Lot 74 Calinup Road, Gelorup

Extractive Industry Development Application & Licence

November 2025 | 22-332

element. | PART OF SLR

Acknowledgment of Country

We acknowledge the Whadjuk people of the Noongar nation as Traditional Custodians of the land on which we live and work.

We acknowledge and respect their enduring culture, their contribution to the life of this city, and Elders, past and present.

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Element Advisory Pty Ltd (Element Advisory)

Whadjuk Country. L1, 500 Hay Street. Subiaco WA 6008.

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1. Development Application Details

1.1 Development Application Details

Proposed development	Industry – Extractive
Applicant	Element Advisory, on behalf of McDougall Quarries Pty Ltd
Landowner	McDougall Quarries Pty Ltd
Type of approval sought	Development Application to be determined by the Joint Development Assessment Panel (DAP Form 1)
Subject site	Lot 74 Calinup Road, Gelorup
Real property address	Lot 74 on Deposited Plan 49145
Proposed Extraction Area	22.2079 Ha
Estimated Development value	$4,000,000

1.2 Planning Framework Details

Local Government Area	Capel (Shire of)
Region Scheme	Greater Bunbury Region Scheme (GBRS) – Rural Zone
Local Planning Scheme	Shire of Capel Local Planning Scheme No. 8 – Rural Zone
Land Use Permissibility	A (use not permitted unless the local government has exercised its discretion by granting development approval after advertising the application in accordance with clause 64 of the deemed provisions)
Aboriginal and/or Local Heritage Considerations	ID37870 – Outside the Extraction Area.
Environmental Considerations	– Ministerial Statement 767 – Ministerial Statement 969 – Ministerial Statement 1186
Relevant State Planning Policy(s), Development Control Policy(s), Position Statements and/or Planning Bulletins	– SPP 2.4 Basic Raw Materials – SPP 2.5 Rural Planning – SPP 3.7 Planning in Bushfire Prone Areas – Greater Bunbury Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy (2018) – EPA Separation Distances between Industrial and Sensitive Land uses (GS3)
Local Planning Policies	Local Planning Policy 6.2 – Extractive Industry
Local Law	Shire of Capel Extractive Industry Local Law (2016)

2. Consultant List

This development application has been prepared on behalf of the landowner McDougall Quarries Pty Ltd with input from the following specialist consultants:

2.1 Consultant List

Discipline	Consultant
Planning Consultant	Element Advisory
Licensed Surveyor	Harley Dykstra
Environmental Consultants	MBS Environmental & Tranen Revegetation Solutions
Traffic Engineer	Stantec
Acoustic Consultant	Herring Storer
Hydrologist	JDA Consulting Hydrologists

3. Introduction

This Development Application (DA) has been prepared by Element Advisory on behalf of McDougall Quarries for an Extractive Industry over a portion of Lot 74 Calinup Road, Gelorup (the subject site).

The subject site is 42.438 Ha, which has progressively been quarried since 2001. Current sand extraction activities operate in accordance with relevant development and environmental approvals being PA37/2020 and PA9/2022 granted by the Shire of Capel in 2020 and 2022, and Ministerial Statements 767, 969 and 1186 respectively. The current Development approval is time limited and will expire on 28 July 2028.

The purpose of this DA is to seek approval from the Regional Development Assessment Panel (RDAP) to allow sand extraction in alignment with the ministerial clearing boundary, and to the maximum depth to approximately 11metres AHD being +2m above the maximum groundwater level (+2m MGL), as meeting the intent of Ministerial Statement 767. Current extraction is limited to a maximum depth of 20m AHD under Condition J of PA9/2022. The increased maximum extraction depth proposed will enable the extraction of an additional 1,099,063m^2 of sand.

The proposal remains broadly consistent with existing development and environmental approval framework, noting that:

- The landowner anticipates to complete extraction within 8 years; the approval period granted under PA9/2022.
- No change is proposed to the boundary or total area (22.2079Ha) approved for extractive industry under MS767. The DA will bring the extraction area approved under PA27/2020 and PA9/2022 into alignment with MS767.
- No additional native vegetation is proposed to be cleared;No change is proposed to approved vehicle access arrangements; Bussell Highway via Calinup Road, a Restricted Access Vehicle (RAV) route (RAV 4.3).
- No change is proposed to the approved maximum truck movements whereby 130 x 27.5m B-Double trucks will operate daily during peak haulage campaigns, each carrying a load of up to 54 tonnes of sand each;No change is proposed to future native vegetation rehabilitation requirements as set out under Condition O of Development Approval PA9/2022 and meets the completion criteria of Ministerial Statement 767.
- No change to existing operational hours.

Where approval of existing works is granted, it is anticipated that this approval will supersede existing approvals PA27/2020 and PA9/2022 to form the consolidated approval.

This report provides an overview of the subject site and the proposed development, as well as a detailed assessment against the relevant planning requirements and an examination of the planning merits of the proposal.

This report is accompanied by the following detailed technical reports, statements, approvals and plans:

- Appendix A – Certificate of Title
- Appendix B – Planning Assessment
- Appendix C – Development Plans
- Appendix D – Acoustic Report
- Appendix E – Traffic Impact Statement

- Appendix F – Weed and Dieback Management Plan
- Appendix G – Dust Management Plan
- Appendix H – Rehabilitation Implementation Plan
- Appendix I – Groundwater Monitoring Report
- Appendix J – Ministerial Statements (767, 969 & 1186)
- Appendix K – Current DA Approval (PA9/2022)

4. Subject Site

4.1 Property Description, Ownership and Locality

The subject site is situated approximately 12km southeast of the Bunbury Town Centre and 15.5km northeast of the Capel Townsite.

The proposed staged extraction area totals 22.2079Ha of the 42.438Ha property as outlined within the Works and Excavation plan.

Refer to Appendix C – Development Plans.

The property has been historically cleared and mined, supplying the southwest region with sand, a critical basic raw material (BRM) for over 25 years. The subject site does not contain any existing structures or buildings.

Lot 73 north of Calinup Road and Lot 167 Jilly Road (North East) are owned by McDougall Quarries. Land west of the Calinup ridgeline is currently mined for sand by Carbone Bros.

Refer to Figure 1 – Aerial Image of Lot 74 Calinup Road, Gelorup

The property details are provided within Table 1 below with a copy of the Certificate of Title attached at Appendix A.

Table 1. Summary Of Land Details

LOT NO.	LaNDOWNER	AREA	VOL.	FOLIO	PLAN NO.
74	McDougall Quarries Pty Ltd	42.438HA	4038	30	DP419145

Figure 1. Aerial Image of Lot 74 Calinup Road, Gelorup

4.2 Heritage & Environmental Considerations

4.2.1 Existing Site Topography

The topography of the subject site is commensurate to the existing topography of the Calinup hill. Elevations on the subject site range between 20m AHD at the base of the quarry to 58m AHD at the top of the Calinup hill, west of the Extraction site. The existing site topography is characterised by current extraction operations.

Refer to the Existing Contour and Feature Plan at Appendix C.

4.2.2 Geology, Soils and Groundwater

Lot 74 lies within the Spearwood and Pinjarra soil–landscape systems (DPIRD 2021). The Spearwood system is described as: Sand dunes and plains; Yellow deep sands, pale deep sands and yellow/brown shallow sands. The Pinjarra system is described as: Poorly drained coastal plain with variable alluvial and aeolian soils (DPIRD 2021). The majority of the extraction area is located on the Spearwood S1b phase with parts along the eastern boundary in the Pinjarra P1a phase (DPIRD 2019).

Long term groundwater monitoring has occurred in proximity to the subject site since 1979, however, due to uncertainty of results before 2006, Average Annual Maximum Groundwater (AAMGL) levels are measured from 2007 onwards. Onsite groundwater levels were measured in November 2021 and 2022. JDA Hydrologists have modelled the groundwater contours on the development plans attached at Appendix C. A copy of the JDA groundwater analysis completed for the site is included within Appendix I and mapped within Figure 2.

Refer to Figure 2 – JDA Estimated Maximum Groundwater Level's (MGL)

The subject site has an approved groundwater license (No. 207466), allowing the use of 20,000 kilolitres (KL) per year to be taken from the Perth – Superficial Swan aquifer. The license was granted in June 2022 and expired in July 2025. A new groundwater license is to be lodged by McDougall Quarries imminently.

4.2.3 Acid Sulphate Soils (ASS)

Department of Water and Environmental Regulation (DWER) Acid Sulphate Soil (ASS) risk mapping for the Swan Coastal Plain demonstrates that the subject site is partially mapped as having the potential for a moderate to low risk of intercepting ASS. However, since the extraction of sand will be separated from groundwater, the risk associated with disturbance of ASS is considered low for this development proposal.

4.2.4 Surface Water

The site is well drained through highly permeable sandy soils allowing for all surface water to be contained onsite through onsite infiltration. No surface water is to be discharged offsite and is contained pursuant to Water Quality Protection Note No. 15 (WQPN 15).

4.2.5 Wetlands

Pursuant to the DWER Geomorphic Wetland mapping data, the subject site is not identified as containing any geomorphic wetlands.

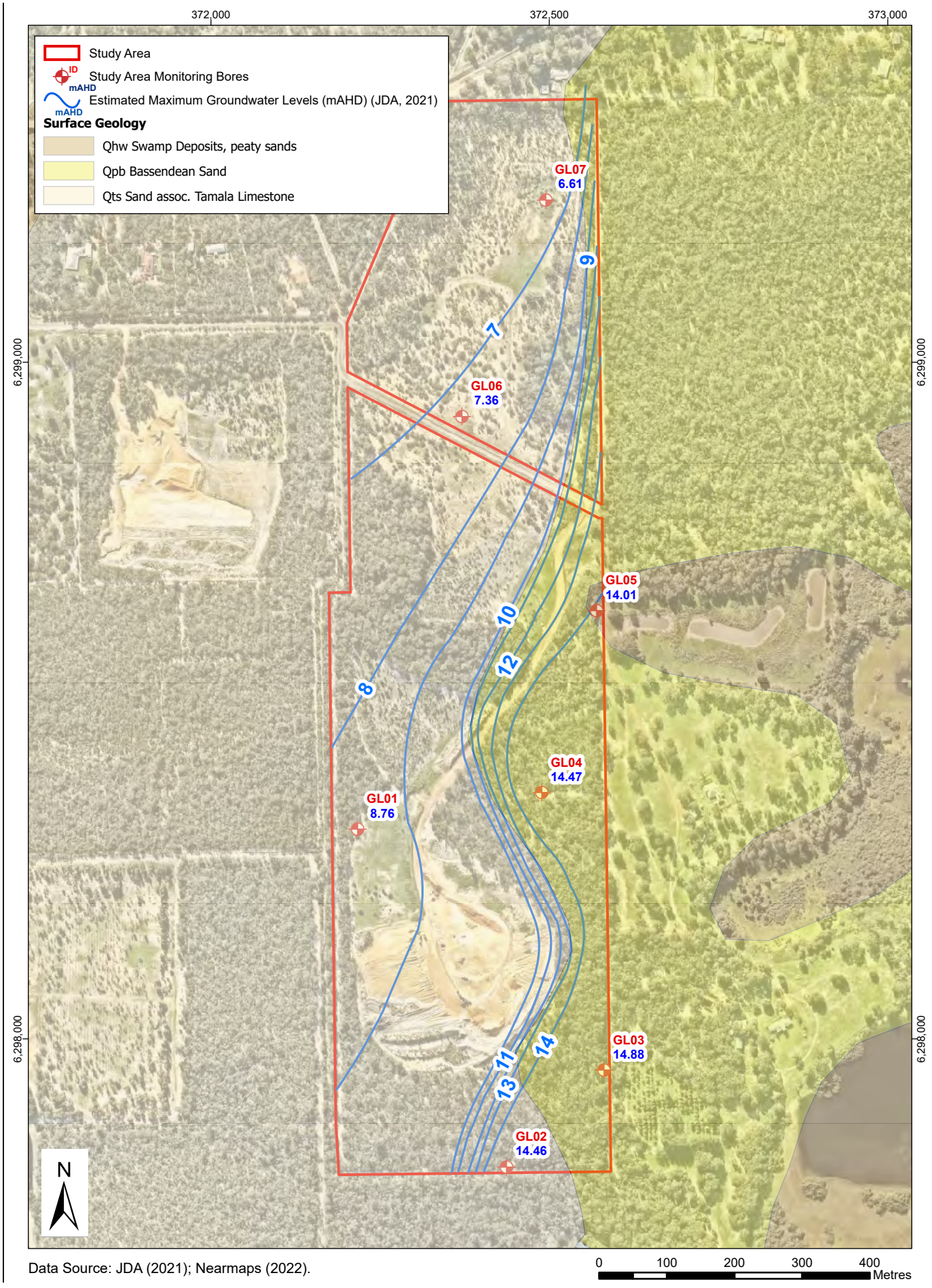

Figure 2. JDA Estimated Maximum Groundwater Level's (MGL)

4.2.6 Native Vegetation

Native vegetation located outside of the approved Ministerial boundary is to be retained and preserved during extraction operations.

Clearing of native vegetation within the approved extraction area has been progressively undertaken in accordance with the Rehabilitation Plan approved under MS 767. Annual compliance reporting and auditing is undertaken by DWER as required under the Ministerial Statement. No additional clearing of vegetation is proposed by this Development Application.

4.2.7 Heritage

A search using the Department of Planning, Lands and Heritage (DPLH) mapping system indicates that there are no places with Aboriginal Cultural Heritage significance on the subject site. Furthermore, the Heritage Council's State Heritage Register and the Shire's heritage records indicate there are no sites or places of State or Local heritage significance that will be impacted by the proposed development.

