaints management procedure.

This sub-section records the procedures that would be implemented following the receipt of a water-related complaint. Complaints can also be directed to the Company via phone or email. These details are presented

in **Table 25** below.

Table 25: Complaints Management

Communication Method	Details
Email	info@boral.com.au
Website	https://www.boral.com.au/locations/boral-quarries-stockton-fullerton-cove
Phone	1300 267 253

Following receipt of any water-related complaint, Boral would implement the following procedure:

1. The complaint will be reviewed by the Quarry Manager to determine the nature, date and time of the water quality source.

2. The water monitoring data for the relevant period will be examined and a report prepared. The Quarry Manager will contact the complainant to discuss and attempt to resolve the complaint. Further water quality measures and water monitoring will be undertaken to inform of triggers and response actions if required in consultation with the complainant.

3. In the event that the procedures identified in Step 2 above resolve the issues raised, no further action will be taken. In the event that the complaint is not resolved, supplementary water quality monitoring will be undertaken to inform actions within one month of the conclusion of Step 2 in accordance with the procedures identified in Step 5.

4. Should the monitoring report indicate that no exceedance of the relevant criteria was identified, the Quarry Manager will continue to consult with the complainant in relation to managing water quality.

5. Should the monitoring report indicate that an exceedance of the criteria identified in SSD-52984213 or the EPL the Quarry Manager will notify the relevant government agencies. In addition, the Quarry Manager will continue to consult with the complainant in relation to the complaint.

6. In the event that multiple complaints are received from the same individual(s) and Boral can demonstrate:

- Have demonstrated compliance with the criteria.

- There is documented evidence of a genuine attempt by Boral to discuss the issue and seek a resolution with the complainant.

- Then Boral may, in consultation with the relevant government agencies, limit responses to further complaints to Steps 1 and 2 above.

The complaints register will be maintained by Boral for the life of the site and updated monthly. A record of any complaint will be kept for at least the life of the project and the record will be produced to any authorised officer if requested as well as made available on the Boral website. A summary of complaints received will be provided in the Annual Review and made available on the Boral website.

8.4 PUBLICLY ACCESSIBLE INFORMATION

As per the Environmental Management Strategy prepared for the Stockton Quarry Inland Dune Project all information on potential environmental impacts associated with the Water Management Plan will be provided on the public website located at www.boral.com.au.

All information required for the development in accordance with Part C Condition 12 of Development Consent SSD-52984213 and any monitoring requirements of the Environmental Protection Licence (EPL 10132) will be provided on the website.

9 OTHER REPORTING

9.1 ANNUAL REPORTING

9.1.1 Annual Review

The site's environmental officer is responsible for managing the environmental reporting program and arranging specialist consultants to prepare reports, as required. The activities and performance outcomes of the WMP will be presented in the AR.

This will include detailed assessment of monitoring results collected over the course of the WMP, an evaluation of any trends occurring across the site, a summary of any incidents or non-compliances with licences/criteria and recommendations for management actions.

In accordance with the requirements of Project Approval Condition C10, By the end of March in each year after the commencement of development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department, Council, Hunter Water Corporation and any other interested period upon request reviewing the environmental performance of the development.

As per Condition C10 of the Development Consent, the Annual Review must:

- describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;

- include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the:
    - *I. relevant statutory requirements, limits or performance measures/criteria;*
    - *II. requirements of any plan or program required under this consent;*
    - *III. monitoring results of previous years; and*
    - *IV. relevant predictions in the document/s listed in condition A2(c);*

- identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;

- evaluate and report on:
    - *I. the effectiveness of the noise and air quality management systems; and*
    - *II. compliance with the performance measures, criteria and operating conditions of this consent;*

- identify any trends in the monitoring data over the life of the development;

- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

- describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.

9.1.2 EPL 10132 Reporting

Boral must also submit an Annual Return in accordance with condition R1.1 of EPL 10132 which states:

R1.1 The licensee must complete and supply to *the EPA an Annual Return in the approved form comprising* of the following

1. *a Statement of Compliance,*
2. *a Monitoring and Complaints Summary,*
3. *a Statement of Compliance – Licence Conditions,*
4. *a Statement of Compliance -Load based Fee,*
5. *a Statement of Compliance -Requirement to Prepare Pollution Incident Response Management Plan,*
6. *a Statement of Compliance – Requirements to Publish Pollution Monitoring Data; and*
7. *a Statement of Compliance – Environmental Management Systems and Practices.*

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

9.1.3 Hunter Water Reporting

In response to Hunter Water's recommendation, Boral will provide notification of relevant pollution incidents (non-trivial spills), as detailed in the PIRMP. Groundwater monitoring data, including routine monitoring results and any exceedances, will be provided to Hunter Water through Annual Review reporting, Water Trigger Investigation Reports, and upon request. These reports and associated groundwater monitoring data will be sent directly to wrdevelopments@hunterwater.com.au

9.2 INDEPENDENT ENVIRONMENTAL AUDIT

An Independent Environmental Audit (IEA) must be undertaken for the development.

As per Condition C11 of Development Consent, the IEA must:

a) be conducted within one year of commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise;
b) be conducted and carried out in accordance with the Independent Audit Post Approval Requirements (NSW Government, 2020) or its latest version; and
c) reported and submitted to the Department in accordance with the Independent Audit Post Approval Requirements (NSW Government, 2020) or its latest version

This management plan will be reviewed for its effectiveness of the management measures set out pursuant to the submission of each IEA.

9.3 SITE WATER BALANCE REPORTING

As per Condition B35 (d) (i), an annual report will be prepared to detail the actual water use on-site compared to the projected water balance with a summary of water sources used during the year, including volumes extracted from the SGS. The site water balance will be maintained as a living register, reconciling inflows and outflows. Annual Review reporting will include a reconciled balance against WAL volumes, demonstrating compliance with licensed entitlements and adequacy under varying climatic scenarios

Detailed records of water used for sand processing, dust suppression, and other operational activities will be provided with water storage levels and data on water storage capacity and any fluctuations throughout the year. Compliance review and assessment of the level of compliance with water use conditions and any adjustments made to water management practices to improve efficiency or address issues.

10 ROLES AND RESPONSIBILITIES

Roles and responsibilities are outlined and defined in **Table 26** below. In accordance with Condition C1 (e) of the Development Consent, additionally detailed in the EMS.

Table 26: Roles and Responsibilities

Position	Position Description
Quarry Manager	The Quarry Manager is the person who manages the Quarry and is responsible for the day-to-day activities on the site including environmental requirements. Preparation and submission of the Annual Review and any other associated reporting requirements. Assessment, analysis and collation of all monitoring results, with escalation to external specialists and/or suitably qualified person/s when required. Maintain internal system for environmental compliance.
Environment Business Support	Role is to support the Quarry Manager in completing all environmental and other requirements.
On site personnel	Onsite personnel, all employees and contractors working on the site.
Suitably Qualified Person	Where the Quarry Manager sub-contracts tasks within this management plan, the quarry manager is to satisfy themselves as to the suitability of the contractor for the task. A suitably qualified contractor will be able to demonstrate the following for the required task: • Relevant qualifications or training • Relevant experience

11 TRAINING AND AWARENESS

All personnel will undergo water management awareness training specifically regarding water use management processes through the induction and re-induction process. Water management will be a component of the competency-based site induction program. The following areas will be covered in the induction.

- Awareness of water monitoring locations.
- Procurement of equipment to ensure water limits are complied with.
- Awareness of the importance of timely reporting.

The Quarry Manager will be responsible for ensuring the appropriate water quality management training and is to be included in the induction.

12 REVIEW AND IMPROVEMENT

Monitoring results, trigger exceedances and any required corrective actions will be reviewed following each Annual Review, incident/non-compliance review, Independent Environmental Audit, consent modification, or change in development phase, in accordance with Condition C5 and used to inform updates to this Plan and associated management documents.

As per *Condition C5* of the Development Consent, this plan will be reviewed within three months of:

(a) the submission of an incident report under condition C7 or a non-compliance under condition C9;

(b) the submission of an Annual Review under condition C10;

(c) the submission of an Independent Environmental Audit under condition C11;

(d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or

(e) notification of a change in development phase under condition A14.

Additionally, in line with Condition C6 of the Development Consent, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary and submitted to the Planning Secretary for approval within six weeks of the review.

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13 REFERENCES

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Appendix A

Consultation for the Water Management Plan (Boral, DPHI, DCCEEW, HWC)

Consultation for Boral Stockton Dry Sand Project Water Management Plan (Pre Approval)

- **13 June 2025**
- **21 August 2025**
- **8 September 2025**
- **October 2025 ND**
- **13 January 2026**

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
Department of Climate Change, Energy, the Environment and Water **(DCCEEW Water Group)** **Letter dated 13 June 2025**	<u>Recommendation 1.1</u> The Department of Planning, Housing and Infrastructure requests the proponent to update the Maximum Extraction Depth Management Plan (MEDMP) to define the following: • groundwater table across the extraction footprint, • re-evaluate the hydrological conceptual model, • update the groundwater table contour map, in particular the northern strip sand dunes to be investigated • include relevant historical data from southeastern quadrant e.g. GW1 • re-evaluate the maximum extraction depth, and • describe the location of benches when defining maximum extraction depths.	Boral suggests there will be additional collection of a further 12 months of groundwater monitoring data from a piezometer network which is currently being installed within the extraction footprint. The drilling program network will comprise of an approximate 63 proposed piezometers across the site for an acid sulfate soils assessment, of which at least 8 will be retained for groundwater level and quality monitoring (Figure 1 below). This will be the basis of additional collection of groundwater table data across the footprint. The results will be incorporated within the 12-month update of the Maximum Extraction Depth Management Plan. The Water Management Plan will define the frequency of the monitoring based on the inputs of Boral's preferred hydrologist. Following the interim period of 12 months, Boral commits to a full model review informed by the updated groundwater data, with results analysed and updated by a suitably qualified and experienced hydrogeologist. The MEDMP will be updated accordingly and re-submitted for review. Historical groundwater data collected from piezometer GW1 located in the southeastern quadrant of the extraction footprint indicates groundwater levels have remained relatively stable with highs of 3.08. to maintain compliance with A7 and A8 with a +0.7m buffer brings the threshold to 3.78. Boral believes the data supports the proposed interim extraction level of 4.5 m AHD as conservative, with the additional option to bench the working face to reduce the risk of groundwater interception at the northern edge of the footprint. The TARP will be updated to reflect this risk-based approach during the 12-month monitoring period, inclusive of the relevant historical data.	Updated in Section 1.6
	<u>Recommendation 1.2 - Prior to approval</u> The Department of Planning, Housing and Infrastructure requests the proponent to update the Water Management Plan (WMP) to reflect the outcomes of Recommendation 1.1 above and then use to: • Revise the groundwater level performance targets • Revise the Trigger Action Response Plan (TARP) to demonstrate compliance and accountability to operate within the Conditions of A7 of the project		Updated in Section 7
	<u>Recommendation 2.1 - Pre approval</u> The Department of Planning, Housing and Infrastructure requests the proponent to ensure relevant nomination of work dealing applications for Water Access Licences (WAL) proposed to account for water take by the project have been completed prior to the water take occurring.		Updated in Section 5 and Section 1.6
Department of Climate Change, Energy, the Environment and Water **(DCCEEW**	<u>Response to Recommendation 1.1</u> – Prior to approval • groundwater table across the extraction footprint • re-evaluate the hydrological conceptual model • update the groundwater table contour map, in particular the northern strip sand dunes to be investigated • include relevant historical data from southeastern quadrant e.g. GW1		Updated in Section 1.6
	<u>Response to 2.1</u> – Pre Approval (WSW)	Boral confirms that the administrative process to renew the previously lapsed	Updated in