4.2.8 Current Environmental Approvals

Lot 74 is subject to Ministerial Statement 767, 969 and 1186, with rehabilitation of the subject site is to occur pursuant to the endorsed rehabilitation management plan prepared and approved by the EPA under condition 9 of MS 767.

Condition 11 of MS 767 states:

> *The depth of sand extraction shall not be less than 2 metres above the historical maximum water table level for the location, or less than 20 metres AHD, which ever is the greater.*

The 20m AHD level was derived from two piezometers located outside of the extraction area as outlined below.

Refer to Figure 3 – MBS Environmental Public Environmental Review (2003) Figure 4 Map

The Public Environmental Review report prepared by MBS Environmental in 2003 states groundwater recorded at bores 3 and 4 were 17.8m AHD and 17.25m AHD on the 17th of November, 1999 respectively. No further groundwater analysis was completed or recorded. Groundwater was recorded within Lot 73 (north of Calinup Road) within bores 1 and 2 at 7.61m AHD and 7.47m AHD on the 27th of October, 1998 respectively. These levels align with the levels recorded by JDA Hydrologists in 2021 and 2022. We note no bores were installed within the extraction area in early 2000. To be conservative and in accordance with the guidelines for Water and Rivers Commission, the 2m separation distance was agreed and the nominal level of 20m AHD was established. However, the intent remained at 2m above the maximum groundwater level (MGL).

The proposed development application therefore meets the intent of MS 767 by maintaining a 2m separation to the groundwater level. A minor amendment to condition 11 of MS 767 is to be lodged with EPA services following lodgement of this application.

Refer to the Public Environmental Review Report at Appendix L

4.3 Current Development Approval

Existing operations onsite have been subject to various Development Approvals over the lifetime of operations. Current operations are approved and operational under (PA37/2020) for a period of 8 years from the 29th July, 2020 (Condition a), with extraction activity limited to 5 years from licence approval (Condition b).

Refer to Appendix J – Current Development Approval

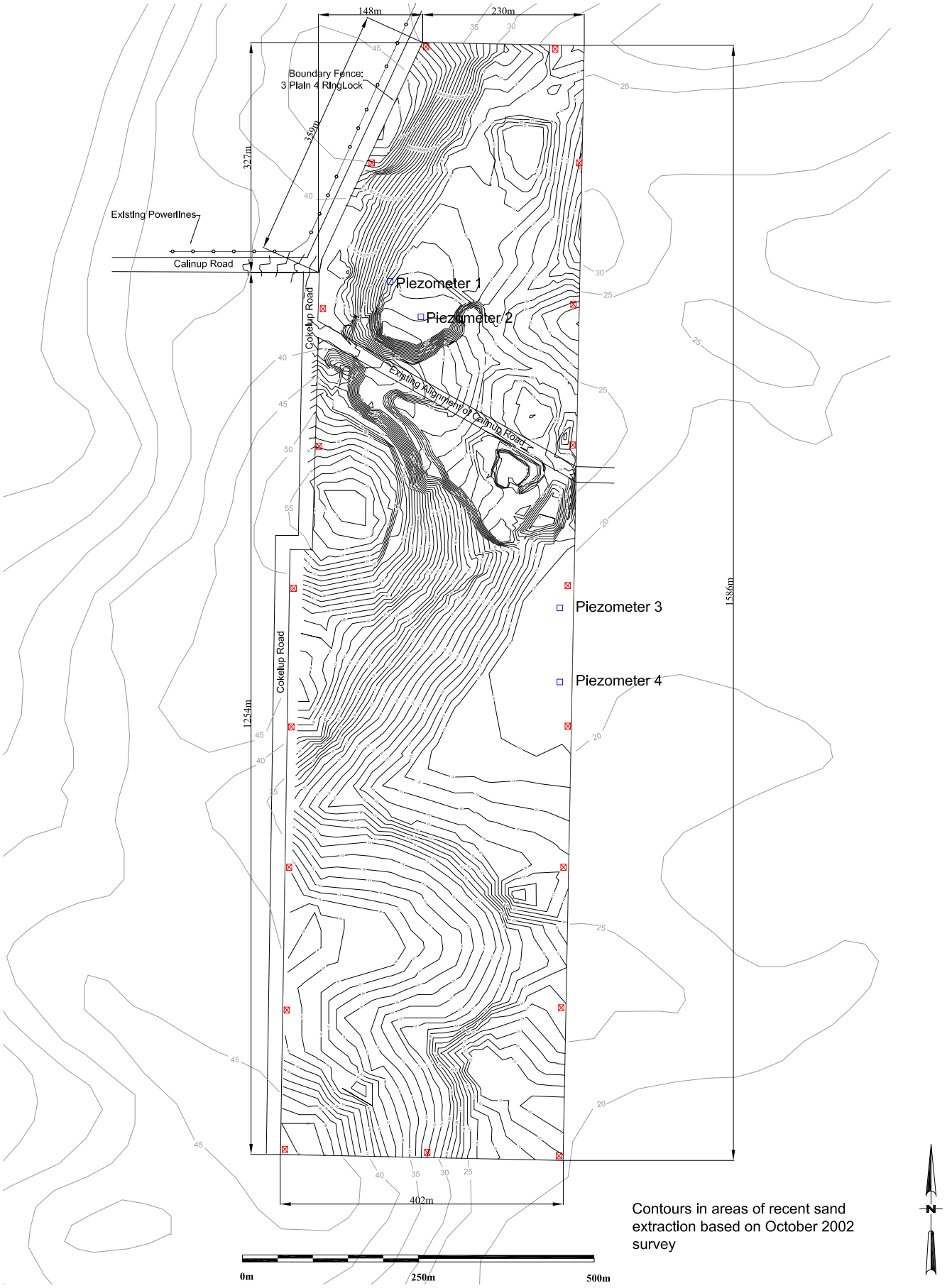

Figure 3. MBS Environmental Public Environmental Review (2003) Figure 4 Map

5. Proposed Development

5.1 Development Details

5.1.1 Overview

The proposal is for sand extraction restricted to 22.2079Ha of Lot 74, being the area currently used for extractive industry purposes, to a depth of approximately 11m AHD, being 2m above the maximum groundwater level (+2m MGL). Extraction is to occur over 18 stages, with each stage to comprise of an area less than 2Ha open to extraction at any given time.

Sand extraction is to be completed by BCP, with haulage proposed to use 27.5m B-Double trucks on the RAV 4.3 road network identified in the haulage route shown in Figure X. Regional Road access is provided via Calinup Road, connecting to Bussell Highway.

Following extraction, the site is to be recontoured with a bulldozer (or similar) to enable rehabilitation to native vegetation as set out in the Rehabilitation Implementation Plan at Appendix H.

The Development proposal is summarised in Table 2 below:

Table 2. Development Details:

Development Details:	
Subject Site Area	42.438Ha
Area of Vegetation Clearing	N/A – Clearing completed under Ministerial Statement 767
Extracted Material	Sand
Lot Boundary Setbacks	Minimum 20m
Minimum Separation Distance to Sensitive Land Use	253.5m
Extractive Industry License Area (%)	22.2079Ha (52.3%)
Rehabilitation Area (% of Extraction Area)	22.2079Ha (100%)
Rehabilitation Type	Native vegetation (subject to Ministerial Statement No. 767)
Requested Approval Timeframe	10 years (8 years extraction activity, 2 years rehabilitation)
Extraction Method	Front-end loader
Batter Slopes (Vertical: Horizontal)	1:4
No. of Stages	18

Development Details:	
Proposed Extraction Yield	1,750,373 BCM Net:1,099,063 BCM
Depth of Extraction	+2m MGL (approx. 11m AHD)
Proposed Haulage Vehicle Movements	Maximum of 130 per day (dependent on market demand)
RAV Network	RAV 4.3 (27.5m B-Double)
Haulage Route	Calinup Road to Bussell Highway (RAV 4.3)
Hours of Operation	Mon-Fri: 7:00am to 6:00pm Sat: 7:00am to 12:00pm No works are to occur on Sundays or Public Holidays.

A review of the proposed DA against existing approved Development Approvals (PA37/2020 and DA9/2022) and the proposed development are provided in Table 3 below:

Table 3. Comparison of the proposed Development and Current Approved Operations

	Current Approval (PA37/2020 & DA9/2022)	Proposed Development
Subject Site Area	42.438Ha	42.438Ha
Area of Vegetation Clearing	N/A – Clearing completed under Ministerial Statement 767	
Extracted Material	Sand	
Lot Boundary Setbacks	North: 40 West: 20m East: 27m South: 150m	North: 20.5m West: 24.1m East: 24.5m South: 148.8m Aligns to MS 767 Boundary
Minimum Separation Distance to Sensitive Land Use	Northwest: 494 (approx.) East: 300m	Northwest: 253.5m East: 300m
Extractive Industry License Area (% of Parent Lot)	18.7037Ha (32%)	22.2079Ha (52.3%)
Rehabilitation Area (% of Extraction Area)	18.7037 Ha (100%)	22.2079Ha (100%)
Rehabilitation Type	Native vegetation (subject to Ministerial Statement No. 767)	
Approval Timeframe	8 years (from 29 July 2020) 5 years extraction following issue of license	10 years (8 years extraction, 2 years rehabilitation)
Extraction Method	Front-end loader	

	Current Approval (PA37/2020 & DA9/2022)	Proposed Development
Batter Slopes (Vertical: Horizontal)	1:4	
No. of Stages	16	18
Proposed Extraction Yield	651,310 m3	1,750,373 m3 Net:1,099,063 m3
Depth of Extraction	20m AHD	+2m MGL (Approx.11m AHD)
Proposed Haulage Vehicle Movements	Maximum of 130 per day (dependent on market demand)	
RAV Network	RAV 4.3 (27.5m B-Double)	
Haulage Route	Calinup Road to Bussell Highway (RAV 4.3)	
Hours of Operation	Mon-Fri: 7:00am to 6:00pm Sat: 7:00am to 12:00pm No works are to occur on Sundays or Public Holidays.	

5.1.2 Nature of Operations and Duration

The proposed daily operations onsite are outlined as follows.

Machinery located onsite during extraction works may include but are not limited to the following:

- A loader for the purpose of loading sand into trucks;
- A bulldozer or tracked bobcat for the clearing of topsoil located within each extraction stage and the sequential rehabilitation of each stage by respreading topsoil;
- Trucks for transporting material off-site; and
- A 15KL watercart for dust suppression.

The duration of works onsite are anticipated to occur over an eight-year period in accordance with a time-limited extractive industry license granted under the *Shire's Extractive Industry Local Law (2016)*.

It is anticipated that all material may be extracted within eight (8) years, with rehabilitation to be completed following the completion of each stage, resulting in a 10-year approval period overall.

Rehabilitation and ongoing monitoring and maintenance of the rehabilitation area to a self-sustaining status will require management over a period of 10 years following the completion of works onsite.

The following activities are expected as part of the on-going operation of the site:

- **Removal and Stockpiling of Topsoil** - the top 100mm of topsoil from the active extraction stage is to be removed and stockpiled. Stockpiles are to be located where convenient for operations with a batter no greater than 1:3 to ensure minimal erosion of the stockpile during winter periods.
- **Sand excavation** - This activity involves excavation of the sand resource from the working face within the stage and loading of trucks for haulage offsite.
- **Screening** - Screening of excavated material may be required dependent upon the particle size of material and market demand for material size. Should screening be undertaken onsite, a mobile screen is to be located within the base of the pit and operated in accordance with the environmental acoustic report attached at Appendix D. Material is to be loaded into the screen by front-end loader prior to loading trucks for haulage.

- **Final contouring and topsoil respread** – A combination of equipment may be used to undertake spreading and earthworks including a bulldozer and/or tracked bobcat. Final batters are to be no greater than 1:4 and certified by a feature survey prior to rehabilitation.
- **Site rehabilitation** – Rehabilitation is to be completed in stages, following each stage of extraction, by a suitably qualified consultant. Annual reporting is required onsite to meet the conditions of Ministerial Statement 767 to the satisfaction of DWER.

5.1.3 Stages of Excavation

Since 2015, the extraction operations have progressed gradually in approximately 1 ha to 2 ha stages from north to south, followed by progressive rehabilitation. Extraction is currently operational in stages 5–7, following the completion of Cells 18–11 at a batter slope of 1:4. Following this approval, extraction is planned to progress from Stage 18 to 1 at a depth of +2m MGL with a rehabilitated batter at 1:4.

The net volume of additional sand to be extracted is estimated to be in the order of 1,099,063m^3.

5.1.4 Depth of Extraction

Depth of extraction is to be limited to approx. 11m AHD being 2m MGL, in accordance with the depth as deemed appropriate in MS 767 and the Shire's local planning framework. Detailed post extraction contours are provided within the development plans provided at Appendix C.

It is the operator's responsibility to not exceed this depth of extraction to prevent any risk of exposing groundwater within the site.

5.1.5 Site Access and Movement

Access to the site is via Calinup Road to Bussell Highway. An internal limestone access road will be used during extraction operations for loading and turnaround facilities as required by operations.

The proposed haulage route for the development is identified within Figure 4.

The proposed haulage route is a RAV 4.3 network and capable of accommodating all proposed haulage.

Refer to Figure 4 – Proposed Haulage Route

5.1.6 Hours of operation

The proposed hours of operation are 7:00am to 6:00pm, Monday to Friday inclusive, and 7:00am to 12:00pm on Saturdays. No works are to occur on Sundays or Public Holidays.

5.1.7 Site Office & Ablutions

Existing operations onsite require a temporary site office and ablution facilities as staff are onsite for limited periods of time.

5.1.8 Water Supply for Dust Suppression

It is anticipated that during the summer months of October to March, approximately 30KL (two full water carts) will be required for dust suppression per day. An estimated 4,500KL of water is required per year for dust suppression. This volume is supplied by the existing groundwater bore onsite, with the landowner permitted to take up to 20,000KL annually.