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
Water Group) **Letter dated 21 August 2025**		Water Supply Work (WSW) approval is now underway. The WSW is required to enable abstraction under the relevant Water Access Licences held by Boral. Progress updates on the application and supporting documentation will be provided as required. We trust this revised strategy provides the clarity and assurance sought by the DCCEEW.	Section 5
	<u>Response to 2.2 – Post Approval</u> DPHI should request the proponent to ensure that relevant nomination of work dealing applications for Water Access Licenses proposed to account for water take by the		
	<u>Response to 2.3 – Post Approval</u> DPHI should request the proponent review Table 5 WAL register of the Water Management Plan to ensure license and approval reference numbers are correct.	Boral has updated Table 5 to reflect 45028 opposed to 40528.	
Hunter Water Corporation **(HWC)** **Letter dated 2 June 2025**	The Maximum Extraction Depth Management Plan is generally satisfactory to Hunter Water. The only comment is that Hunter Water advises that current actions and responses related to the required groundwater level buffer in the Trigger Action Response Plan do not ensure compliance with the approval conditions. It is recommended that these actions and responses be amended to ensure compliance with the approval requirements.	Boral has implemented the recommendation, and the TARP has been amended.	Updated in Section 7
Department of Planning, Housing and Infrastructure (DPHI) **Letter dated 19 September 2025**	Letter requesting RFI following DCCEEW recommendations	Boral has prepared updates to the plan following the recommendations of DPHI, DCCEEW and HWC. Outlined further below.	
Department of Planning, Housing and Infrastructure (DPHI) Letter December 2025	• Please confirm if the plan has been prepared with consideration of the 2022 DPE Guidelines for Groundwater Documentation for SSD/SSI Projects - Technical guideline.	• Boral outlines the plan has been prepared with consideration of the 2022 DPE Guidelines for Groundwater Documentation for SSD/SSI Projects - Technical guideline.	Updated in Section 2
	• Further detail is required to describe/address: maintain water management systems in a proper and efficient manner not included • Identify risks to receiving environment and downstream water users. • Include the location or description of the nearest 3rd party bore • Section 6 includes non committal language such as 'should' please update to include firm commitments i.e "will'. • Detail how setbacks are maintained in accordance with the Aquifer Interference Policy • Include a description of proposed ESC	Water Management General a) maintain water management systems in a proper and efficient manner included in: • Extraction controls (MEL, interim floor) • Groundwater supply bores and pumping controls • Erosion and sediment controls • Progressive rehabilitation and surface water management b) Identified risks to receiving environment and downstream water users in receptor risk section, overall low risk outlined. c) Figure has been included outlining the locations or description of the nearest 3rd party bore. Alluvial waters d) Section 6 updated to remove non committal language, plan reviewed for overall language on committal language. e) Setbacks to the groundwater source are maintained through application of minimum extraction levels and groundwater buffers	Table 10

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
		consistent with the NSW Aquifer Interference Policy, rather than fixed horizontal distances. f) Erosion and sediment controls are addressed through operational measures in Section 5 and supported by site-specific ESC plans implemented prior to disturbance.	
	Section 2.6.5 states site geology, surface water runoff from the in-situ landscape is negligible. Erosion risks are confined to construction with imported material such as the access road and hardstand areas. Table 10 doesn't describe controls. Describe the controls which could be used	Boral has updated Table 13. (Previously Table 10).	Updated in Table 10
	a. please provide the baseline data in the WMP b. Include ASS groundwater quality indicators in the monitoring program c. Update the TARP to include ASS groundwater quality indicators, including a stop pumping action d. Provide a protocol for the management of contaminated groundwater e. provide detailed mitigation measures for the management of exposed ASS	a. ASS EIS report baseline data implemented in the plan. b. Parameters of the groundwater regime include: • pH • electrical conductivity • sulfate • iron and aluminium • field observations of colour, odour or turbidity c. Triggers and evaluation through water trigger investigation protocols outlined. d. Exposed acid sulfate soils provide a protocol e. Mitigation and management measures table updated to include ASS, section for exposed ASS implemented into the plan, although overall low risk confirmed by EIS assessment.	Updated in Section 1.6 and 7.1.4
	Please identify where baseline groundwater yield has been addressed or include it.	Boral has included groundwater baseline data on groundwater yield.	Updated in Section 3.5
	Provide a lower trigger level for drawdown limits and cease pumping action for Worimi Conservation Lands	Included a section to outline lower trigger level for drawdown limits and cease pumping action for Worimi Conservation Lands, pull information from the EIS.	Updated in Section7.3.2
	a. provide a description of the program to monitor and evaluate each of the performance measures in Table 6 (replicated at Table 20 of the WMP) b. provide a description of the program to monitor and evaluate impacts of the project on the North Stockton Catchment Area c. Please provide an explanation of what information is missing and why the current measures would be inadequate.	• Section for performance criteria within WMP, addition of specific monitoring evaluation on performance criteria added. • Include description of the program to monitor and evaluate impacts of the project on the North Stockton Catchment Area	Updated in Table 10
	a. Include triggers for remaining performance measures e.g. drawdown (GDEs and bore users) and water quality b. Please explain or define the control level. c. Include details of reporting consistent with the consent (including timeframes)	Reviewed and updated trigger action response plan	Updated in Section 7
	• Please provide details of the notification timeframe • Please make a commitment to implement the plan prior to quarrying • Table 10 and 20 Please include details of how these have been addressed or a firm commitment on how they will be addressed.	• Timeline added to reporting in the Major Projects Portal • Completed • Table 10 and Table 20 updated to align commitments and performance measures.	Updated in Table 10

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
DPHI on behalf of Department of Climate Change, Energy, the Environment and Water (DCCEEW Water Group)	1.1 Recommendation – pre-approval The Department of Planning, Housing and Infrastructure (DPHI) should request the proponent to demonstrate there is a secure water supply to meet site water demands. The proponent identified in the WMP that they were in the process of obtaining approvals for the site water demand bores. The proponent has not provided any additional water supply work approval references to meet site water demands beyond year 1. While the proponent holds 524 shares they are currently only able to extract 16 ML/year of the required 129.25 ML/year as the other WALs have no extraction point. This is insufficient to support the project. The proponent should identify the relevant works including reference number that will be used to support the projects site water demands.	Groundwater extraction beyond 16 ML/year will not occur unless and until all required works approvals and WAL dealings are granted. See the footnote of Table 5 WAL register for more details.	Updated in Section 1.6.1
	1.2 Recommendation – pre-approval DPHI should request the proponent to ensure that the Water Access Licences proposed to account for water take by the project has nominated extraction points; These dealings must be completed prior to water take occurring. Prior to water take occurring, nominated extraction points must be finalised as dealings on relevant Water Access Licences. Water Group notes that WAL43827 currently permits the licence holder to extract up to 16 ML/y, although WAL45028, WAL37223 and WAL44499 currently do not have any nominated extraction points associated with each licence.	Nominate extraction points. Note: Info from Boral - New water supply works application number, DAPP-64 Water Supply Works	Updated in Section 1.6.1
Hunter Water	We have reviewed the WMP (Rev 1.2, October 2025) to ensure that our previously stated concerns have been appropriately reflected within this management plan. Hunter Water is satisfied that the proponent has adequately considered the previously identified risks to the North Stockton Catchment Area and revised the document, for the most part, accordingly. As per the Groundwater Exceedance Protocol discussed in section 7.5.1 of the revised WMP, in accordance with Condition B35 (d)(iv), the proponent notes the requirements to notify Hunter Water of groundwater trigger exceedances and a protocol for providing Hunter Water with groundwater monitoring data. The proponent notes that a “Water Trigger Investigation” report will be submitted to Hunter Water (among other stakeholders) in section 7.5.2, presumably via the Major Projects Portal notification mentioned. However, regarding the protocol for providing groundwater monitoring data, the proponent indicates the method will be inclusion in their “Annual Review” report that will be made publicly available on the proponents website.	WMP updated to include additional measures for the NSCA Noted. Boral in response will provide the Hunter Water recommendation that in addition to the pollution incident (non-trivial spills) notifications (detailed in PIRMP) which need to be reported via 1300 657 000, that both the ‘Annual Review’ and ‘Water Trigger Investigation’ reports are sent to: wrdevelopments@hunterwater.com.au Boral will provide Hunter Water directly.	Updated in Section 7.3 and 8

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
	As previously noted, Hunter Water recommends that in addition to the pollution incident (non-trivial spills) notifications (detailed in PIRMP) which need to be reported via 1300 657 000, that both the 'Annual Review' and 'Water Trigger Investigation' reports are sent to: wrdevelopments@hunterwater.com.au A notification via the Major Projects Portal for a groundwater exceedance is acceptable, but we request that the Annual Review report be sent to the above email address. Monitoring operational performance of developments that pose ongoing water quality risks in our drinking water catchments requires a systematic and resource-intensive approach. Departures from the expected reporting process, including delayed publication or alterations to website structure, significantly hinder these efforts. Accordingly, we request that the Annual Review report be provided directly to Hunter Water when available.		
DPHI January 2026	B35 c) it is understood that these components form part of the system, How do these maintain the system? Is there an inspection, review process or schedule to ensure they are maintained? Added - satisfied Figure 11 and Section 3.12 added -satisfied Section 6 updated - satisfied Section 2.6.1 updated and describes setbacks – satisfied Table 5.1 reiterates PM4.1 only. Please include protocols for the inspection and maintenance of ESC.	Response to (a) Added: SECTION 4 TABLE 10 To improve clarity Boral have provided additional information in Management Measures - Table 10 to include: • Performance Criteria form the Consent • Management Measures from associated documents outline in Condition A2© • Description of proposed ESC • Maintaining water management system controls through inspections and review process. Response to (f) Added to SECTION 4 TABLE 10 Added ESC controls: • ESC measures will be inspected following significant rainfall events and maintained as required including haul roads and hardstands. • Disturbance will be staged and progressive rehabilitation undertaken. Added: SECTION 6.1 INSPECTIONS For both (a) and (f) Inspections section has been updated to include controls of site that will ensure the development complies with the condition. General environmental inspections include: • All inspections will be documented using inspection checklists. • Condition and capacity of water storage facilities. • Integrity of liners, bunds, pipes, and water transfer infrastructure. • Performance of water reuse and recycling systems. • Condition of sediment controls and runoff management structures. • Sand stockpile condition and moisture management. • Identified issues will be recorded in the site's environmental register and managed in accordance with the EMS corrective action process. • Where compliance or emerging risks are identified, timely corrective actions will be implemented and tracked to completion.	Section 4 Table 10 Section 6.1