Figure 4. Proposed Haulage Route

5.2 Noise

An acoustic report was prepared by Herring Storer to model proposed developments noise emissions with a copy of the report included at Appendix D.

The Acoustic Report concludes that all operations are compliant with the assigned day period noise levels of 48 and 47 dB(A) for the nearest sensitive land uses. Operations therefore are to comply with the Environmental Protection (Noise) Regulations (1997).

Refer to Figure 5 – Modelled Acoustic Contours (Worst Case Scenario)

Refer to Appendix D – Acoustic Report

5.3 Traffic and Transport

A Traffic Impact Statement (TIS) has been prepared by Stantec in support of the proposed haulage operations onsite.

The TIS concludes that proposed development is estimated to generate up to 130 daily truck trips and 4 light vehicle trips on operation days, which translate to approximately 26 peak hour trips. These values are minimal and can be assumed to have a low to moderate impact. This impact is currently approved and remains unchanged by this proposal.The proposed development will operate within the existing approved haulage capacity of the road network and will not require any upgrades to the existing haulage route to support the proposed development.

Refer to Appendix E – Traffic Impact Statement

5.4 Weed and Dieback Management

A Weed and Dieback Management Plan has been prepared by MBS Environmental setting out the contingency measures required to prevent the introduction and spread of weeds and Phytophthora Dieback within the subject site.

A clean down area previously approved at the entrance to the site will continue to be used to prevent the spread of weeds and dieback within the conservation areas of the site should access be required. All other vehicle movements are to remain on existing tracks and within the extraction boundary area.

Refer to Appendix F – Weed and Dieback Management Plan

5.5 Dust Management

Dust generated onsite is to be managed in accordance with the Dust Management Plan (DMP) prepared by MBS Environmental attached at Appendix G.

As outlined within the DMP, dust will be managed onsite using water from the bore when visible dust is observed during activities such as, topsoil stripping, sand excavation, loading, transportation, vehicle movements, rehabilitation and natural wind events.

No dust complaints have been received for existing operations due to the screened nature of operations, with the current dust management methodology proposed to continue.

Refer to Appendix G – Dust Management Plan

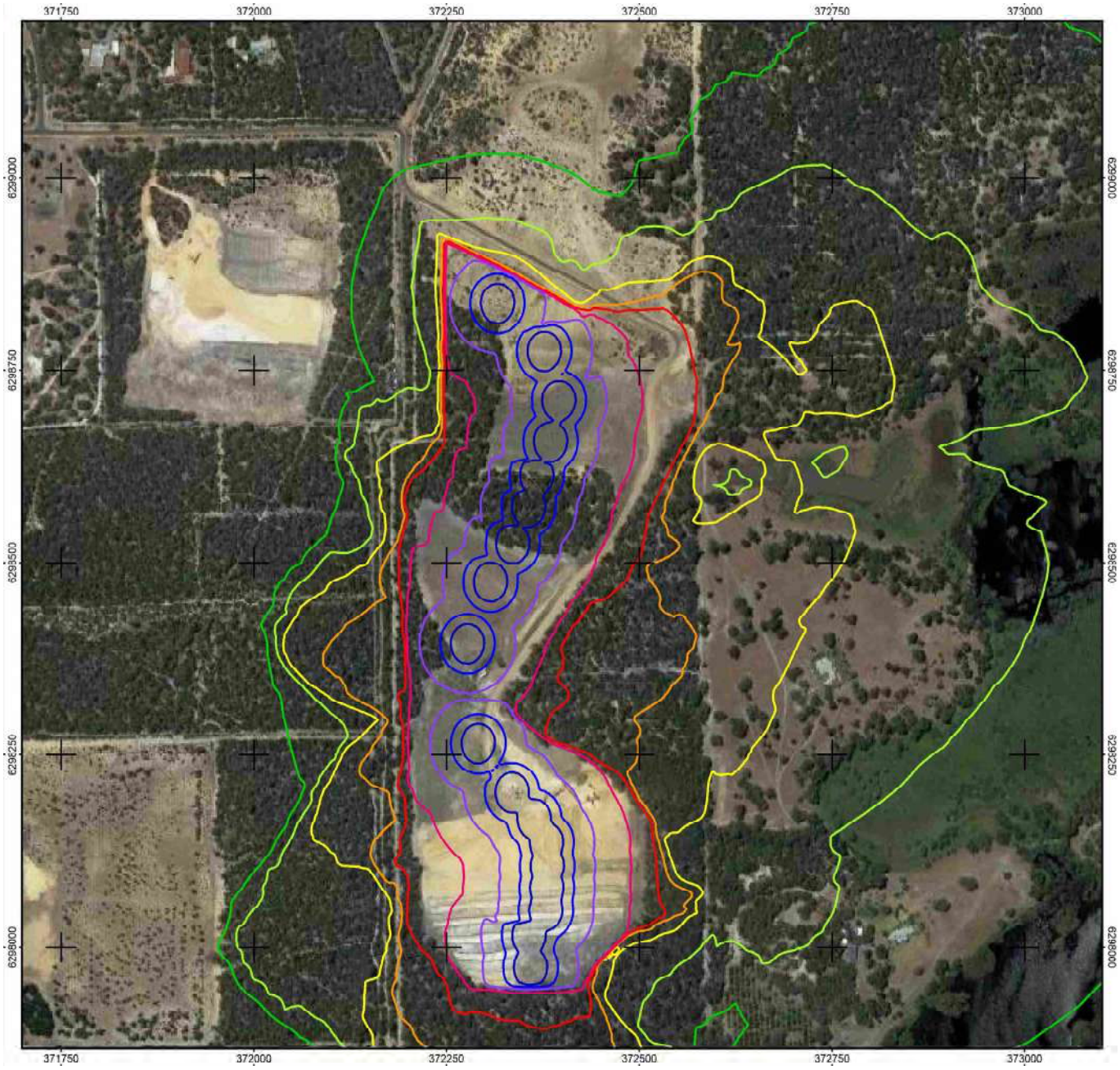

Figure 5. Modelled Acoustic Contours (Worst Case Scenario)

5.6 Rehabilitation to Native Vegetation

Following the extraction of sand from each stage (18 to 1), each stage is to be progressively rehabilitated to native vegetation as detailed extensively within the Rehabilitation Implementation Plan attached at Appendix H.

The rehabilitation methodology set out by the Rehabilitation Implementation Plan will ensure future rehabilitation onsite meets the completion criteria listed in Ministerial Statement 767 to the satisfaction of the Shire.

Refer to Appendix H – Rehabilitation Implementation Plan

5.7 Stormwater Management

Stormwater management onsite has historically been completed within each extraction stage, with permeable soils (sand) providing the opportunity for onsite infiltration within the base of each stage. All Stormwater is to be contained within the proposed extraction boundary, with no offsite impacts anticipated by this proposal.

5.8 Onsite Vehicle Refuelling

All machinery onsite are to be serviced by an authorised service vehicle which is to arrive onsite when required and contains a hydrocarbon spill kit to prevent any potential contamination of the site.

All major servicing is to occur offsite.

No hydrocarbons are to be stored onsite at any time, with the refuelling of machines to occur from an authorised service vehicle.

6. Orderly and Proper Planning

In addition to the assessment and justification provided in the planning assessment at Appendix B, the principles of orderly and proper planning require that new development is consistent with the planning vision and strategic direction for the locality.

The key matters relating to orderly and proper planning are as follows:

- The application seeks approval to a currently approved Extractive Industry, a discretionary land use within the Rural Zone of LPS 8 and meets the objectives of the Greater Bunbury Region Scheme Rural Zone;
- The extraction boundary proposed aligns with the approved clearing boundary defined within Ministerial Statement 767.
- The proposed development seeks to extract sand to a depth no greater than +2m MGL, ensuring an appropriate buffer is maintained to groundwater, reflective of the intent of Ministerial Statement 767;
- The proposal will enable the increased yield from an operational quarry, supplying a critical basic raw material to the Greater Bunbury Region, contributing to local employment and economic development.
- The proposal will not impact on the amenity of surrounding rural land uses in the vicinity of the site due to the nature of operations (within an existing approved extraction boundary) and topography;
- Calinup Road is a bitumen sealed road, capable of supporting RAV 4.3 vehicles and current approved haulage movements per day.
- The proposed development is capable of managing Dust and Noise emissions within the site without any offsite amenity impacts on the locality;
- Following Extraction, each stage is to be progressively rehabilitated to native vegetation in a manner set out within the Rehabilitation Implementation Plan and monitored annually by DWER to achieve the assigned completion criteria within MS 767.

Given the above, the proposed development is considered to be consistent with the principles of orderly and proper planning and therefore should be supported by the RDAP on its planning merit.

7. Conclusion

This report has been prepared by Element Advisory, on behalf of the landowner McDougall Quarries Pty Ltd for an Extractive Industry at Lot 74 Calinup Road, Gelorup (the subject site).

The development proposal seeks approval to extract sand from the site in alignment with the boundary and the intended separation distance to groundwater permitted under the Ministerial Statement 767. In light of Development Approval PA9/2022, this application will increase the approved excavation depth from 20m AHD to +2m MGL and expand the extraction boundary within stages 1–3. All other operational aspects of the proposal will remain as previously approved.

This report sets out the development approval framework, project area description, proposed development and planning framework applicable to the proposal. The planning assessment demonstrates the proposed development will achieve the strategic intent for the area and is consistent with the requirements and standards in the applicable statutory planning framework.

Whilst some variations are proposed to the relevant development standards under the local planning framework, they have been appropriately justified. This proposal provides a unique land use opportunity to supply the southwest region with sand, a critical construction material, which is needed to meet current and projected demand within the greater Bunbury Region.

The proposal is consistent with the principles of orderly and proper planning and can be appropriately managed as outlined within this report.

It is respectfully requested that the Shire support and recommend approval of the proposed development to the RDAP, subject to appropriate conditions reflective of current operations.

Appendix A – Certificate of Title

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
4038	**30**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 74 ON DEPOSITED PLAN 419145

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MCDOUGALL QUARRIES PTY LTD OF 87 KEEL RETREAT GEOGRAPHE WA 6280
(AF P606664) REGISTERED 3/7/2023

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1.	N161939	MEMORIAL. SOIL AND LAND CONSERVATION ACT 1945. AS TO PORTION ONLY - SEE DEPOSITED PLAN 419145 REGISTERED 30/10/2015.
2.	O371316	MORTGAGE TO CORPORATE FUNDING PTY LTD OF CARE OF STATOS LEGAL PTY LTD LEVEL 5 444 QUEEN ST, BRISBANE CITY QLD 4000 REGISTERED 20/3/2020.
3.	P606665	NOTIFICATION SECTION 165 PLANNING & DEVELOPMENT ACT 2005 LODGED 3/7/2023.
4.	P606666	NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 3/7/2023.
5.	P606667	NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 3/7/2023.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP419145
PREVIOUS TITLE:	1356-756
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF CAPEL

Appendix B – Planning Framework

Greater Bunbury Region Scheme

The Greater Bunbury Region Scheme zones the subject site 'Rural' as outlined within Figure 6 below.

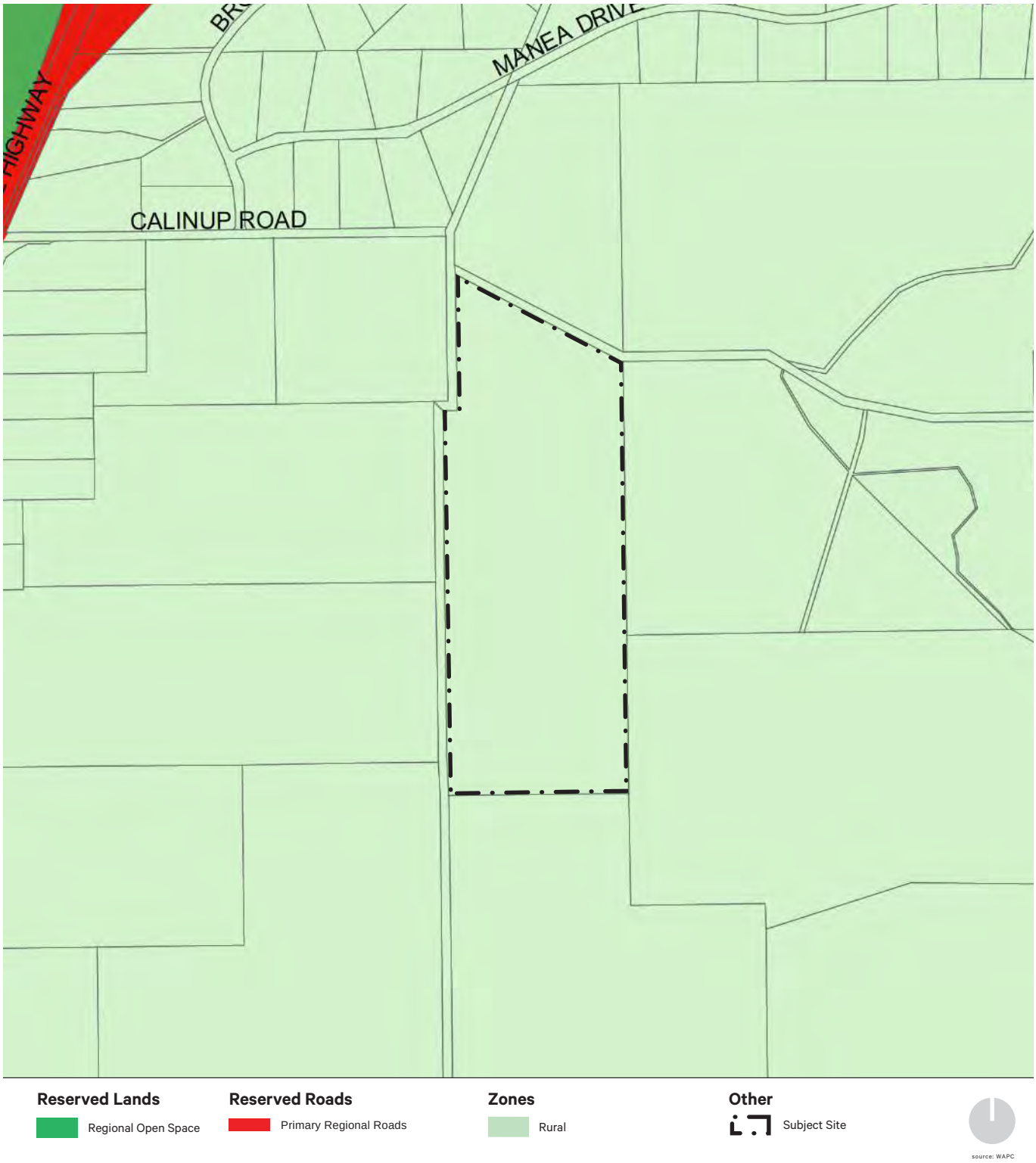

Figure 6. Greater Bunbury Region Scheme (GBRS)

The purpose of the 'Rural' zone is as follows:

Rural – to provide for the sustainable use of land for agriculture, assist in the conservation and wise use of natural resources including water, flora, fauna and minerals, provide a distinctive rural landscape setting for the urban areas and accommodate carefully planned rural living developments.