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
		• Inspection outcomes and any required actions will be reviewed as part of regular environmental reporting and management review processes. Sections reviewed and updated in the document.	
DPHI 13 January 2026 RFI	B35 (d)(iii) The plan appears to rely on the conclusions of previous ASS assessments referenced in the EIS, which found ASS risks from sand extraction activities to be low, to justify providing minimal detail and commitments around baseline data, monitoring parameters and trigger levels, and management and mitigation measures. As detailed in the Departments Assessment Report, the Department considers that these assessments did not adequately consider the ASS risks associated with groundwater drawdown from the proposed water supply wells, nor did they provide an accurate representation of the groundwater quality at the site. The intent of this condition is therefore, to require a comprehensive ASS management plan that addresses the deficiencies in the EIS assessments and provides robust monitoring and management measures to account for the uncertain risk of impacts. a. Section 3.4.3 appears to summarise baseline data provided in the EIS. As detailed in the Department's Assessment Report, the Department does not consider the EIS background data to be representative of the existing water quality in and around the proposed disturbance footprint as the monitoring wells used were 400 m – 900 m to the east, in a different infiltration environment and potentially affected by disturbance from the windblown project. The Department's Assessment Report further concludes that Boral would need to set trigger levels for ASS monitoring which would require a baseline dataset that is representative of the pre-disturbance groundwater quality in and around the proposed disturbance footprint. For this reason, the condition requiring detailed baseline data from monitoring sites within 200m of the disturbance area was imposed. Please explicitly address this condition. It is noted that a further acid sulfate soil assessment is referred to in section 3.9.1, however it is unclear what implications this has for the plan. If it is intended that the ASSMP is to be updated following this assessment and that pumping is not to occur until this time, please provide clear commitments in the plan. Demonstrate how the ASSMP is consistent with the Commonwealth Department of Agriculture and Water Resources National acid sulfate soils guidance: Guidance for the dewatering of acid sulfate soils in shallow groundwater environments (Shand et al, 2018). This guideline should be addressed in section 2.6.	Response to (a) Added: SECTION 1.6 PROPOSED ACTIVITIES UNDER THIS VERSION OF THE WMP Added: SECTION 3.4.3 As outlined in Section 1.6 of this plan continued acid sulfate soil monitoring is being conducted detailing ASS risk indicators from sites within 200m of the approved disturbance area as per SSD-52984213 Condition B35 (d) (iii), with samples being collected from the drilling program borehole installation. The results will be provided in the revision of this WMP, and a maximum of 16ML/y in Stage 1 will occur until further revision of this plan. Acid sulfate soils including the management of contaminated groundwater and mitigation measures can be found in Section 6.5 and Section 7.1.4 of this WMP. Added: SECTION 2.6.7 In accordance with SSD-52984213 Condition B35 (d) (ii) the Commonwealth Department of Agriculture and Water Resources (2018) guidance on the dewatering of acid sulfate soils is recognised as national best practice and has informed the development of the ASS management approach for the project. The WMP objectives regarding acid sulfate soil management at the site is based on the precautionary principles including avoidance of groundwater drawdown where practicable, staged progression of excavation, establishment of representative baseline groundwater quality conditions, comprehensive monitoring of early warning indicators, and enforceable trigger-based responses. Management measures escalate from investigation and increased monitoring to restriction or cessation of extraction where required, with adaptive refinement of controls and treatment applied only if monitoring demonstrates it is necessary. Added: SECTION 2.6.7 Response to (b) Added: SECTION 6.5 ACID SULFATE SOILS MONITORING (RISK BASED APPROACH) As per Condition B35 (d)(iii) a risk-based Acid Sulfate Soils (ASS) monitoring program will be implemented to verify ASS risk under operational conditions while maintaining conservative groundwater controls. As per Section 1.6 initial operations will be undertaken under conservative reduced-level (RL) controls, and groundwater pumping at a maximum of 16ML/year once approvals are obtained during establishment phase. Works will initially be confined to 5mAHD. Therefore, no sand mining will occur below 5mAHD under this version of the management plan. Materially reducing the likelihood of groundwater drawdown-related ASS impacts while site-specific baseline data is established. Maintaining the required 0.7 m above the 99th percentile groundwater level will be maintained. This separation represents the primary groundwater and ASS risk control during early operations.Targeted ASS sampling will be undertaken within the disturbance footprint following	a) Section 3.4.3 & Section 2.6.7 b) Section 2.6.7 & Section 3.6.1

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
	b. ASS monitoring parameters have been added to Table 13. As detailed in the Department's Assessment Report, the Department considers the EIS background data and proposed monitoring parameters are based on an assumption of low ASS risk as the EIS assessment did not consider potential drawdown from water supply wells. Again, as detailed in the Department's Assessment Report, The Department considers comprehensive groundwater monitoring for ASS is required and should include trigger levels for the following parameters: a. sulfate/chloride mass ratio; b. alkalinity; c. sulfate/alkalinity; d. aluminium/calcium; e. other trace metals' f. nutrients; and g. net acidity Include a monitoring program in both the groundwater table and produced water, with trigger levels for the above parameters. c. No TARP for ASS has been included. An ASS TARP must be included as required by the condition. d. Section 7.6 - Provide further detail of the management measures to prevent further mobilisation of, and for the management of, contaminated groundwater. e. Exposed ASS protocol in Section 7.3 added – level of detail is insufficient and vague. Provide further detail on the management measures to be implemented. Eg, what are best practice ASS management principles? What further management measures will be implemented? Note: For clarity and better understanding this condition may be best addressed by providing an Acid Sulfate Soil Management Plan as an Appendix document or self contained section.	commencement and completion of groundwater bore installation. Samples during installation will be completed with parameters analysed to ASS risk identification and verification, including: • Sulfate / chloride mass ratio • Alkalinity • Sulfate / alkalinity • Aluminium / calcium • Selected trace metals • Nutrients • Net acidity These parameter sampling results will be used to confirm ASS risk levels under operational conditions and will be incorporated into the development of the ASSMP within the revision of the WMP. Future proposed testing and trigger levels will be outlined in the next revision of the ASSMP/WMP and will be risk based, based on the drilling and investigation program. Response to (c) (d) (e) Added: SECTION 7.1.4 for ASS TARP response. The ASSMP will be incorporated into the WMP on the revision of the WMP once results have been. Until the sampling and analysis have been completed, for the initial stage of early establishment and construction, extraction will progress toward and be limited to 5mAHD. Therefore, no sand mining will occur below 5mAHD under this version of the management plan. No groundwater pumping is to occur under this revision of the management plan.	
DPHI 13 January 2026 RFI	B25 (d)(iii) Added Section 7.2.3. Drawdown TARP Table 23. a. Please identify where this has been addressed. b. Table 25 now includes the North Stockton Catchment Area but appears incomplete and also states "description of the program to monitor and evaluate impacts of the project on the North Stockton Catchment Area" as a performance criteria. Please i. detail what the program is or its relevance here. Table 13 now includes the North Stockton Catchment Area. Please clarify which trigger levels ap ii. Which monitoring locations represent the catchment area (or if all do) and; iii. How often the data will be reviewed. c. Not addressed, now Section 6.3.2 paragraph 3 states "Monitoring requirements and appropriate mitigation measures may need updating depending on the outcomes of an impact assessment that considers the	Response to (a) (b) Table 6 Table 20 have now been reincorporated into Table 10 to outline both performance measures and how they will be achieved. Added: SECTION 4 TABLE 10 Performance Measure: Quarry activities do not adversely affect the North Stockton Catchment Area or associated groundwater resources. • Implement groundwater trigger levels, monitor groundwater levels and monitor rainfall forecasts • Implement erosion and sediment controls on access roads, haul roads and hardstands. • Periodically review groundwater data • Groundwater monitoring data will be provided to relevant agencies, including Hunter Water, where requested.	Section 4 Table 10 Figure 12 Section 1.6 Section 7.1.1

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
	required groundwater extraction for operational needs." Please identify if this impact assessment has been completed or will be completed.	While the North Stockton Catchment Area is not downgradient from the Quarry, future pumping may cause groundwater interaction across to this area. Therefore, to reduce any risk, the program to monitor and evaluate impacts of the project on the North Stockton Catchment Area (Figure 12 below) will include: • Selected bores along the Quarry northern and northeastern boundary will be monitored at the same frequency, same parameters as per Section 6.3.1 • Same trigger levels will apply to those bores in relation to the evaluation of impacts on the North Stockton Catchment Area as per those provided in Section 7.2 with TARP response plan in Section 7.3. • The selected bores will provide the early warning for any potential impact that may occur due to Quarry activities. • The data will be reviewed at the same frequency as the other bores as per Section 4 and 6.3.1 Response to (C) Removal of implications of additional assessment. This was referring to the collection of samples within the disturbance footprint from the drilling program installation of monitoring groundwater bores. Now outlined in Section 1.6 and Section 7.1.1.	
DPHI 13 January 2026 RFI	B35(d)(iii) a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development; Comment: Table 22 – Water Quality i. Table 22 includes incorrect cross-references. ii. Level red trigger level is unclear. Please clarify what consecutive 3 month periods is, how many monitoring events? What is the purpose and intended outcome of a hydrogeology review? How does this address the exceedance?	Updated: Section 7.2 see TARP Table 10	Updated: Section 7.2 see TARP Table 10
DPHI 13 January 2026 RFI	C4 (c) C4(d) C4(e) C4(f) It is understood that these components form part of the system, How do these maintain the system? Is there an inspection, review process or schedule to ensure they are maintained?	C4(c) Response: Table 10 has now been updated and provided at the start of the WMP outlining performance measures and mitigation measures derived from the consent and EIS / associated documents. Added SECTION 4 Table 10 •ESC measures will be inspected following significant rainfall events and maintained as required including haul roads and hardstands. •Disturbance will be staged and progressive rehabilitation undertaken. C4 (d) – (f)	Table 10 SECITON 6.1 SECTION 7
DCCEEW Rec 1.2	Nominate extraction points. Note: Info from Boral - New water supply works application number, DAPP-64	SECTION 2.3 outlines:	Section 5

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
	Water Supply Works. Please confirm if the response in the response table is a note only or points will be nominated in this revision of the plan.	All progression details of the WAL's and WSW's will be detailed in the revision of this plan. Boral has reapplied for the water supply works with no updates.	
DPHI General	Please include a section number to show where within the document a comment has been addressed. Please complete sentences and correct grammatical errors. Please complete these and any others Update Section 10 responsibilities to reflect the environmental responsibilities of each role involved. Please choose one name and use it consistently throughout.	• Completed • SECTION 9.1.3: Boral in response will provide the Hunter Water recommendation that in addition to the pollution incident (non-trivial spills) notifications (detailed in PIRMP), that both the 'Annual Review' and 'Water Trigger Investigation' reports are sent to: wrdevelopments@hunterwater.com.au • SECTION 3.8 updated to "east-south-east towards" • SECTION 7.2.2 updated to "Trigger levels values are outlined in Table 16, pH and EC in Table 17 ." Added: SECTION 10 Added Table 25 Site Environmental Officer Preparation and submission of the Annual Review and any other associated reporting requirements. Assessment, analysis and collating of all monitoring results, with escalation to external specialists / suitably qualified person/s when required. Maintain internal system for environmental compliance. The terminology has been generally updated to 'extraction will not occur below 5mAHD.'	Section 9.1.3 Section 3.8 Section 7.2.2 Section 10 Table 25 Throughout the WMP
DPHI RFI April 2026 and; Revision 7 Response	Condition − a protocol for the management of contaminated groundwater; DPHI Action / Comment • Section 7.1.4. Incorrect cross reference • Table 23 p71 TARP has reference to incorrect table • Level Red pH and EC action is 'Activate Section 7' Please clarify or describe what this means	• Added Section 7.3.2 Contaminated Groundwater Management Protocol • Updated from Table 17 and Table 19 to Table 19 and Table 20 • Updated to Section 7.3 Water Trigger Investigation and 7.3.2 Contaminated Groundwater Protocol.	Section 7.1.4 Table 23

	Condition:
	• a program to monitor and evaluate:
	− compliance with the performance measures listed in Table 6 and the performance criteria in the plan;
	− groundwater levels across the site and identify any unauthorised groundwater interference;
	− impacts on groundwater dependent ecosystems; and
	− impacts of the project on the North Stockton Catchment Area;
	DPHI Action / Comment:
	• Table 11 M31 – replace 'periodically review' with what the period of review would be or refer to section where the timing is detailed
	• Table 11 M31 'where requested' conflicts with Section 9.1.3
	• Table 11 M32 detail which are the 'selected bores'
	• Table 11 M32 describe or provide specific cross references to the 'same trigger levels'
		• Updated to: Monthly, quarterly and annual reviews of data, in line with results and timelines outlined in Section 6 and reporting required timelines outlined in Section 9.
		• Updated to: Groundwater monitoring data, Annual Reviews and Water Trigger Investigation reports are sent to: wrdevelopments@hunterwater.com.au as requested by Hunter Water.
		• Table 11 M31 updated to:
		  ○ Monthly, quarterly and annual reviews of data, in line with results and timelines outlined in **Section 6, Table 16** and reporting required timelines outlined in **Section 9**.
		  ○ Groundwater monitoring data, Annual Reviews and Water Trigger Investigation reports are sent to: wrdevelopments@hunterwater.com.au as requested by Hunter Water.
		• Table M32 updated to: While the North Stockton Catchment Area is not
			Table 11 M31
			Table 11 M32

Agency	Correspondence / Submission Comments	Boral Response	Section Addressed
		hydraulically downgradient from the Quarry, the potential for groundwater interaction under future operating conditions has been identified. Accordingly, a precautionary monitoring framework will be implemented to assess any potential impacts to this area (refer to Figure 11). ○ Monitoring of selected bores along the northern and northeastern Quarry boundary (MWX2, MWX4D/S and GW2) outlined in Figure 11 in accordance with the frequency and parameters outlined in Section 6. ○ Application of the same bore-specific trigger levels and TARP framework as described in Section 7.2 with TARP response plan in Section 7.3. ○ Installation and incorporation of additional monitoring bores (where required) to provide early warning of potential groundwater level changes associated with Quarry activities. ○ Ongoing review of monitoring data in line with the site-wide groundwater monitoring program outlined in Table 16.	
	Condition • a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development; DPHI Action / Comment TARPS contain incorrect cross references	Cross referencing has been reviewed throughout the document and TARPs cross references updated in Table 22, 23 and 24.	Table 22, 23, 24
	General DPHI Action / Comment Errors are present throughout the document. Please complete sentences, correct grammatical errors and repair cross references. For example, • The table of contents lists Table, Figures and Appendices on Page one • Section 1.1 does not show Figure references in the pdf version • Section 1.6.1 dot point 4 'will require' repeated • Some cross references in the pdf are missing or incorrect e.g. Section 5.6 Figure reference missing in pdf • TARP is misspelled as TARF in Section 7, please correct • TARPS include incorrect cross-references to other Tables • Section 5.1.3 dot point one should refer to the next revision instead of this revision for increased water use.	• The table of contents lists Table, Figures and Appendices on Page one • Section 1.1 Figure references updated • Section 1.6.1 dot point 4 'will require' repeated has been updated • Some cross references in the pdf are missing or incorrect e.g. Section 5.6 Figure reference missing in pdf - updated • TARP is misspelled as TARF in Section 7, please correct - updated • TARPS include incorrect cross-references to other Tables – updated • Section 5.1.3 dot point one updated to: refer to the next revision instead of this revision for increased water use.	Sections: 1.1, 1.6.1, 5.6, 5.1.3 and Tables 22, 23, 24
Hunter Water as part of the DPHI RFI dated April 2026 and; Revision 7 Response	DPHI Action / Comment • Section 7.3.1 conflicts with statement in • Section 9.1.3 • Please clarify which action will be taken	Groundwater monitoring data, including routine monitoring results and any exceedances, will be provided to Hunter Water through Annual Review reporting, Water Trigger Investigation Reports, and upon request. These reports and associated groundwater monitoring data will be sent directly to wrdevelopments@hunterwater.com.au	Section 7.1.3 and Section 9.1.3

Appendix B

Groundwater Impact Assessment (Umwelt, 2023)

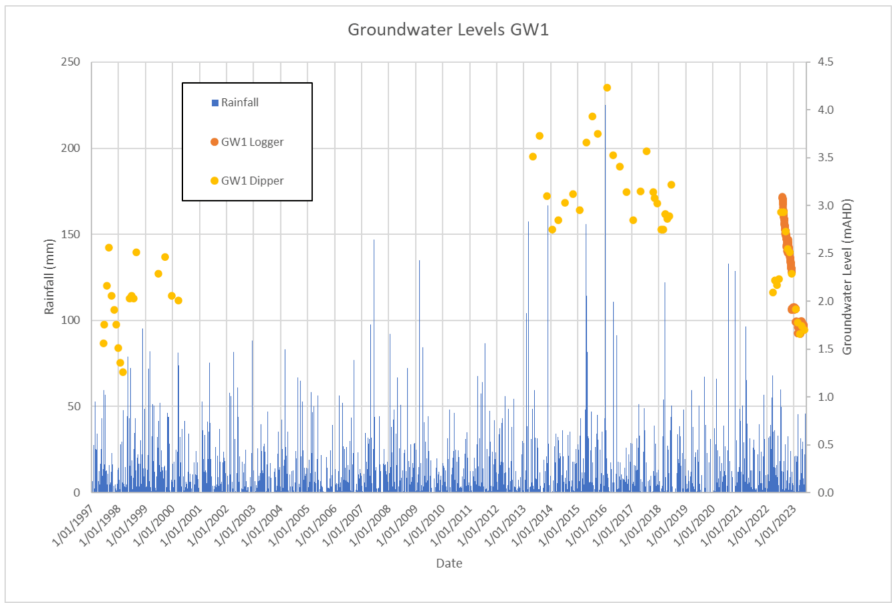
Table 6-1 Groundwater Impact Risk Assessment

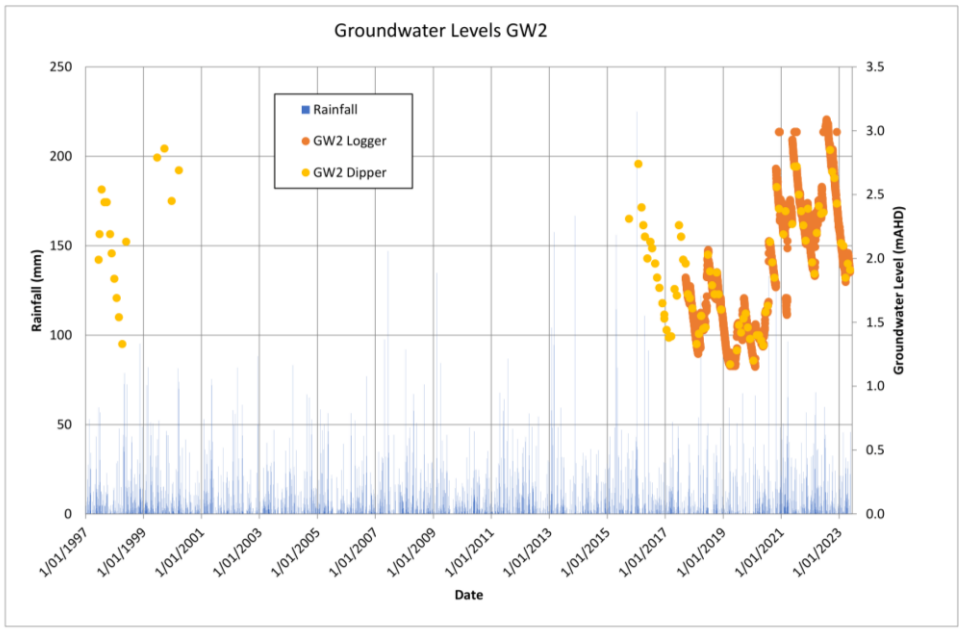
LIKELIHOOD	CONSEQUENCE				
	Insignificant (F)	Minor (I)	Moderate (D)	Major (J)	Catastrophic / Significant (S)
Remote (R)	Negligible (N)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)
Unlikely (U)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)	High (H)
Possible (P)	Very Low (L)	Low (W)	Medium (M)	High (H)	Very High (V)
Likely (L)	Low (W)	Medium (M)	High (H)	Very High (V)	Extreme (E)
Almost Certain (C)	Medium (M)	High (H)	Very High (V)	Extreme (E)	Extreme (E)