The aims of the GBRS relevant to this proposal are as follows:

The aims of the Scheme are to —

(A) Promote the sustainable development of land taking into account relevant environmental, social and economic factors;

(H) Protect strategic minerals and basic raw materials of State and regional importance and provide for the efficient and timely extraction of minerals and raw materials and subsequent rehabilitation of affected land.

The proposed development continues a long established existing approved use and development of land to harness natural resources for urban development. It promotes the sustainable development of the land through the progressive extraction of sand, a critical basic raw material, and the subsequent rehabilitation of the subject site to native vegetation pursuant to Ministerial Statement 767. The proposal is therefore in accordance with the purpose of the Rural zone and aims of the GBRS.

GBRS Strategic Minerals and Basic Raw Materials Resource Policy (2018)

The subject site is entirely located within a Titanium–Zircon Strategic Mineral Resource identified within the GBRS Strategic Minerals and Basic Raw Materials Resource Policy as outlined within Figure 7.

Refer to Figure 7 – Strategic Minerals and Basic Raw Materials Resource Policy

The principal purpose of the Policy is to ensure long-term security of access for minerals and basic raw materials as they are a major source of employment with significant flow-on effects to other sectors of the economy. Although the proposed operations are not for the extraction of Titanium Zircon minerals, the proposed operations are not considered to impact upon mineral deposit and are of a nature which have historically co-located. Extraction of minerals as defined by the *Mining Act 1978* is prohibited without the granting of a mining tenement and is governed by the Department of Mines. This proposal therefore does not propose the extraction of mineral sands.

The policy objectives and applicable response are provided within table below.

GBRS SMBRM Policy Objective	Proposed Development
4.1. To identify land within the GBRS area that contains mineral resources and basic raw materials or state or regional significance	The proposal is identified as being located within a Titanium–Zircon mineral deposit. Basic Raw Material extraction is considered appropriate for the location.
4.2. To prevent strategic resources of State or reginal significance being sterilised from incompatible development and land uses	The proposal seeks to extract BRM following established land use and development approvals and under a time limited approval. It will not sterilise the land.
4.3. To encourage the mining of strategic resources in accordance with acceptable environmental standards	The proposal is considered to propose an appropriate extraction methodology to meet acceptable environmental standards.

GBRS SMBRM Policy Objective	Proposed Development
4.4. To promote the rehabilitation and restoration of mining and extraction sites after works have been completed, in a manner consistent with the long-term use of the land.	The proposal is considered to propose an appropriate rehabilitation methodology to achieve the completion criteria of MS 767.

The proposal therefore meets the objectives of the GBRS SMBRMR Policy.

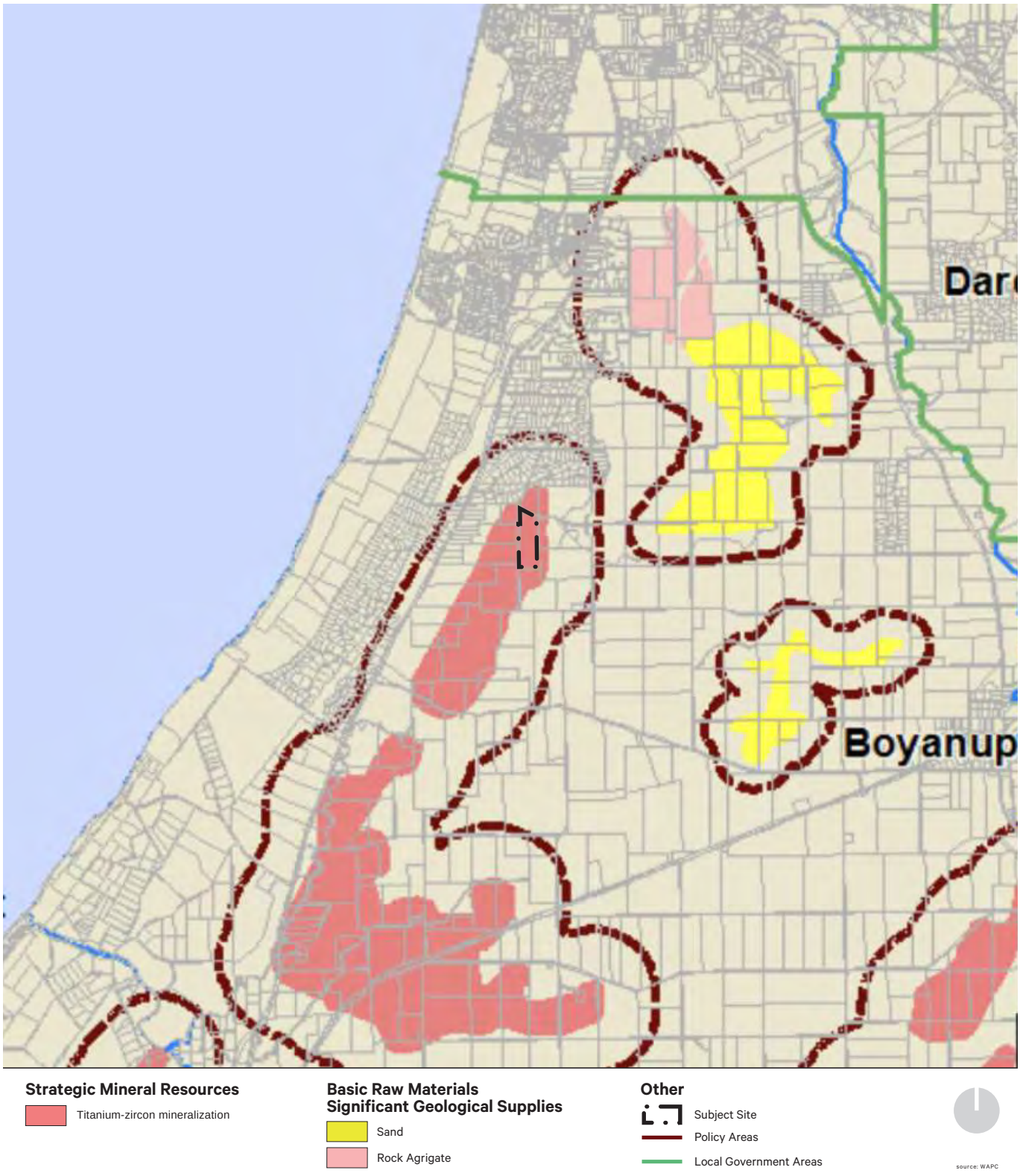

Figure 7. Strategic Minerals and Basic Raw Materials Resource Policy

Planning and Development (Local Planning Schemes) Regulations 2015

Clause 67(2) of Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015 (the Deemed Provisions), specifies matters which are to be given due regard when determining applications for approval.

An assessment of the proposal against the relevant matters outlined in Clause 67(2) of the Deemed Provisions has been undertaken. A summary of the assessment is provided in Table 4.

Table 4. Clause 67(2) of the Planning and Development (Local Planning Schemes) Regulations 2015 Assessment

Provision	Applicant Response	
(a) the aims and provisions of this Scheme and any other local planning scheme operating within the Scheme area	Refer to the planning justification provided under the Local Planning Scheme No. 8.	✓
(b) the requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the *Planning and Development (Local Planning Schemes) Regulations 2015* or any other proposed planning instrument that the local government is seriously considering adopting or approving	LPS 8 was recently endorsed by the Minister for planning. No Local planning scheme amendment is relevant to this proposal.	✓
(c) any approved State planning policy	Refer to the assessment listed under State Planning Policy 2.4, 2.5 and 3.7.	✓
(d) any environmental protection policy approved under the Environmental Protection Act 1986 section 31(d)	Refer to the assessment outlined under EPA Separation distances between Industrial and Sensitive land uses.	✓
(e) any policy of the Commission	Refer to the assessment outlined under GBRS Strategic Minerals and Basic Raw Materials Resource Policy (2018)	✓
(f) any policy of the State	N/A	
(fa) any local planning strategy for this Scheme endorsed by the Commission	Refer to summary of assessment under the Shire of Capel Local Planning Strategy.	✓
(g) any local planning policy for the Scheme area	Refer to summary of the local planning policy 6.2 – Extractive Industries.	✓
(h) any structure plan or local development plan that relates to the development	N/A	✓
(i) any report of the review of the local planning scheme that has been published under the Planning and Development (Local Planning Schemes) Regulations 2015	N/A	✓
(j) in the case of land reserved under this Scheme, the objectives of the reserve and the additional and permitted uses identified in this Scheme for the reserve	N/A	✓

Provision	Applicant Response	
(k) the built heritage conservation of any place that is of cultural significance	N/A	✓
(l) the effect of the proposal on the cultural heritage significance of the area in which the development is located	Extraction is located within the previously approved boundary of MS 767. No impact on Cultural Heritage is proposed.	✓
(m) the compatibility of the development with its setting, including – (i) the compatibility of the development with the desired future character of its setting; and (ii) the relationship of the development to development on adjoining land or on other land in the locality, but not limited to, the likely effect of the height, bulk, scale orientation and appearance of the development.	The proposed development seeks approval within an approved MS 767 boundary and within an operating site. The character of the locality is characterised by extraction, with another extraction operation west of the subject site.	✓
(n) the amenity of the locality including the following – (i) environmental impacts of the development (ii) the character of the locality (iii) social impacts of the development	The environmental impacts of the proposal are detailed within MS 767 and associated reports. The character of the locality is defined by extraction operations. No social impacts are anticipated by the proposal as operations have continued onsite for the past 30 years.	✓
(o) the likely effect of the development on the natural environment or water resources and any means that are proposed to protect or mitigate impacts on the natural environment or the water resource	The separation distance to groundwater set by condition 11 of MS 767 remains unchanged. The proposal seeks to maintain a 2m separation to groundwater, meeting the intent of condition 11.	✓
(p) whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved	The entire extraction area is to be rehabilitated to native vegetation to satisfy the completion criteria of MS 767 as set out within the rehabilitation implementation plan. Existing vegetation outside of the extraction area are to be preserved.	✓
(q) the suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bush fire, soil erosion, land degradation or any other risk	The site is suitable for sand extraction as has been previously approved. No soil erosion or land degradation is proposed by this development.	✓
(r) the suitability of the land for the development taking into account the possible risk to human health or safety	No possible risk to human health is proposed by the development. Management of operations are to continue as currently approved.	✓

Provision	Applicant Response	
(s) the adequacy of – (i) the proposed means of access and egress from the site; and (ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles	The access and egress from the site remains unchanged from the current approval (PA9/2022)	✓
(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety	Calinup Road is a RAV 4.3 network, with current haulage movements already approved under PA9/2022. Access to the Bunbury Outer Ring Road is to be constructed by MRWA and supports existing haulage movements.	✓
(u) the availability and adequacy for the development of the following – (i) public transport services (ii) public utility services (iii) storage, management and collection of waste (iv) access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities) (v) access by older people and people with disability	N/A	
(v) the potential loss of any community service or benefit resulting from the development other than potential loss that may result from economic competition between new and existing businesses	N/A	
(w) the history of the site where the development is to be located	The subject site and Calinup road has a long history of Sand Extraction.	✓
(x) the impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals	The development will positively impact the community, by providing sand for future construction purposes within the Shire of Capel.	✓
(y) any submissions received on the application	Submissions received on the application are to be considered and addressed through the assessment process.	✓
(za) the comments or submissions received from any authority consulted under clause 66	Submissions received on the application are to be considered and addressed through the assessment process.	✓
(zb) any other planning consideration the local government considers appropriate		

Shire of Capel Local Planning Scheme No. 8

The subject site is zoned "Rural" under the Shire of Capel's Local Planning Scheme No. 8 (LPS 8). as outlined within Figure 8.