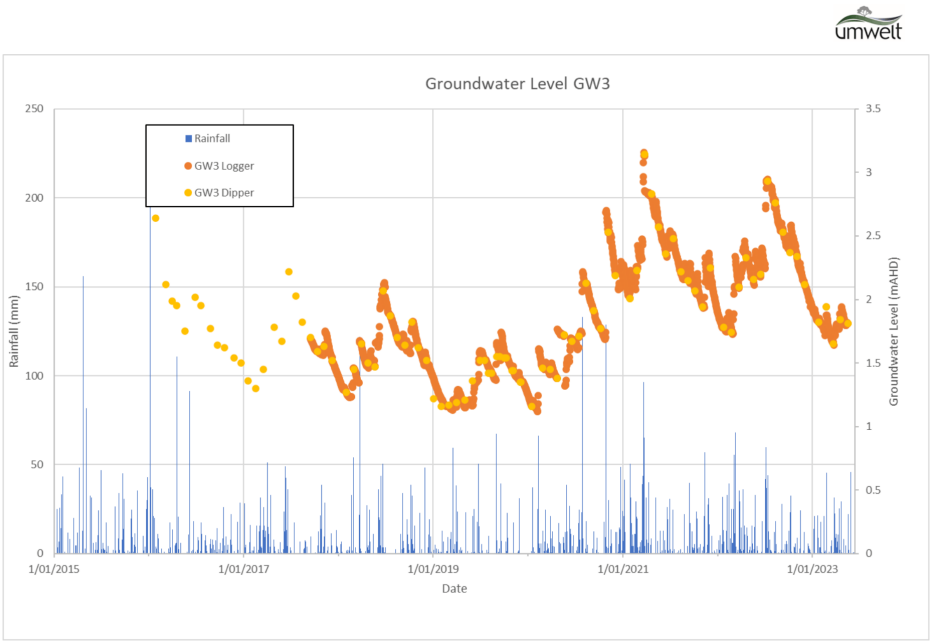
Phase	Potential Area of Impact	Effects Without the application of mitigation or management measures	Risk Rating			Mitigation/Management Measures	Residual (Mitigated) Risk Rating		
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating
Operation	Groundwater Quality	Fuel or chemical spills, fire management systems or inappropriate material storage, leads to contamination of groundwater and/or nearby waterways, resulting in environmental degradation and fines under the EP Act.	P	I	W	• Industry best practice Environmental Management Plan (EMP) to be implemented that includes a Waste Management Plan that addresses the storage and stockpiling of raw materials, transport of materials to site, and disposal of materials. • Location of site sheds/storage areas and vehicle parking to be identified in EMP away from sensitive areas. • Spill Management Protocol to be implemented if any spills occur at the site.	U	I	L
Operation	Groundwater Quality	Spills of wash water leads to contamination of groundwater and/or nearby waterways, resulting in environmental degradation and fines under the EP Act.	P	I	W	• Industry best practice EMP to be implemented that includes a Waste Management Plan that addresses the and disposal of materials. • Wash water to be recycled.	U	I	L
Operation	Groundwater Quality	Intersection of Acid Sulfate Soils with potential localised impacts to water quality.	P	I	W	• Site within the area mapped as mostly having a low probability of ASS. • The ASS assessment conducted indicates a single localised occurrence of moderate risk potential ASS. An ASS Management Plan was recommended as part of the report.	U	I	L
Operation	Groundwater Level	No lowering of the groundwater table will occur as part of the sand excavation. Groundwater table will be lowered as part of the licensed groundwater extraction (sand washing and dust suppression on haul roads).	P	I	W	• Installation of monitoring bores around the planned excavation area to be equipped with level loggers. Continued monitoring of existing bores with loggers (MW X and GW series) that are away from the extraction area. • Supply bores to be located and designed by suitably qualified hydrogeologist. • Installation of flowmeters on the headworks of the groundwater supply bores. • Regular reporting of groundwater levels and extraction volumes	U	I	L
Operation	GDEs	No lowering of the groundwater table will occur as part of the sand excavation. Groundwater table will be potentially be lowered in localised areas as part of the licensed groundwater extraction, which is understood to have been previously approved.	P	I	W	• Consideration of the location of the approved extraction to minimise potential drawdown to key receptors and installation of flowmeters on the headworks of the groundwater supply bores.	U	I	L
Operation	Other Bore Users	No lowering of the groundwater table will occur as part of the sand excavation. Groundwater table could be lowered in localised areas as part of the licensed groundwater extraction, which is understood to have been previously approved.	P	I	W	• Installation of monitoring bores around the planned excavation area to be equipped with level loggers. Continued monitoring of existing bores. • Consideration of the location of the approved extraction to minimise potential drawdown to key receptors and installation of flowmeters on the headworks of the groundwater supply bores. • Regular reporting of groundwater levels and extraction volumes	U	I	L

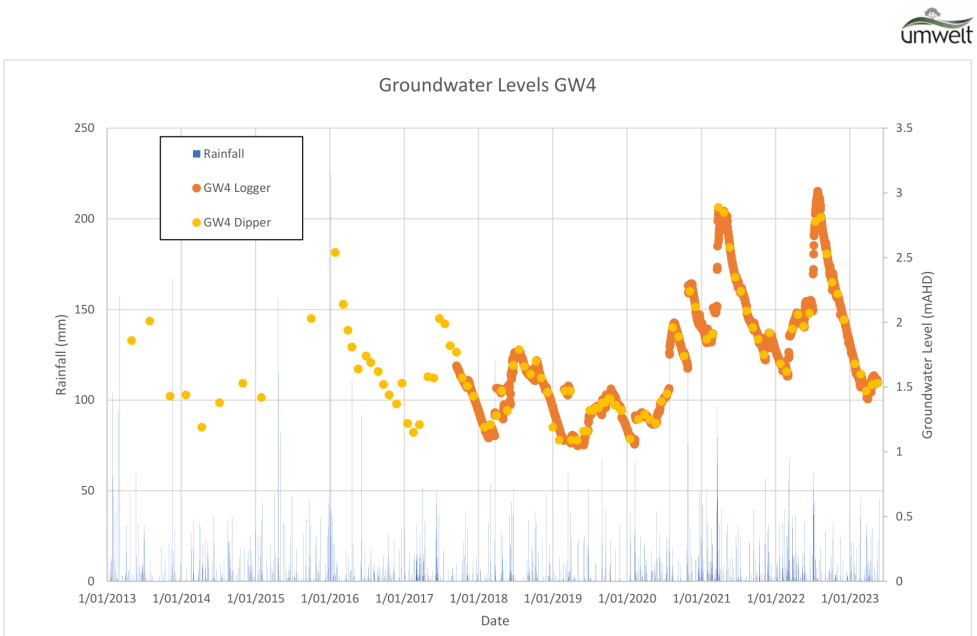
Appendix C

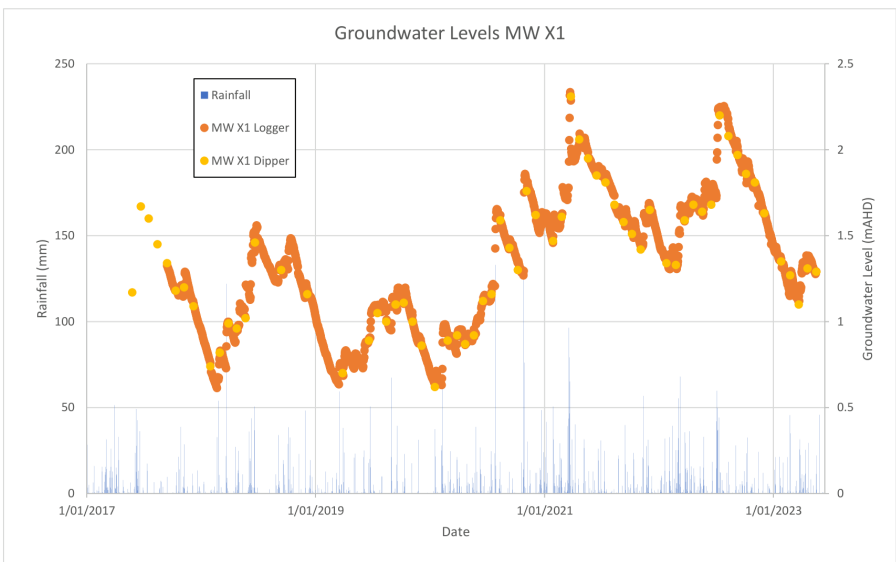
Groundwater Logger and Dipper Levels (Umwelt, 2023)

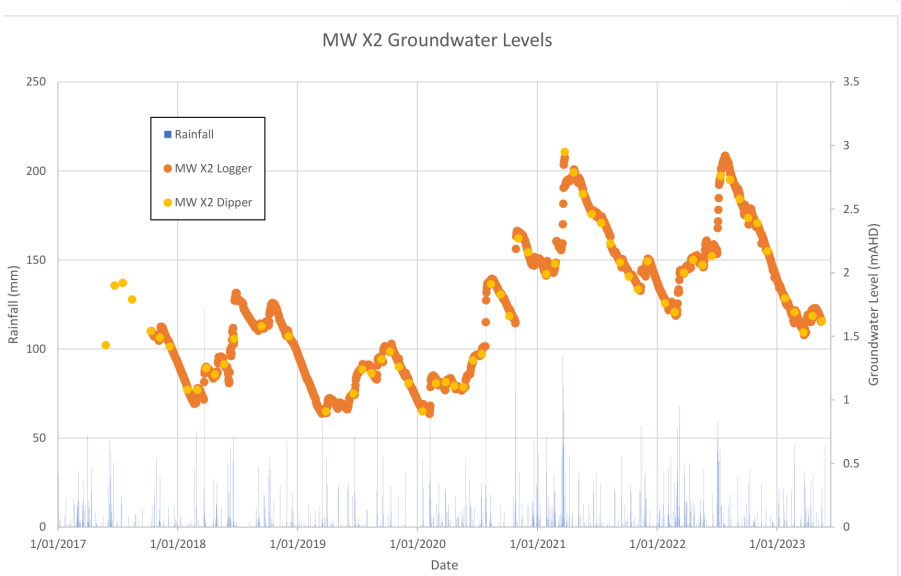

Groundwater Levels GW1
Rainfall
GW1 Logger
GW1 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

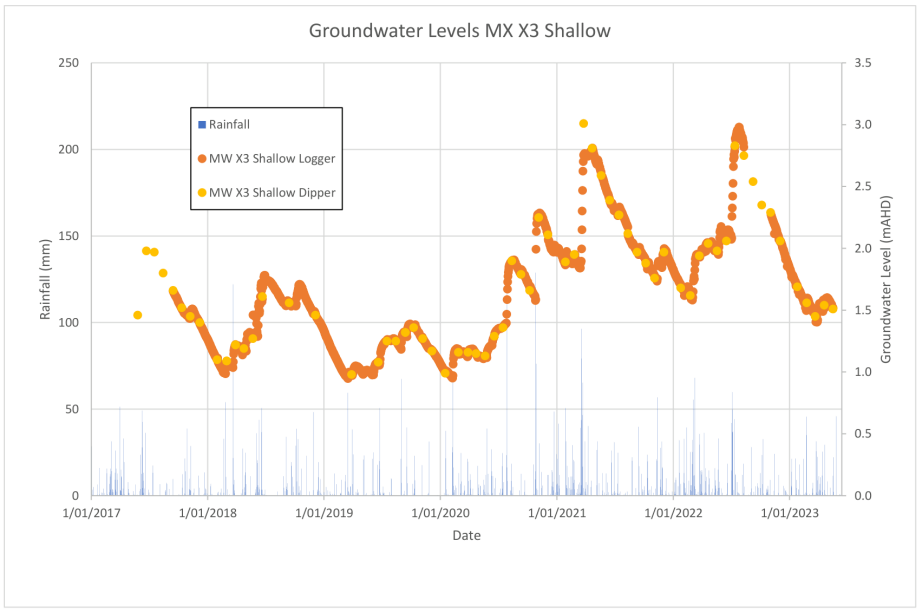

Groundwater Levels GW2
Rainfall
GW2 Logger
GW2 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

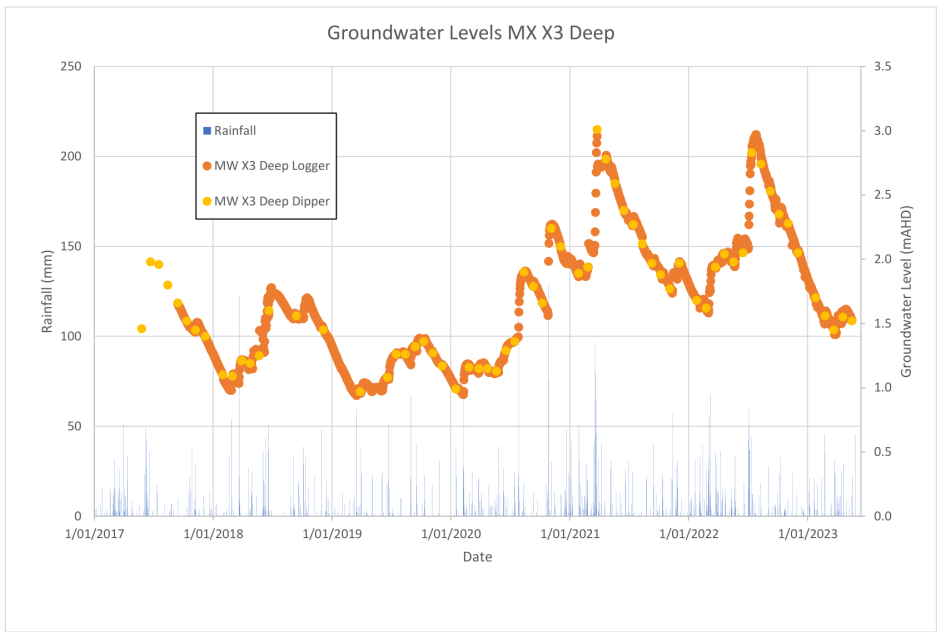

Groundwater Level GW3
Rainfall
GW3 Logger
GW3 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

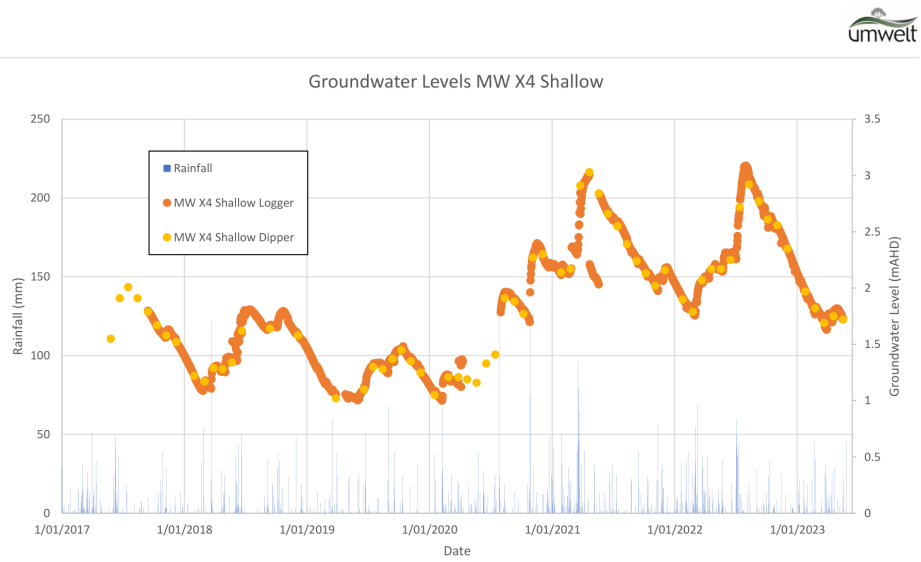

Groundwater Levels GW4
Rainfall
GW4 Logger
GW4 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

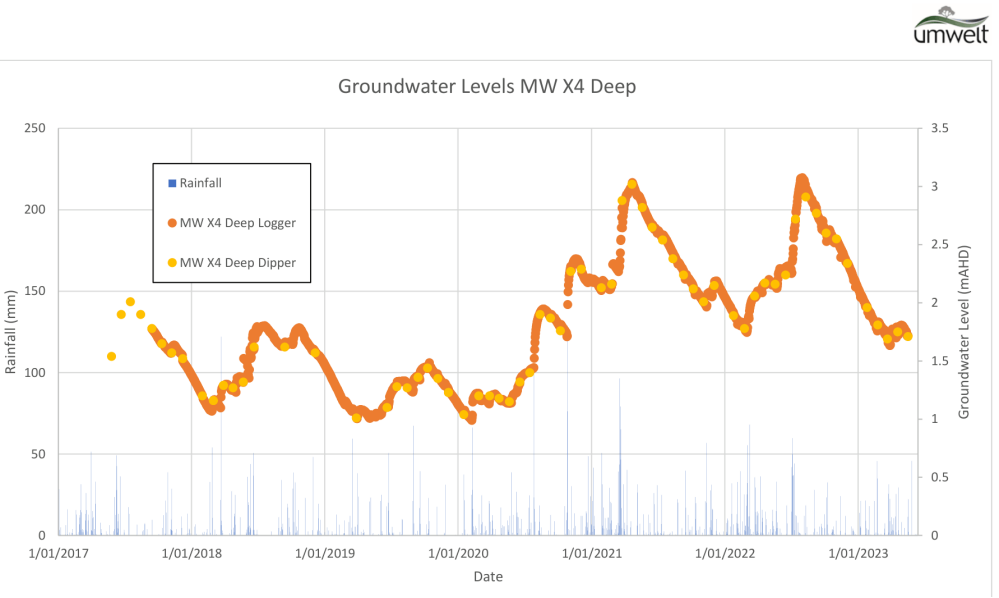

Groundwater Levels MW X1
Rainfall
MW X1 Logger
MW X1 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

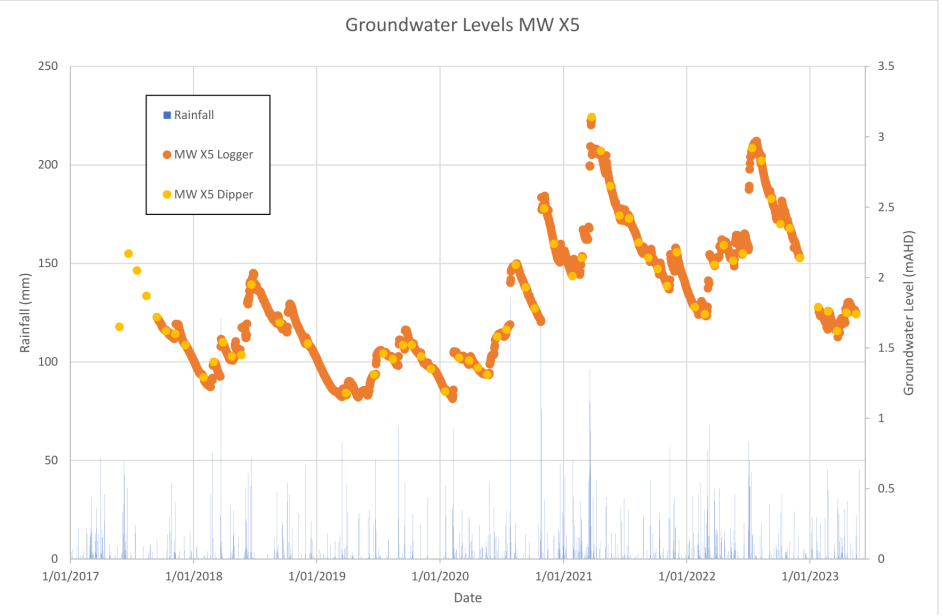

MW X2 Groundwater Levels
Rainfall
MW X2 Logger
MW X2 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date

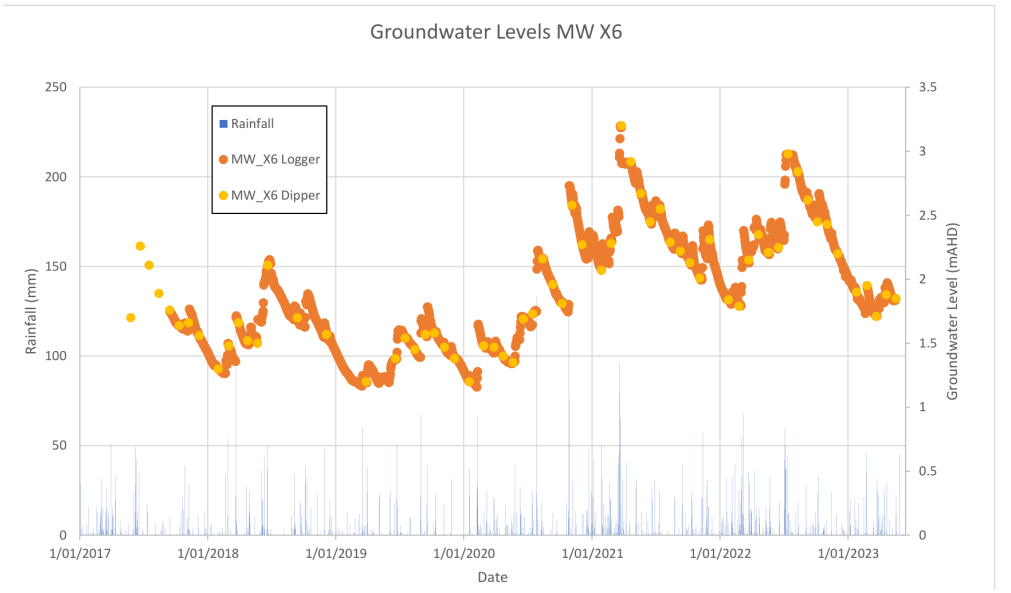

Groundwater Levels MX X3 Shallow
Rainfall
MW X3 Shallow Logger
MW X3 Shallow Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