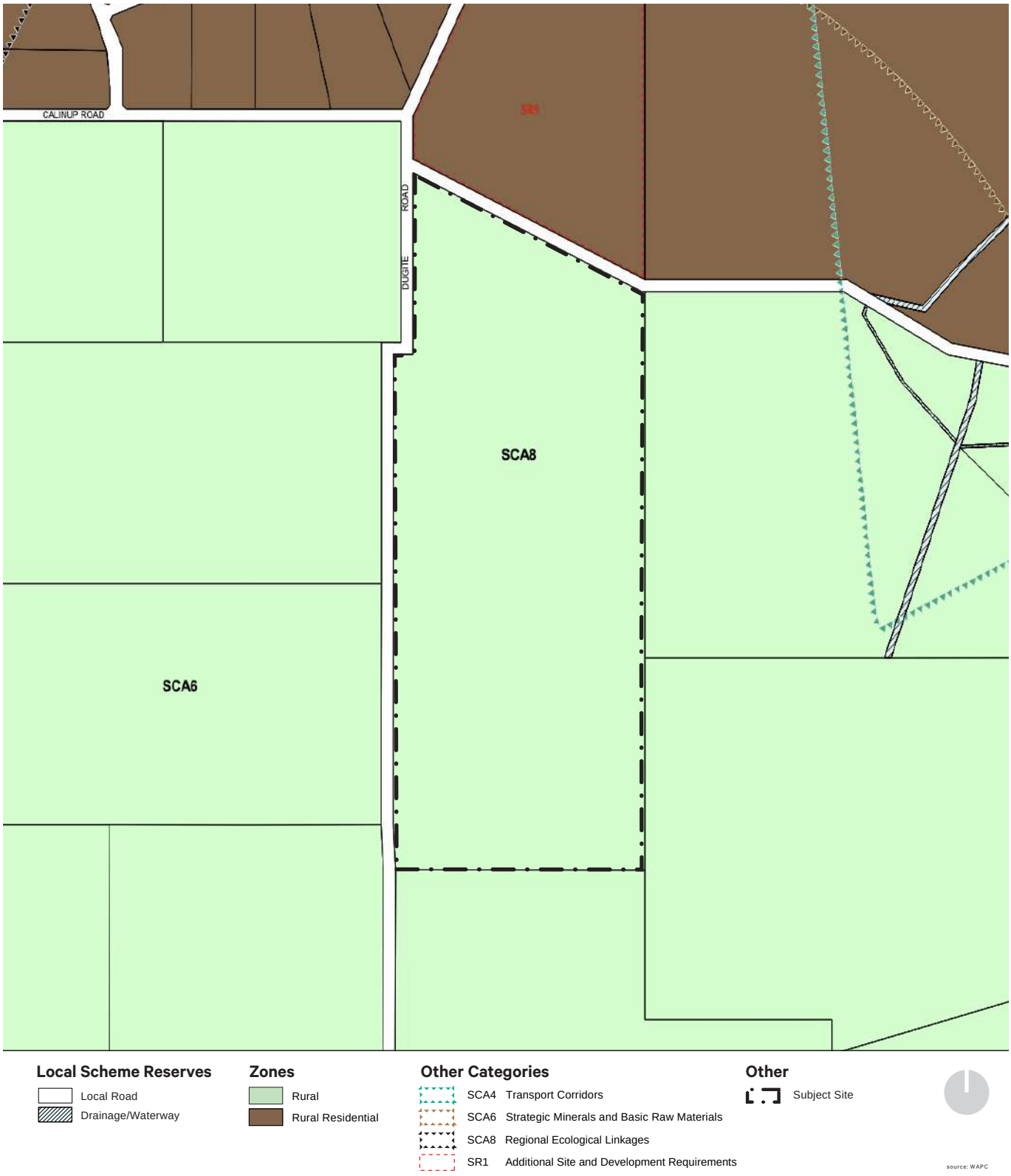

Figure 8. Local Planning Scheme No. 8 Zoning

The objectives of the Rural zone are outlined as follows:

1. To provide for the maintenance or enhancement of specific rural character;
2. To protect extensive agricultural activities such as cropping and grazing and intensive uses such as horticulture as primary uses with other rural pursuits and rural industries as secondary uses in circumstances where they demonstrate compatibility with the primary use;
3. To maintain and enhance the environmental qualities of the landscape, vegetation, soils and water bodies, in order to protect sensitive areas especially the natural valley and watercourse systems from damage;
4. To provide for the operation and development of existing, future and potential rural land uses by limiting the introduction of sensitive land uses in the Rural Zone;
5. To provide for a range of non-rural land uses where they have demonstrated benefit and are compatible with surrounding Rural uses.

The proposed extractive industry considered to meet objective (5) of the Rural Zone, having a demonstrated benefit to the economic development within the Shire and is appropriately managed to be compatible with surrounding Rural uses.

An 'Industry Extractive' land use is defined by LPS 8 as:

> *means premises, other than premises used for mining operations, that are used for the extraction of basic raw materials including by means of ripping, blasting or dredging and may include facilities for any of the following purposes –*
>
> *(a) the processing of raw materials including crushing, screening, washing, blending or grading*
>
> *(b) activities associated with the extraction of basic raw materials including wastewater treatment, storage, rehabilitation, loading, transportation, maintenance and administration.*

Within the Rural zone, an Industry Extractive land use is a discretionary land use "A" which may be considered, subject to the application being made available for public comment.

The subject site is located entirely within SCA 6– Strategic Minerals and Basic Raw Materials.

The purpose of SCA 6 is as follows:

> *'To identify areas where basic raw materials and strategic mineral resources need to be protected from incompatible land uses in line with the GBRS Strategic Minerals and Basic Raw Materials Resource Policy 2018.'*

The proposed Extractive Industry satisfies the purpose of SCA 6 by identifying a strategic source of basic raw materials and engaging in appropriate extraction prior to rehabilitation to native vegetation. This allows for the extraction of a significant Basic Raw Material Resource while also enabling improved rehabilitation to native vegetation.

The following table assess the proposal against the objectives of SCA6 under the LPS8:

Table 5. LPS8 Special Control Area 6: Strategic Minerals and Basic Raw Materials Assessment

LPS8 SCA6 Objective	Comment
(a) To identify land within the Scheme area which contains mineral resources and basic raw materials of State or regional significance	The extraction area includes a regionally significant deposit of sand.
(b) To prevent mineral resources and basic raw materials of State or regional significance being sterilised by incompatible development and land uses.	The proposal seeks to extract BRM and not sterilise the resource.

LPS8 SCA6 Objective	Comment
(c) To encourage the mining of mineral resources and extraction of basic raw materials in accordance with acceptable environmental standards.	Extraction of BRM is to be completed to an acceptable environmental standard as set out within this report.
(d) To promote the rehabilitation and restoration of mining and extraction sites, after works have been completed, in a way that is consistent with the long-term use of the land.	The proposed extraction area is to be entirely rehabilitated to native vegetation in accordance with MS767.

The subject site is further located within Special Control Area 8 – Regional Ecological Linkages.

The purpose of SCA 8 is as follows:

> *To identify significant ecosystems on the Scheme Map as a Special Control Area and to provide measures to ensure that land use and development within its boundaries are regulated and managed to protect significant ecological linkages, foreshore environments, biodiversity and environmental quality.*

The proposed extraction boundary aligns with the Ministerial Boundary of MS 767 with clearing of native vegetation already completed onsite, and no further clearing proposed. Following extraction, the subject site is to be rehabilitated to native vegetation, enhancing the ecological linkage for the region as set out within LPS 8.

Local Planning Policy 6.2 – Extractive Industries

Local Planning Policy 6.2 – Extractive Industries (LPP6.2) has been prepared by the Shire to ensure appropriate location of Extractive Industry uses and mitigation of adverse amenity and environmental impacts. Whilst Draft LPP6.2 has not yet been adopted by the Shire, it completed public advertising on the 6th of February 2023. As the Draft LPP6.2 is expected to be formally adopted coinciding with the approval of the proposed extractive industry, an assessment of the proposal against this policy, now considered to be seriously entertained, has been conducted below.

LPP6.2 Acceptable Development Provision	Applicant Comments
Element: Amenity	
AD1.1.1 Hours of operation are limited to 7am to 7pm Monday to Friday and 7am to 1pm on Saturday. No operation on recognised public holiday days.	Approved hours of operation are proposed in accordance with AD 1.1.2.
AD 1.1.4 Development is located, designed and rehabilitated compatible with long-term planning and environmental protection.	Proposed extraction area is to be rehabilitated to native vegetation in accordance with surrounding remnant vegetation and the conditions of MS 767. Details of rehabilitation are outlined in the Rehabilitation Implementation Plan attached at Appendix H.
Element: Environmental	
AD1.2.1 Development does not prejudicially affect native flora and fauna; groundwater quality, quantity and use; surface drainage and surface water quality including discharge of sediment and sites of cultural and/or historic significance on or near the land.	The subject site is cleared pursuant to the conditions of MS 767. Rehabilitation to native vegetation may be undertaken as set out within the Rehabilitation Implementation Plan. The proposed depth of extraction maintains an acceptable separation to groundwater (+2m MGL), with stormwater to be appropriately managed onsite.

LPP6.2 Acceptable Development Provision	Applicant Comments
AD1.2.2 Dieback is managed in accordance with Best Practice Guidelines – Management of Phytophthora Dieback in Extractive Industries (2005 – Dieback Working Group) as detailed within an agreed Dieback Management Plan.	A Weed and Dieback Management Plan attached at Appendix F and provides measures that will be implemented to prevent the introduction and spread of weeds and Phytophthora Dieback within the extraction and adjoining covenanted areas.
AD1.2.3 Excavation shall not occur within 2 metres of the estimated maximum ground water level.	The proposed EIL is seeking extraction to a maximum depth of 2m above the MGL at the subject site.
PC 1.2.4 Final excavation batters to achieve rehabilitated slopes compatible with future land use, existing soil structure, topography and positive environmental outcomes	The current Development Approval permits batter slopes at 1:4. The proposed development therefore seeks to continue the batter to +2mMGL, with rehabilitation set out within the RIP ensuring the subject site may establish native vegetation over the entire site.
AD1.2.5 Sites to be rehabilitated in accordance with an agreed Environmental Management Plan and Rehabilitation Implementation Plan prepared and implemented in accordance with application and bonding requirements as specified in Appendix 1 of this Policy.	The proposal is accompanied by a Rehabilitation Implementation Plan, prepared pursuant to Appendix 1 of the Policy.
Element: Buffers	
PC1.3 Development to demonstrate satisfactory mitigation and management measures in accordance with SPP 4.1 Industrial Interface and Guidance Note 3 – Separation Distances Between Industrial and Sensitive Land Uses (EPA – 2005).	The proposed development is appropriately managed in accordance with Guidance Note 3 – Separation Distances Between Industrial and Sensitive Land Uses. The extraction north western corner of the extraction boundary is located 253.5m from the nearest sensitive land use in lieu of the recommended buffer distance between 300–500m. Potential impacts such as noise and dust are appropriately justified within this report.
Element: Visual Impact	
AD1.4.1 Visual screening to be provided through retention of existing vegetation and/or provision of an appropriate landscaping screen/bund to the satisfaction of the Shire. No walls or fences will be considered.	The proposed extraction area is set back a minimum of 20m from surrounding Calinup road in accordance with LPS 8. Calinup Road is a cul-de-sac with limited passing traffic excluding two residents east of the site. Staged extraction progressing from stage 18–1 will enable the extraction face to be screened from Calinup Road due to the depth of extraction and the natural surface level.

LPP6.2 Acceptable Development Provision	Applicant Comments
Element: Transport	
AD1.5.1 Haulage is to be wholly contained to the "Tandem Drive 4" network route, as identified by MRWA	Calinup Road is a RAV 4.3 haulage Route. Refer to Figure X for further information on the proposed haulage route.
AD1.5.2 Haulage traffic is to be proposed which will minimise conflict with school pick up and drop off (7:30am–9am and 2:30pm–4pm Monday to Friday).	Calinup Road is a restricted access vehicle route which does not impact upon the school bus route.
AD1.5.3 Where available, haulage traffic is to utilise road networks which have a sealed surface, and appropriate designed to accommodate the proposed vehicle type.	Calinup Road is a sealed road, capable of supporting current approved haulage vehicles.
AD1.5.4 Development Application is accompanied by a Traffic Impact Assessment that demonstrates the local road network capacity is sufficient to accommodate the additional traffic and proposed truck volumes generated by the development.	A traffic impact statement has been prepared in support of the development proposal and affirms Calinup Road can accommodate the currently approved 130 haulage movements per day pursuant to P9/2022.

State Planning Policy 2.4 – Basic Raw Materials

State Planning Policy 2.4 seeks to enable the responsible extraction of Basic Raw Materials (BRM) while ensuring the protection of people and the environment. The application of this Policy provides the foundation for land use planning to address the sustainable management of BRM in Western Australia. Applicable to this proposal, the following objectives of the Policy are as follows:

> *a) Provide guidance to facilitate the planning of BRM extraction from sites, where such extraction is considered appropriate on planning and environmental grounds;*
>
> *(c) ensure considerations relating to the extraction of BRM and the regional importance of the materials are taken into account in the early stages of the planning process including scheme amendments, planning strategies and structure plans;*
>
> *(e) prioritise the extraction and availability of BRM through the identification of sequential use sites and planned extraction and remediation as appropriate for the final intended land use;*
>
> *(f) ensure that the use and development of land for extraction of BRM, during or after extraction, avoids, minimises and mitigates detrimental impacts on the community and environment, including water resources and biodiversity values, while allowing for future use, consistent with long term planning.*

Considering the above Policy objectives, the proposed EIL seeks to meet the objectives of the Policy as follows:

- The proposed extractive industry seeks to extract a basic raw material in an appropriate manner which considers planning and environmental constraints onsite;
- The proposed rehabilitation to native vegetation allows for the land to be rehabilitated back to create an regional ecological link and;

- Due to the property's location, it is appropriately separated from surrounding sensitive land uses due to surrounding vegetation outside of the extraction boundary and at depth within an existing extraction site.