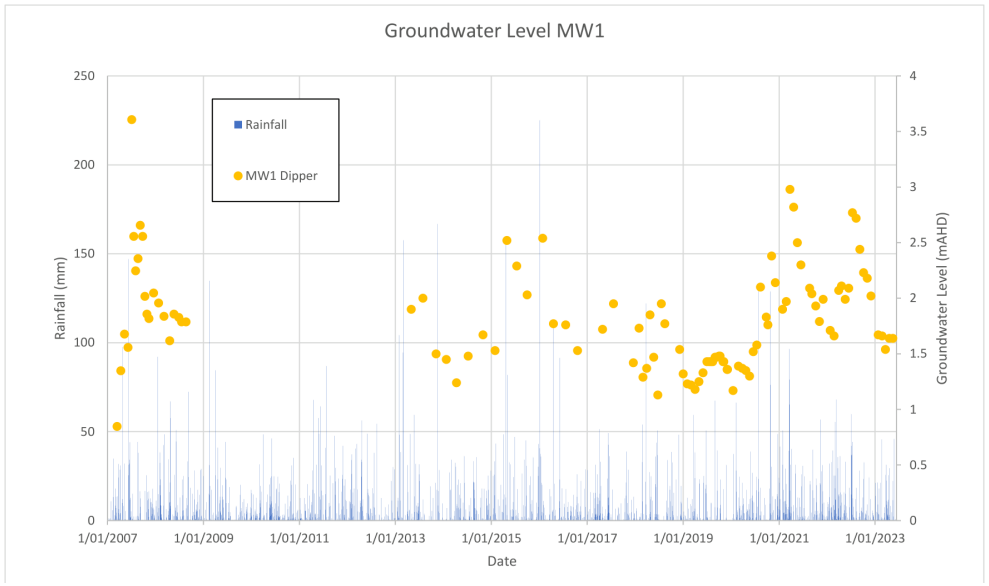

Groundwater Levels MX X3 Deep
Rainfall
MW X3 Deep Logger
MW X3 Deep Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

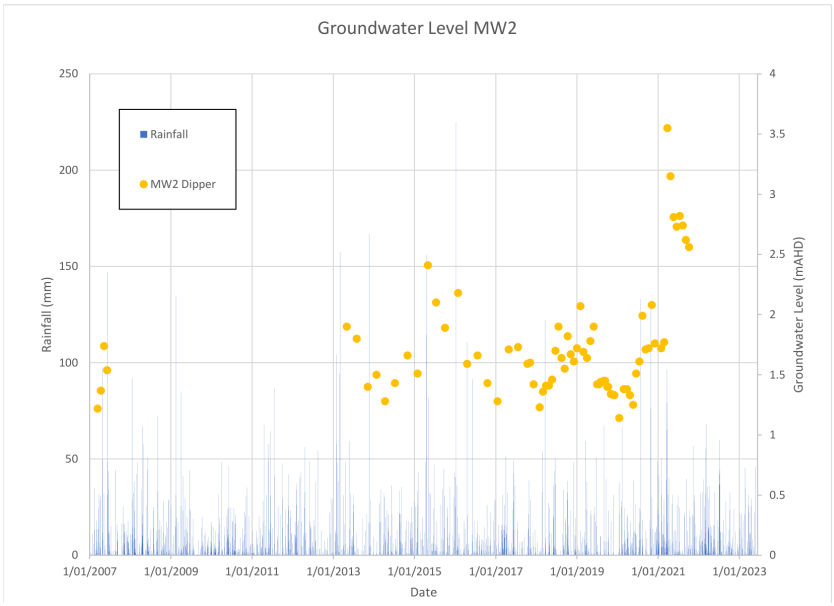

Groundwater Levels MW X4 Shallow
Rainfall
MW X4 Shallow Logger
MW X4 Shallow Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

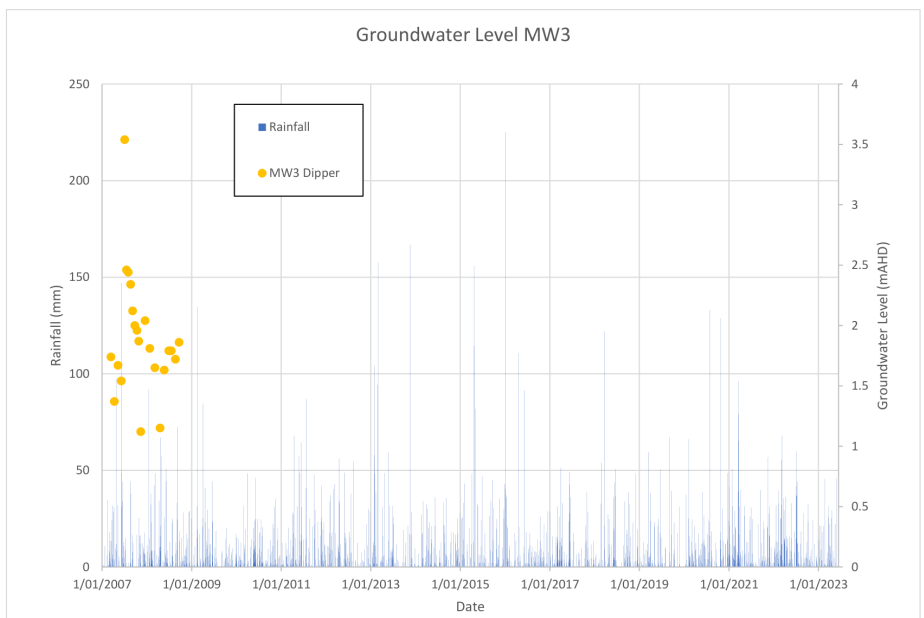

Groundwater Levels MW X4 Deep
Rainfall
MW X4 Deep Logger
MW X4 Deep Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

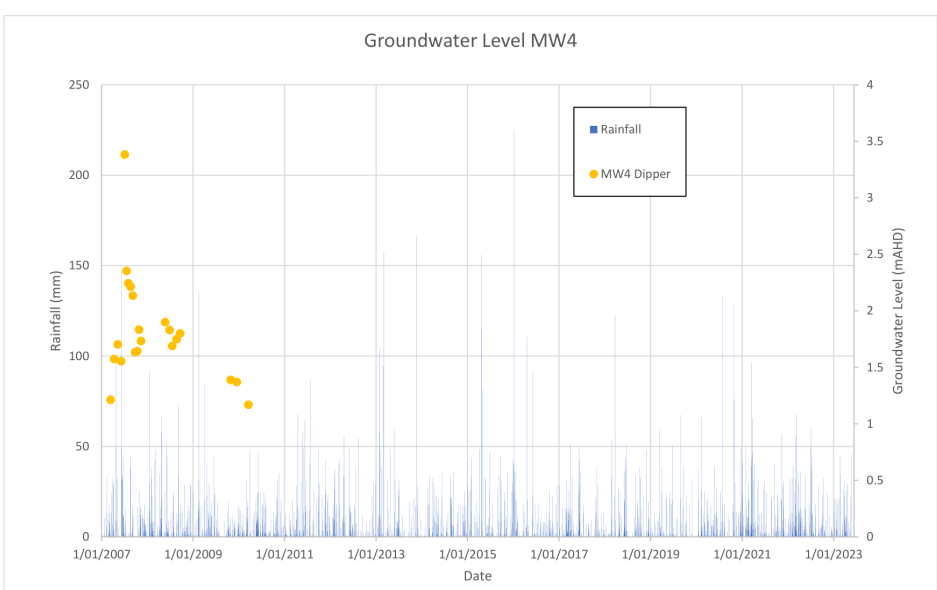

Groundwater Levels MW X5
Rainfall
MW X5 Logger
MW X5 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

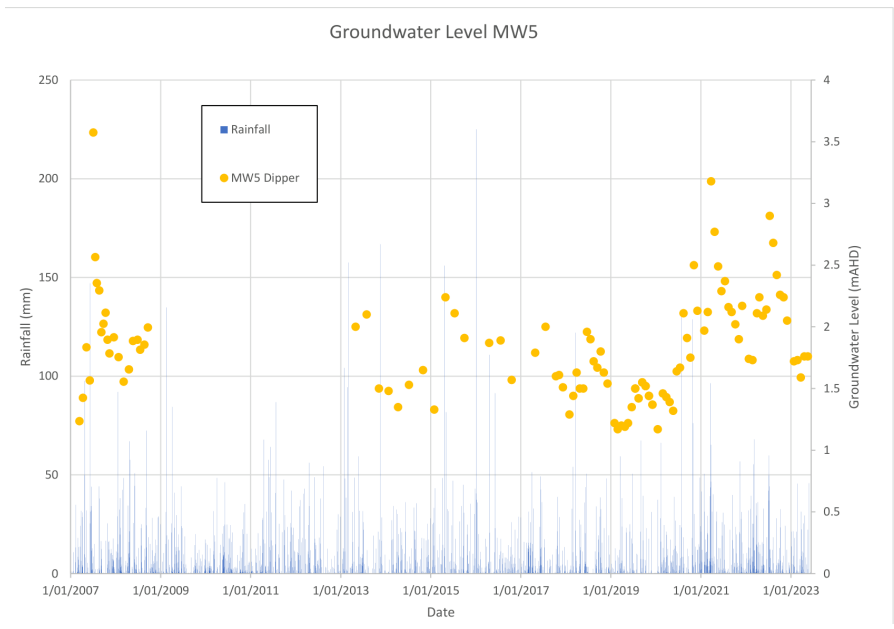

Groundwater Levels MW X6
Rainfall
MW_X6 Logger
MW_X6 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
1/01/2017
1/01/2018
1/01/2019
1/01/2020
1/01/2021
1/01/2022
1/01/2023

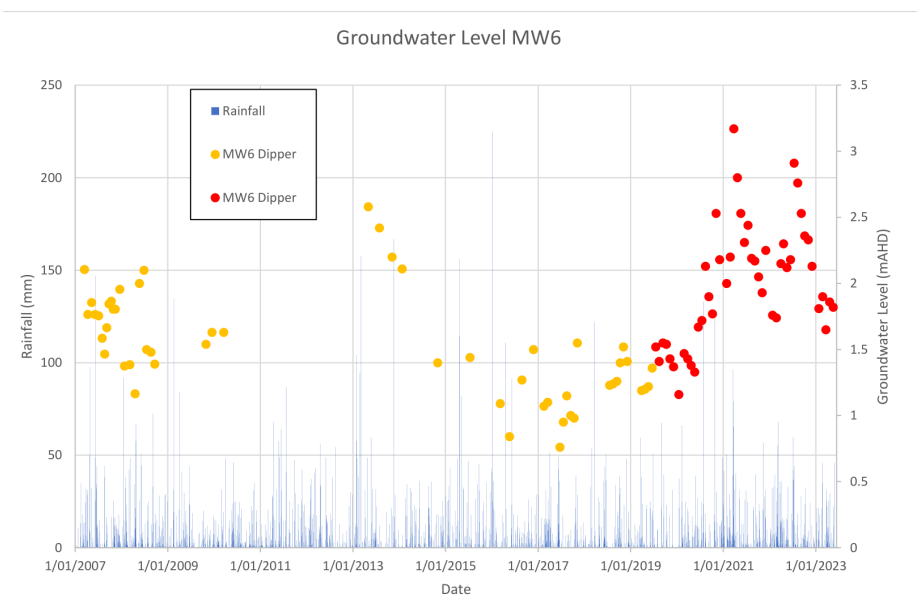

Groundwater Level MW1
Rainfall
MW1 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023