Demonstration of consistency with the assessment criteria detailed within SPP 2.4 is outlined within the following table:

SPP 2.4 Guidelines Part 4	Analysis of this Extractive Industry Application
(a) the avoidance or mitigation of conflicts and detrimental effects on existing and future sensitive land uses and agricultural land in the surrounding areas (that is, noise, dust, vibration, blasting and vehicular traffic);	The proposed extractive industry is to be appropriately separated from surrounding sensitive land uses. In areas where adequate separation cannot be achieved, appropriate management of the proposed works allow proper mitigation against impacts associated with noise, dust, vibration and traffic.
(b) having an effective consultation process with appropriate stakeholder engagement, including advertising as required;	The development application is to be made available for public comment as part of the development application process with due regard given to any submissions made.
(c) prioritisation of proposals within SGS areas aligned with DMIRS geoVIEW.WA mapping in Perth and Peel;	Not applicable to this application.
(d) if the resources is identified as a SGS area and/or local basic raw material demand;	The site is identified as an SGS for a Titanium Zircon mineral deposit.
(e) the quantity and quality of resource and scale and duration of extraction;	The proposal seeks approval for an additional net 1,099,063 m^3 of Sand.
(f) management of finished ground levels for BRM extraction and site rehabilitation to: i) Maintain appropriate horizontal separation between extraction, water supply infrastructure and any other engineering requirements; ii) Avoid the exposure of groundwater and maintain the required vertical separation distances to groundwater for sequential land use; iii) Protect ground water and surface water quality.	The proposed extractive industry will be consistent with SPP 2.4 Guidelines Part 4(f). The proposed extractive industry is adequately separated from water supply and engineering infrastructure. A separation distance to groundwater of +2m from the MGL is proposed and is considered sufficient to protect against potential interception of groundwater. The proposed depth aligns with the requirement of MS767.
(g) the site's potential for sequential land use and the ability to rehabilitate the land in a manner compatible with its long-term use identified by the Local Planning Scheme;	Rehabilitation of native vegetation is to be completed to satisfy the completion criteria set within MS 767.
(h) the ability to stage the extraction operations to avoid conflicts with any adjacent land uses;	Staging is proposed in a manner which does not impact surrounding sensitive land uses.

SPP 2.4 Guidelines Part 4	Analysis of this Extractive Industry Application
(i) the effect of the proposed extractive industry on any adjacent agricultural land;	The proposed extractive industry does not impact any agricultural land uses within proximity of the site.
(j) the availability and suitability of road access;	The subject site has access to a RAV 4.3 route.
(k) the effect of the proposed extractive industry on any native flora and fauna and general landscape values;	All impacts associated with flora and fauna values are managed by MS 767.
(l) how all water resources will be protected during BRM extraction including a separation distance to the defined groundwater level plus other management measures to protect water resources during BRM extraction;	No water resources are anticipated to be negatively impacted by this proposal.
m) potential impacts on fragmentation and connectivity of remnant vegetation;	No fragmentation is anticipated as part of this application. Rehabilitation of the extraction area will enhance connectivity.
n) any requirements for an environmental offset;	Not required.
o) sites of cultural and historic significance on and near the land, having regard to how they are likely to be integrated with subsequent land uses; and	Not applicable to this application.
p) location and stability of excavations, stockpiles and overburden dumps.	No stockpiling is to occur onsite.

The proposal is therefore designed in accordance with the provisions of SPP 2.3 – Basic Raw Materials.

State Planning Policy 3.7 – Planning in Bushfire Prone Areas

The subject site is designated to be bushfire prone by DEFES with the provisions of SPP 3.7 and associated guidelines for Planning in Bushfire Prone Areas (V1.4).

Section 2.6 – Discretionary Decision-Making states the following applicable to this application:

> *Decision-makers can apply exemptions from the requirements of SPP 3.7 and these Guidelines where there is no intensification of land-use, and/or the proposal is not increasing the bushfire threat. Intensification of land use and/or development may include planning proposals that:*
>
> *a) result in an increase of visitors, residents or employees; or*
>
> *b) involve the occupation of employees on site for more than three hours at a time for multiple periods during a week.*

An Extractive Industry is listed as a land use which may be considered exempt from compliance with the guidelines where no habitable buildings are proposed and the proposal does no propose an intensification of land use. Since the proposal does not contain any habitable buildings, and employees onsite are to be onsite for periods of haulage and loading only as previously approved, the application is considered exempt from requiring a bushfire assessment at this stage.

Additionally, any potential bushfire risk is further mitigated through the lack of vegetation within the extraction area.

Shire of Capel Extractive Industries Local Law (2016)

The Shire of Capel Extractive Industry Local Law 2016 sets out the licensing requirements for an Extractive Industry within the Shire.

This proposal seeks to meet the policy requirements as stipulated within the Local Law to allow for an appropriately staged and located development to operate in support of regionally significant infrastructure projects within the southwest.

The application seeks to comply with Clause 6.1 – Limits on Excavation Near Boundary as follows:

6.1 Limits on excavation

(a) 20 metres of the boundary of any land on which the excavation site is located;

(b) 20 metres of any land affected by a registered grant of easement;

(c) 40 metres of any thoroughfare;

(d) 50 metres of any bore, watercourse, wetland, swamp, or other water reserve; or

(e) 2 metres of the estimated maximum groundwater level as determined from time to time by the Department of Water or otherwise as adopted by the local government.

A minor variation is sought for the primary setback to Calinup Road (20m in lieu of 40m). A 20m setback to Calinup Road is considered appropriate in this located, since Calinup Road is a cul-de-sac, primarily servicing the needs of the proposed development and two (2) special rural landholdings east of the subject site. Importantly, the 20m setback to Calinup Road also reflects the primary setback requirements of LPS 8 within the Rural Zone and therefore is considered appropriate in this instance.

EPA Separation Distances between Industrial and Sensitive Land Uses (GS3)

The Environmental Protection Authority (EPA) has prepared a guiding document for assessment of environmental factors associated with the separation distances between sensitive land uses and Industrial land uses.

The proposed extractive industry is of a nature which reflects the 'Extractive Industry – Sand and Limestone' industry listed within Appendix 1. The relevant buffer distance is recommended to be 300–500m to sensitive land uses, depending on the size and nature of operations, with key impacts associated with operations being noise and dust.

Appendix C – Development Plans

679

677

131

187

186

11

167

CALINUP ROAD

COKELUP ROAD

74
42.4375ha

303.1
418.2
20.5
41.7
31.6
24.1
784.3
965.8
77.9
148.8
401.9
76
24.5
5
TBM
RL 23.74

NOTES

Horizontal Datum: M.G.A.94 Zone 50
Vertical Datum A.H.D. 71

Datum points have been established from Landgate SSM "GEELORUP SOUTH".
Positions have been measured using long occupation RTK GPS techniques.

Contour Data produced by "Level Surveys" using photogrammetric techniques and supplied by BCP Materials Pty Ltd.
Date of Capture: August 2022.
Contour data has been field verified to a nominal 50mm accuracy by limited, direct measurement of ground surface using RTK GPS.

Dale Johnson
2023.08.22 08:35:06 +08'00'
Licensed Surveyor

LEGEND

- Subject Area (58.711ha)
- Extractive Industry License (22.2079ha)
- Existing Contours
- Ground Water Contours (JDA Consultant Hydrologists 11/11/21)
- E — Underground Electricity (BYDA)
- AE — Overhead Electricity (BYDA)
- T — Telecommunications (BYDA)

EXISTING CONTOUR AND FEATURE PLAN

Lot 74 on Deposited Plan 419145 Calinup Road,
GELORUP

Plan No. | 22046-14
Date | 06/06/23
Drawn | NP
Checked | DPJ
Revision | B

Scale | 1:2500@A2

0 20m 40m 60m

BUNBURY OFFICE:
21 Spencer Street,
BUNBURY WA 6230
T: 08 9792 6000
E: bunbury@harleydykstra.com.au
W: www.harleydykstra.com.au
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

Works and Excavation Plan

Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: **22-332 CP01A** Staff: JL GW Checked: JL

0 80m

element.

Level 18, 191 St Georges Terrace, Perth Western Australia 6000.
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T. +61 8 9289 8300 | **E.** hello@elementwa.com.au **elementwa.com.au**

679

677

131

187

167

11

100

186

CALINUP ROAD

COKELUP ROAD

418.2

303.1

31.6

784.3

965.8

401.9

76

74
42.4375ha

1:4 Batter

1:4 Batter

5

24.5

AE

E

FINISHED DEVELOPMENT PLAN

Lot 74 on Deposited Plan 419145 Calinup Road,
GELORUP

Plan No. | 22046-15
Date | 06/06/23
Drawn | NP
Checked | DPJ
Revision | B

Scale | 1:2500@A2

0 20m 40m 60m

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NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

LEGEND

- Subject Area (58.711ha)
- Extractive Industry License (22.2079ha)
- Toe Line (2m above MGL)
- Rehabilitation to Native Vegetation
- Existing Contours
- Post Extraction Contours
- Ground Water Contours (JDA Consultant Hydrologists 11/11/21)
- E — Underground Electricity (BYDA)
- AE — Overhead Electricity (BYDA)
- T — Telecommunications (BYDA)

Appendix D – Acoustic Report

SAND EXTRACTION OPERATIONS

LOT 74 CALINUP ROAD
GELORUP

ACOUSTIC ASSESSMENT

JUNE 2023

OUR REFERENCE: 31189-3-23142

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
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DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT

SAND EXTRACTION – GELORUP

Job No: 23142

Document Reference: 31189-3-23142

FOR

ELEMENT WA

DOCUMENT INFORMATION			
Author:	Tim Reynolds	**Checked By:**	Paul Daly
Date of Issue:	23 June 2023		

REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Additional neighbour	14/08/2023	TR	N/A
2	Correction to Lot number	15/08/2023	TR	N/A

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CONTENTS

APPENDICIES

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Element WA to undertake an acoustic assessment of noise emissions from a proposed sand extraction operation to be located at Lot 74 Calinup Road, Gelorup.

The sand extraction operation entails the usage of a front end loader and a screen.

This assessment takes into account noise emissions from both the sand extraction and the transport of sand off site via truck. The assessment is provided to support the works approval process.

Operational hours for the site are proposed to be Monday to Friday 07:00 to 18:00 and Saturday's 07:00 to 12:00 hours. No operations on Sundays or Public Holidays.

As part of the study, the following was carried out:

- Identification of individual operations and the associated noise levels.
- Assess the predicted noise levels at the nearest surrounding noise sensitive premises for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, Ultimate Excavation Plan is shown in Appendix A.

2. SUMMARY

Assessment has been conducted on the proposed sand extraction operation at Lot 74 Calinup Road, Gelorup

The applicable criterion for pit operations, including truck movements, would be the assigned L_{A10} day period noise of between 45 and 48 dB(A) for the nearest residential locations. Noise received at the nearest residential premises has, for the worst case, been determined to be 40 dB(A) for the sand extraction operations. Worst case, being in relation to both location and stage of operation. The above noise levels have been considered to contain tonal characteristics, therefore an +5 dB(A) penalty, is applicable. Thus, with the bunding as shown of Figure C1 in Appendix C, compliance with the Regulatory criteria would be achieved.

Given these operating parameters, with the inclusion of some bunding as outlined in Figure C1 in Appendix C, noise levels received at the nearest premises has been determined to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

3. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. Table 3.1 lists the baseline assigned noise levels.

TABLE 3.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Noise sensitive premises: other than highly sensitive area	At all times	60	75	80

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

The "Highly sensitive area" of a noise sensitive premises means:

that area (if any) of noise sensitive premises comprising —

(a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
(b) any other part of the premises within 15 m of that building or that part of the building;

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

"impulsiveness" means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax\ Slow}$ is more than 15 dB when determined for a single representative event;

"modulation" means a variation in the emission of noise that –

(a) is more than 3dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
(b) is present for more at least 10% of the representative assessment period; and
(c) is regular, cyclic and audible;

"tonality" means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and
(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

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

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 3.2 below.

TABLE 3.2 - ADJUSTMENTS TO MEASURED LEVELS

Where **tonality** is present	Where **modulation** is present	Where **impulsiveness** is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The nearest noise sensitive premises to the proposed development have been identified on Figure 1, being on Lot 11. We note that that is another residence located on Lot 100, however, this residence is marginally further away from the excavation.

FIGURE 1 – RECEIVER LOCATIONS

The influencing Factor for the neighboring residence has been determined, as listed in Table 3.3.

TABLE 3.3 – INFLUENCING FACTORS

Influencing Factor (dB)	Location		
	East (Lot 11)	South East (Lot 100)	North West (Lot 31)
% of Industrial in Inner Circle	0	0	0
% of Industrial in Outer Circle	+3 (31%)	+1.8 (18%)	+1 (10%)
Influencing Factor (dB)	+3 dB	1.8 (rounded to +2 dB)	+1 dB

Based on the Influencing Factors, the applicable Assigned Day Period noise levels would be as Listed in Table 3.4.

TABLE 3.4 - ASSIGNED OUTDOOR NOISE LEVEL

Residence	Time of Day	Assigned Level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
East (Lot 11)	0700 - 1900 hours Monday to Saturday (Day)	48	58	68
South East (Lot 100)		47	57	67
North East (Lot 31)		46	56	66

Note : For other existing residences, we believe that the influencing factor would be +0 dB and the assigned noise levels would be as listed in Table 3.1, with the assigned L_{A10} day period assigned noise level being 45 dB(A).

Noise emissions from the pit operations would occur for more than 10% of the time. Therefore, noise received at the neighboring residences from the sand extraction needs to comply with the assigned L_{A10} day period noise levels of between 47 and 48 dB(A).

With 130 truck movements per day, noise emissions from truck movements would occur also occur for more than 10% of the time. Therefore, noise received at the neighboring residences from truck movements needs to comply with the assigned L_{A10} day period noise level of between 47 and 48 dB(A).

4. CALCULATED NOISE LEVELS

Noise received at the nearest neighbouring residential premises, due to noise associated with the proposed sand extraction operations, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of similar equipment proposed for use on site.

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 4.1.

TABLE 4.1 – SOUND POWER LEVEL - NOISE SOURCES dB(A)

Source	Sound Power Level (dB(A))
Front End Loader (FEL)	104
Screen	101
Road Truck	102

Due to the nature of sand extraction operations, the equipment used for the sand extraction are confined to the “pit”. Whilst the pit tends to move with the operations, the barrier effect of the confines (pit walls and stockpile) would be always present.

From information received, it is proposed that the staging of the sand extraction would be as shown the Figure attached in Appendix A. We note that the pit is currently in operation, and as shown on the Aerial photo (Figure 1 in Section 3 – Criteria) with excavation occurring within Stages 11 to 17. Thus we understand that the excavation would complete Stage 11 to 18 and then head northwards (ie starting at Stage 10 and finishing with Stage 1).

Based on the above equipment, a number of scenarios were developed for each stage. This modelling allows for all equipment to be operating at the same time, within each stage of operation. Thus, a combined noise contour plot was development for the pit operations.

The following input data was used in the calculations:

a) Provided backgrounds;

b) Sound Power Levels listed in Table 4.1; and

c) Ground contours provided by client and from Google Earth, with the base level on the pit operations as per the final contours, as shown on the plan attached in Appendix A.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise"* and for the day period are as listed in Table 4.2.

TABLE 4.2 – WEATHER CONDITIONS

Condition	Day
Temperature	20°C
Relative humidity	50%
Pasquill Stability Class	E
Wind speed	4 m/s*

* From sources, towards receivers.

With regards to truck movement to and from the operations, to determine the worst case noise level that would be received at the neighbouring premises, a noise model was run assuming a truck movement around the boundary of the site.

5. RESULTS

Calculated noise levels associated with the noise emissions from the proposed sand extraction for the assumed scenario is summarised below in Table 5.1. Figure B1 in Appendix B shows the combined noise contour plot for the various stages of the pit operations, with Figure B2 showing the noise contours associated with the trucks.

TABLE 5.1 – CALCULATED NOISE LEVEL

Residence	Calculated Noise Level (dB(A))	
	All Equipment Operating	Truck Movement
East (Lot 11)	40	33
South East (Lot 100)	35	27
North East (Lot 31)	24	19

6. ASSESSMENT

Based on calculated noise levels at the nearest premises, noise levels could be considered as being tonal in characteristics. Therefore, a +5 dB(A) penalty has been included to allow for a tonal component.

Hence, Table 6.1 summarises the applicable Assigned Noise Levels, and assessable noise level emissions, for the scenario considered.

TABLE 6.1 – ASSESSMENT OF NOISE LEVELS

Residence	Assessable Noise Level (dB(A)) All Equipment Operating + Truck Movements
East (Lot 11)	40 (45)
South East (Lot 100)	35 (40)
North East (Lot 31)	25 (30)

( ) include a +5 dB(A) penalty for tonal characteristics.

It is noted that the noise level stated above to the truck movements would be considered the maximum noise level, therefore, the above combined total noise level received at the neighbouring residence would be conservative.

Based on the assessable noise level above, comparison against the relevant assigned noise level is contained in Table 6.2.

TABLE 6.2 – ASSESSMENT OF NOISE LEVELS
PIT OPERATIONS (INCLUDING TRUCK MOVEMENTS)

Premises Receiving Noise	Assessable Noise Level dB(A)	Time of Day	Assigned L_{A10} Level (dB)	Compliance
East (Lot 11)	45	0700 - 1900 hours Monday to Saturday (Day)	48	Complies
South Eat (Lot 100)	40		47	Complies
North East (Lot 31)	30		46	Complies

7. CONCLUSION

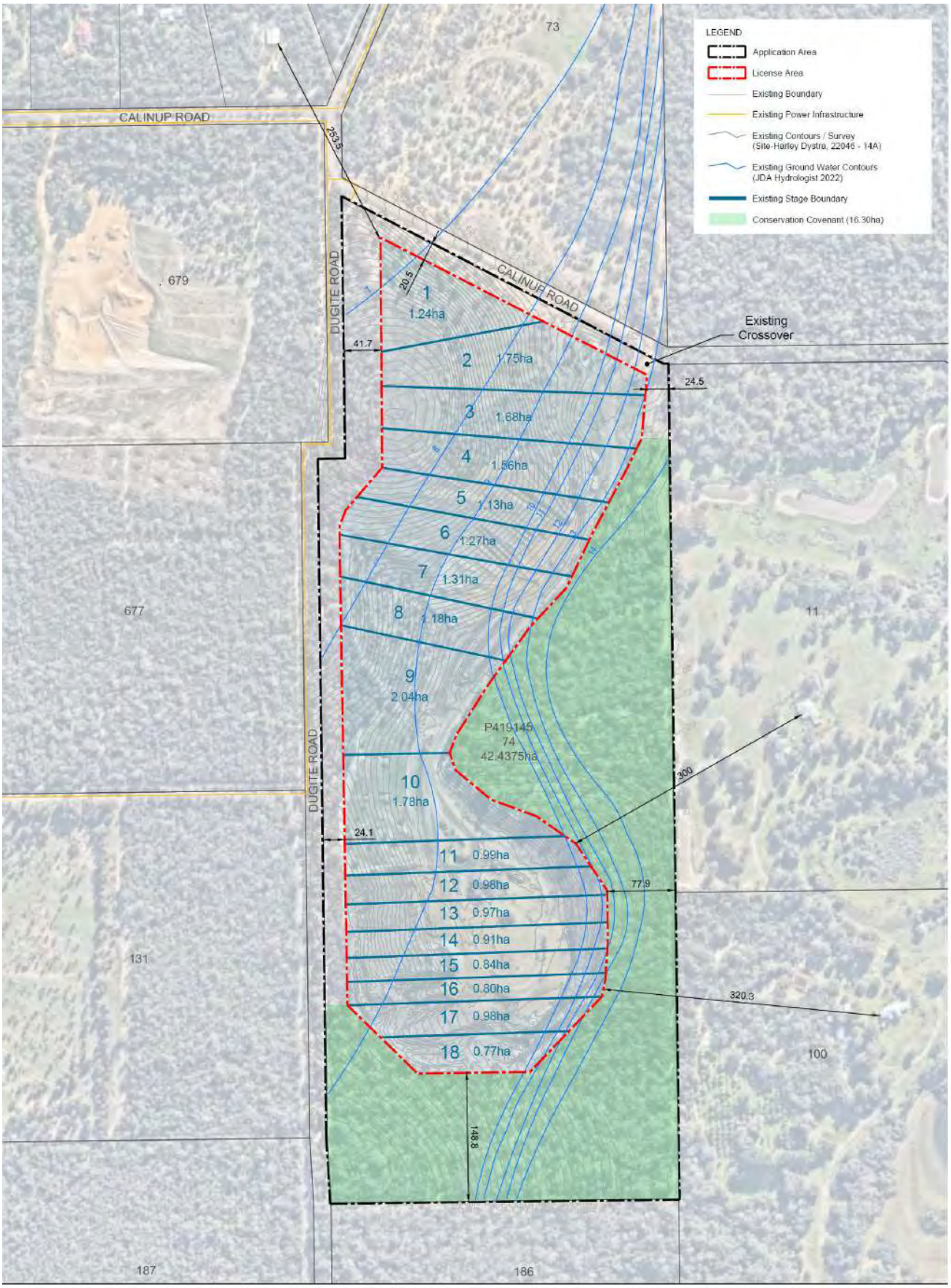
Assessment has been conducted on the proposed sand extraction operation at Lot 74 Calinup Road, Gelorup.

Operational hours for the site are proposed to be Monday to Friday 07:00 to 18:00 and Saturday's 07:00 to 12:00 hours. No operations on Sundays or Public Holidays. Thus, noise received at the neighbouring premises needs to comply with the appropriate assigned day period noise level.

The applicable criterion for pit operations, including truck movements, would be the assigned L_{A10} day period noise of between 47 and 48 dB(A) for the nearest residential locations. Noise received at the nearest residential premises has for the sand extraction operations, for the worst case, been determined to be 45dB(A) with the inclusion of the + 5 dB(A) penalty for tonality. Worst case, being in relation to both location and stage of operation. Thus, noise emissions from the sand excavation would be deemed to compliance with the Regulatory criteria.

APPENDIX A

ULTIMATE EXCAVATION PLAN



Works and Excavation Plan

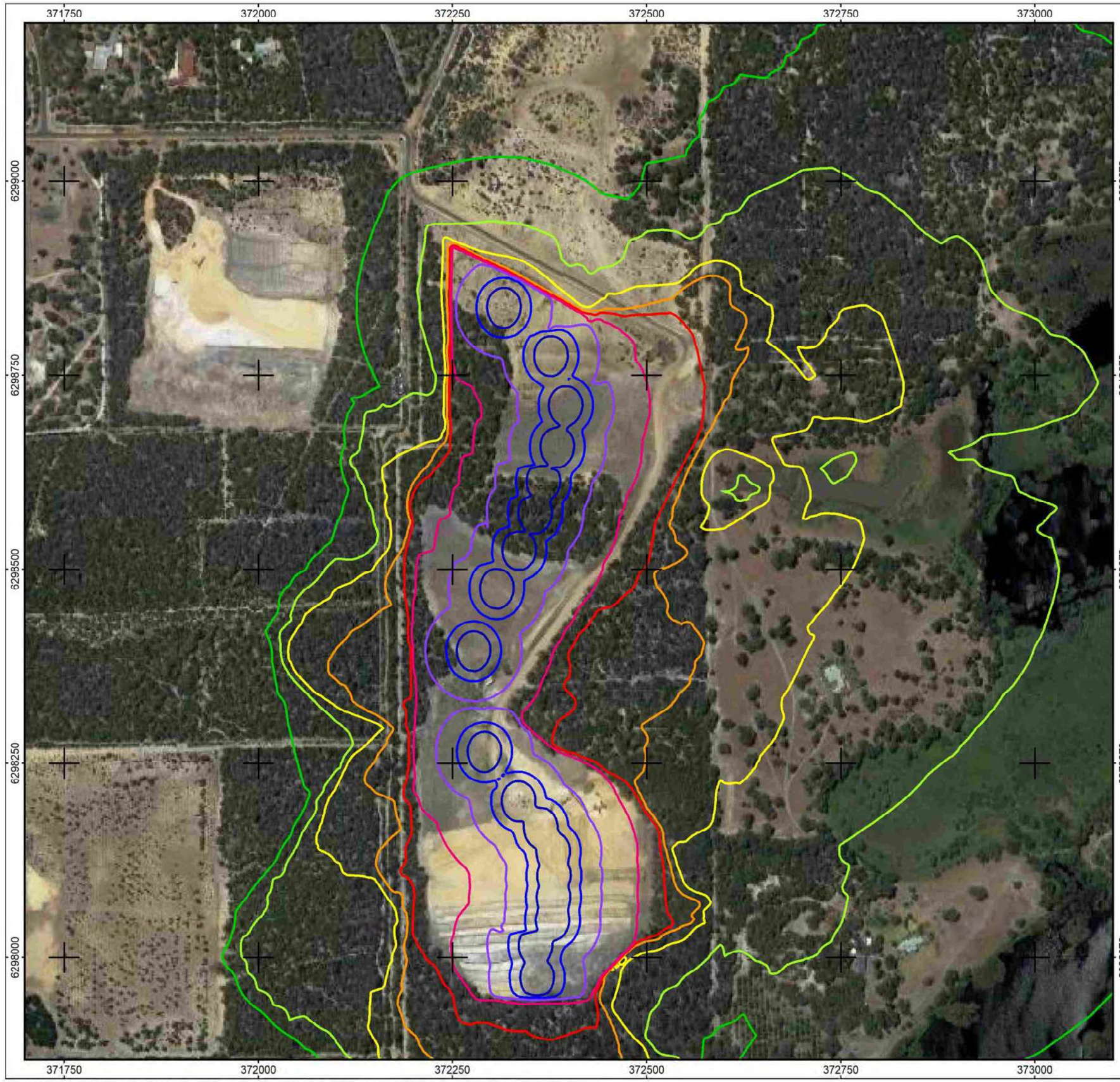
Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: 22-332 CP01A Staff: JL GW Checked: JL

element.