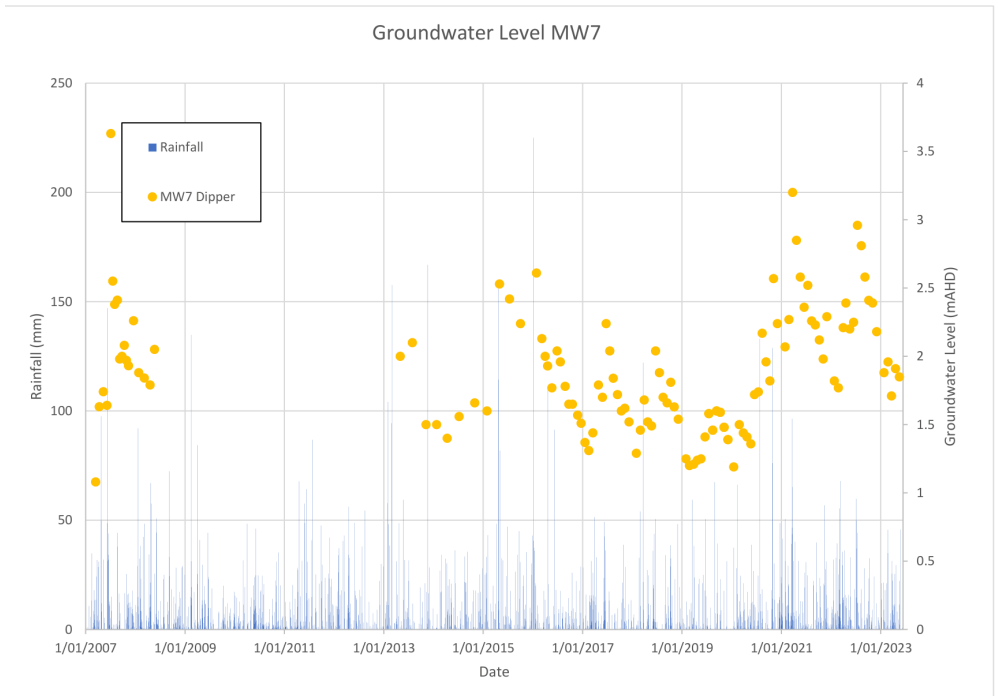

Groundwater Level MW2
Rainfall
MW2 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023

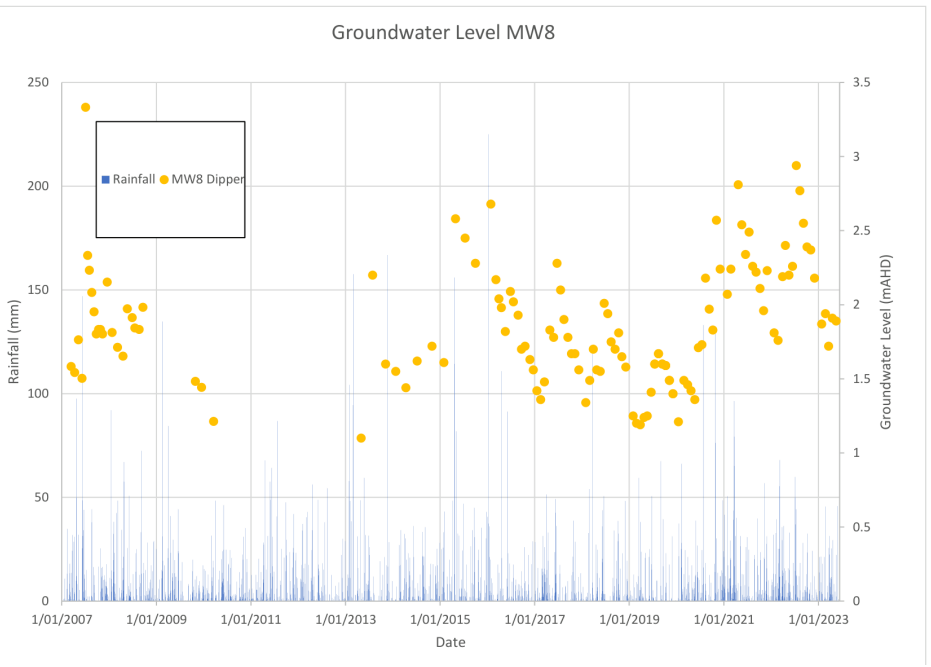

Groundwater Level MW3
Rainfall
MW3 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023

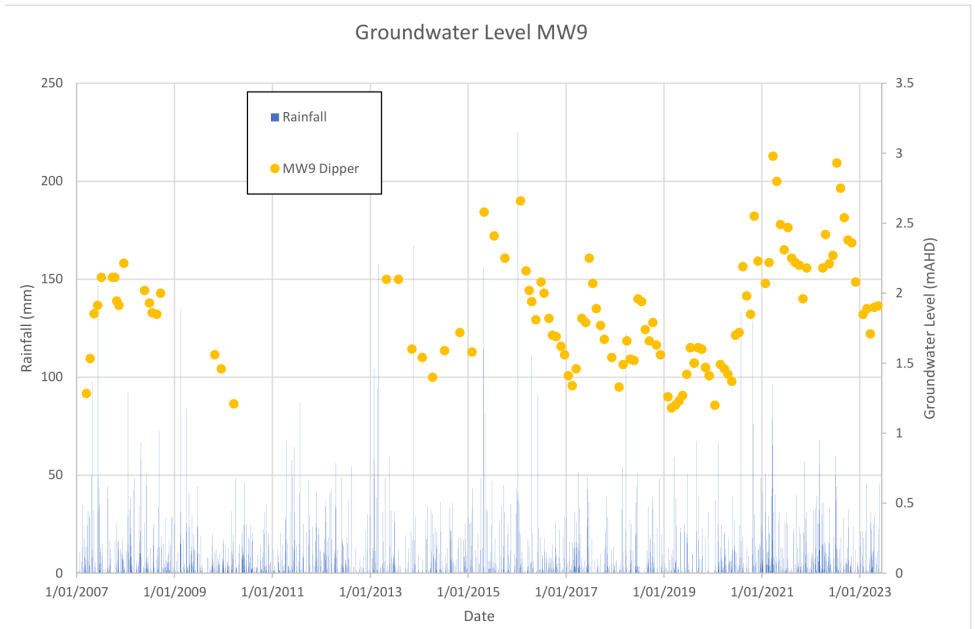

Groundwater Level MW4
Rainfall
MW4 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023

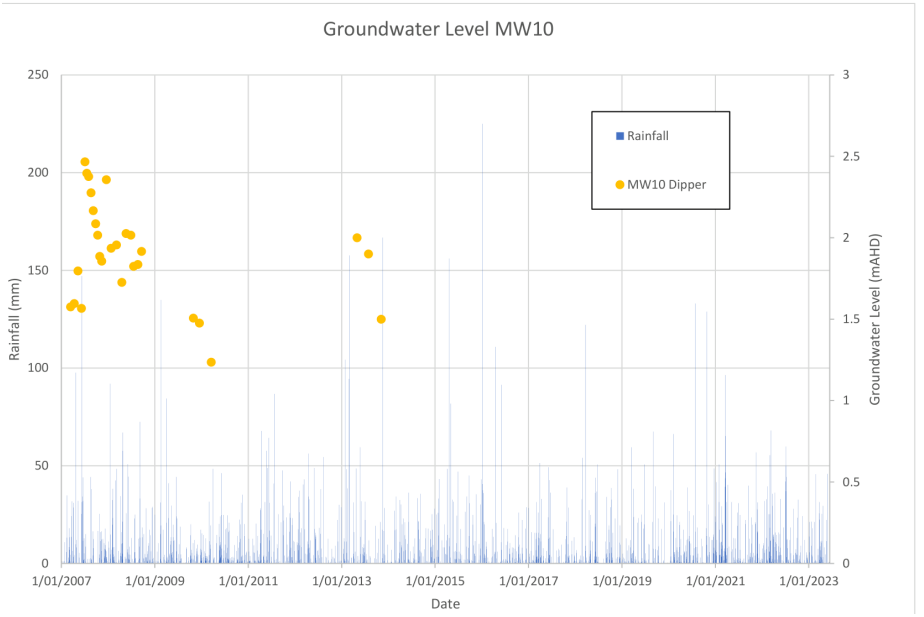

Groundwater Level MW5
Rainfall
MW5 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023

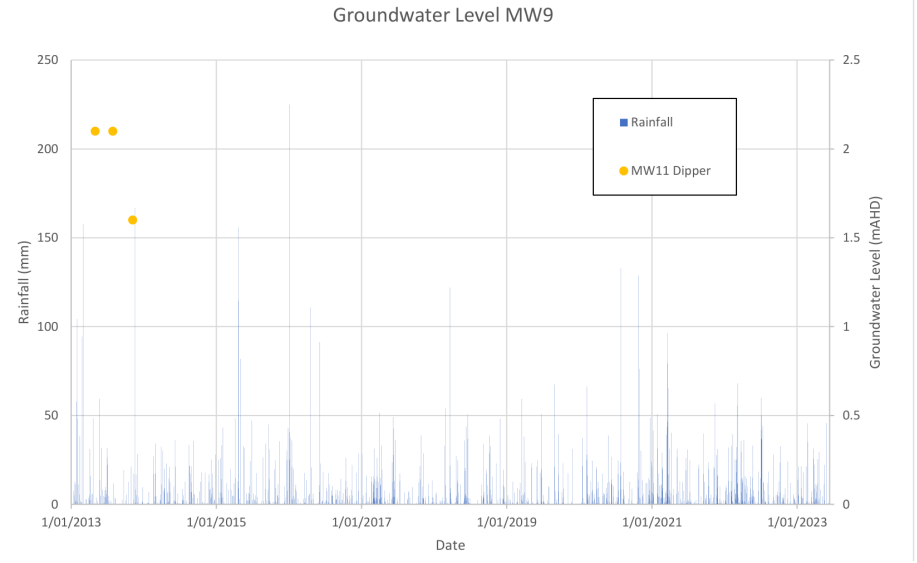

Groundwater Level MW6
Rainfall
MW6 Dipper
MW6 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023


Groundwater Level MW7
Rainfall
MW7 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
4
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023


Groundwater Level MW8
Rainfall
MW8 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023


Groundwater Level MW9
Rainfall
MW9 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
3.5
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023


Groundwater Level MW10
Rainfall
MW10 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
3
1/01/2007
1/01/2009
1/01/2011
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023


Groundwater Level MW9
Rainfall
MW11 Dipper
Rainfall (mm)
Groundwater Level (mAHD)
Date
0
50
100
150
200
250
0
0.5
1
1.5
2
2.5
1/01/2013
1/01/2015
1/01/2017
1/01/2019
1/01/2021
1/01/2023