APPENDIX B

Noise Contours



Customer:

Project: 23142 - Calinup Pit
Project-No. 23142 - Calinup Sand Pit

Map
1

Max Noise Contours - Sand Extraction

Calculation in 1.5 m above ground

Project engineer:
Created: 27/06/2023
Processed with SoundPLAN 8.2, Update 19/01/2023

Levels LA10
in dB(A)

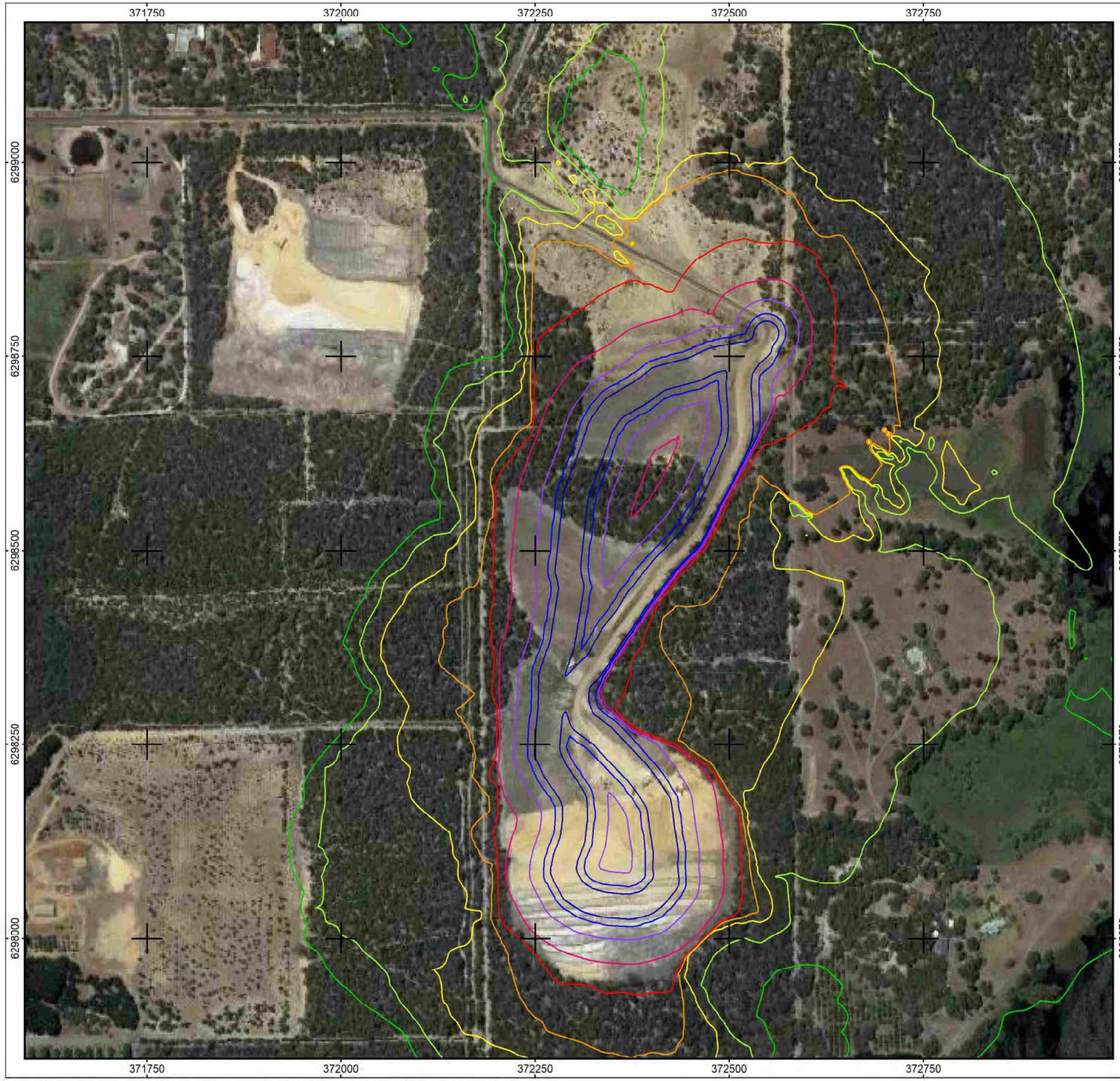
- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70

N

Length scale 1:5000

0 40 80 160 240 320 m

C:\DATATR\Active Projects TR\23142 - Calinup Rd Gerlorup Pit\23142 Calinup Rd Pit\23142 - Calinup Rd Pit\MaxNoBarriers.sgs



Customer:

Project: 23142 - Calinup Pit
Project-No. 23142 - Calinup Sand Pit

Map
2

Combined Noise Contours - Truck Movements on S
Calculation in 1.5 m above ground

Project engineer:
Created: 27/06/2023
Processed with SoundPLAN 8.2, Update 19/01/2023

Levels LA10
in dB(A)

- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70

N

Length scale 1:5000
0 40 80 160 240 320 m

C:\DATATR\Active Projects TR\23142 - Calinup Rd Gerlorup Pit\23142 Calinup Rd Pit\23142 - Calinup Rd Pit\Max Trucks.sgs

Appendix E – Traffic Impact Statement

Transport Impact Statement

Proposed Extractive Industry – Lot 74 Calinup Road, Gelorup

CW1200613 / 304900954 – REV E

22 September 2025

Prepared for:

McDougall Quarries Pty Ltd

Prepared by:

Stantec Australia

Revision	DATE	Description	Author	Reviewed by	Approved by
A	20/04/2023	For Issue	CS	BS	SJL
B	02/08/2023	Minor Update	LL	BS	SJL
C	11/08/2023	Minor Update	LL	BS	SJL
D	18/09/2025	Update	SG	DH	DH
E	22/09/2025	Minor Update	SG	DH	DH

Prepared by - Cameron Steel

Reviewed by - Brian Sii

Approved by - Scott Lambie

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1.0 INTRODUCTION

1.1 BACKGROUND

Stantec has been commissioned by McDougall Quarries Pty Ltd ('the Client') to undertake a Transport Impact Statement for a proposed extractive industry development located at Lot 74 Calinup Road ('Site') within Gelorup, Shire of Capel.

This report aims to assess the impact of the development on the adjacent road network in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016)* and the checklist is included in **Appendix A**.

1.2 SITE LOCATION

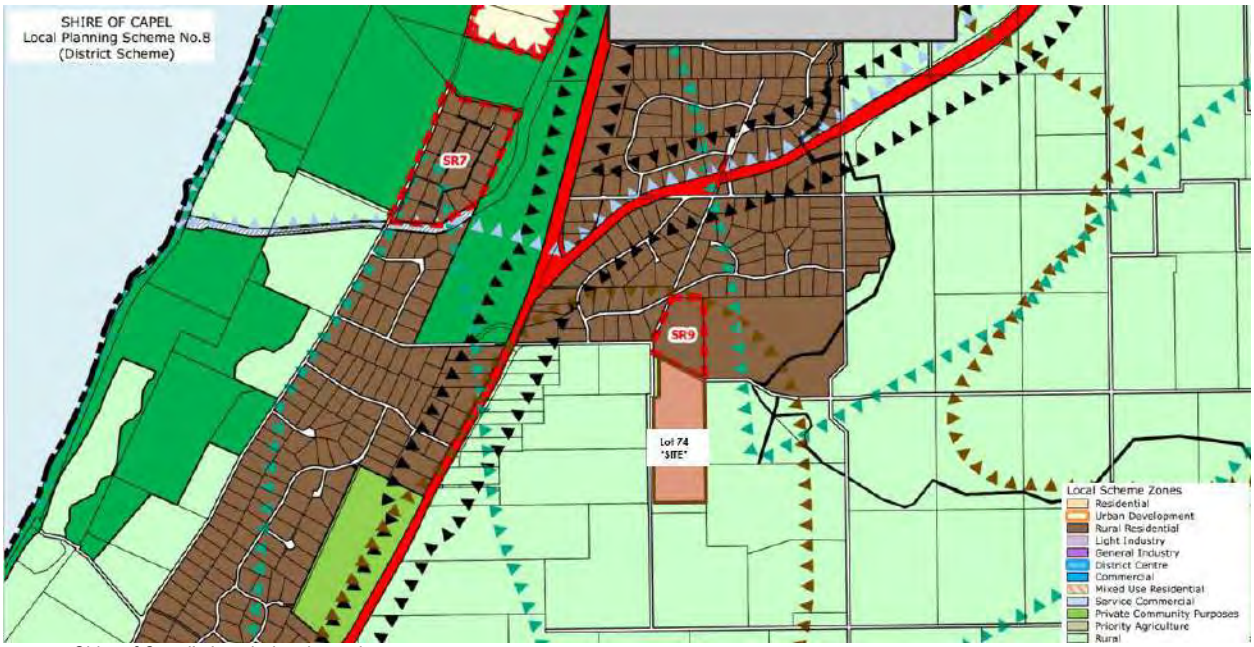
The proposed development is located at the end of Calinup Road as shown in **Figure 1-1**. The Site is approximately 1.5 kilometres from the from Bussell Highway/Calinup Road intersection which also serves as the Site's access point.

Figure 1-1 Aerial Overview of the Site

Source: NearMap2025

According to the *Shire of Capel's Local Planning Scheme No. 8*, the subject Site is zoned as a 'Rural' area as shown in **Figure 1-2**. The northern section of Lot 74 (adjacently north of Calinup Road) is zoned as Rural Residential with a small portion allocated as SR9 (special rural 9) zone. The subject Site however, which is the portion of Lot 74 south of Calinup Road, remains as a Rural zone.

Figure 1-2 Site Zoning Map



Source: Shire of Capel's Local Planning Scheme No. 8

1.3 EXISTING ROAD NETWORK

Road Classifications are defined in the Main Roads Functional Hierarchy as follows:

Primary Distributors (light blue): Form the regional and inter-regional grid of Main Roads WA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads.

Regional Distributors (red): Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.

District Distributor A (green): These carry traffic between industrial, commercial, and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.

District Distributor B (dark blue): Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside the adjoining property. These are often older roads with traffic demand more than what was originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.

Local Distributors (orange): Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local government.

Access Roads (grey): Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian-friendly. They are managed by Local government.

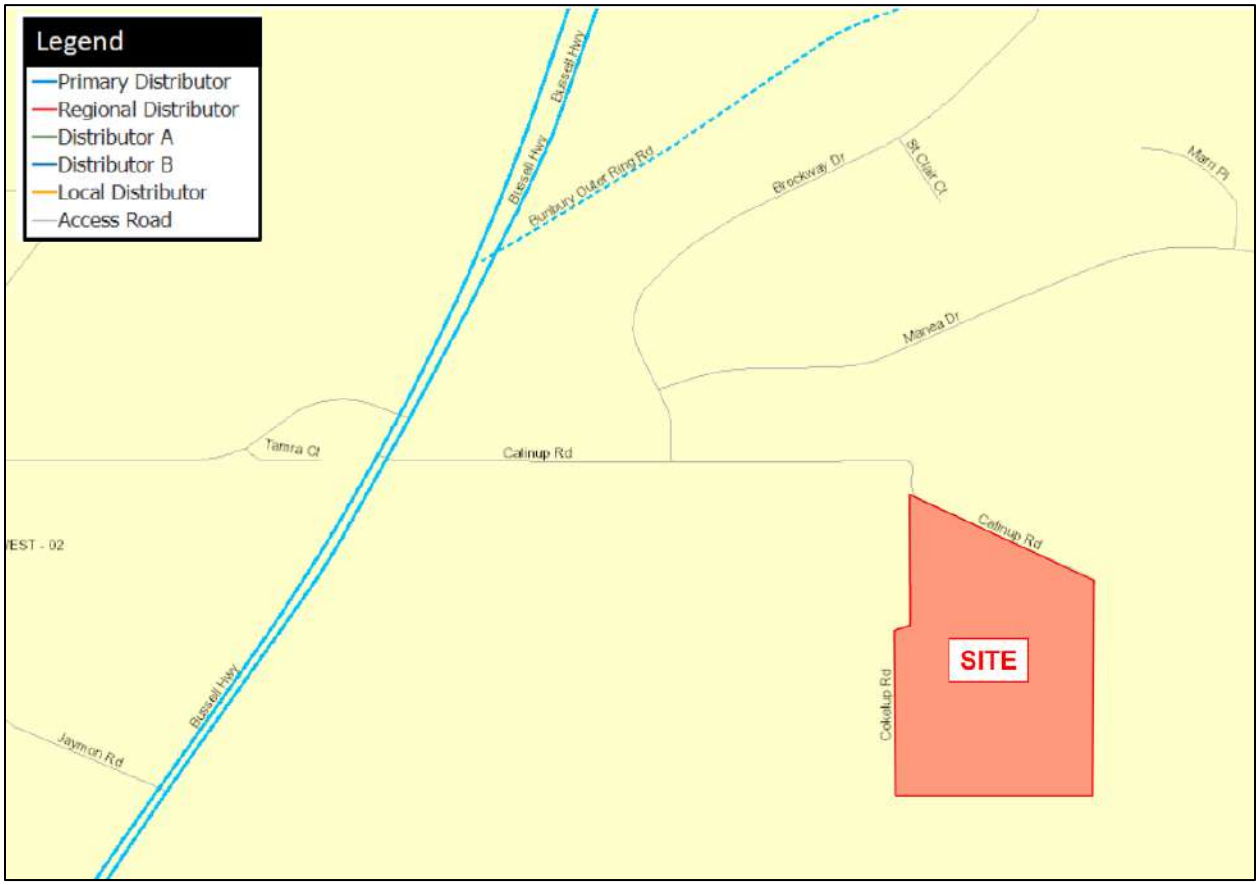
The Site is primarily accessible via Calinup Road via Bussell Highway. A short portion of Cokelup Road intersects with Calinup Road to form a reverse turn intersection. The surrounding road network characteristics is summarised in **Table 1-1** and **Figure 1-3** shows the hierarchy as per Main Roads WA Road Information Mapping System.

Table 1-1 Road Hierarchy and Characteristics

Road Name (Road ID)	Road Hierarchy		Road Characteristics			
	Road Hierarchy	Road Jurisdiction	No. of Lanes	No. of Footpaths	Seal Width (m)	Posted Speed (km/h)
Calinup Road (2060264)	Access Road	Local Government	2 (two-way undivided)	N/A	6.5	70 (SLK 0.00 – 0.74) 110* (SLK 0.74 – 1.50)
Cokelup Road (2060308)	Access Road	Local Government	2 (two-way undivided)	N/A	6.5	110* (SLK 0.00 – 0.07)
Bussell Highway (H043)	Primary Distributor	MRWA	4 (two-lanes, two-way divided)	N/A	7.0 for each direction	110

Source: MRWA Road Information Mapping System
**State Speed Limit (110kph) applies*

Figure 1-3 Road Hierarchy around the Site

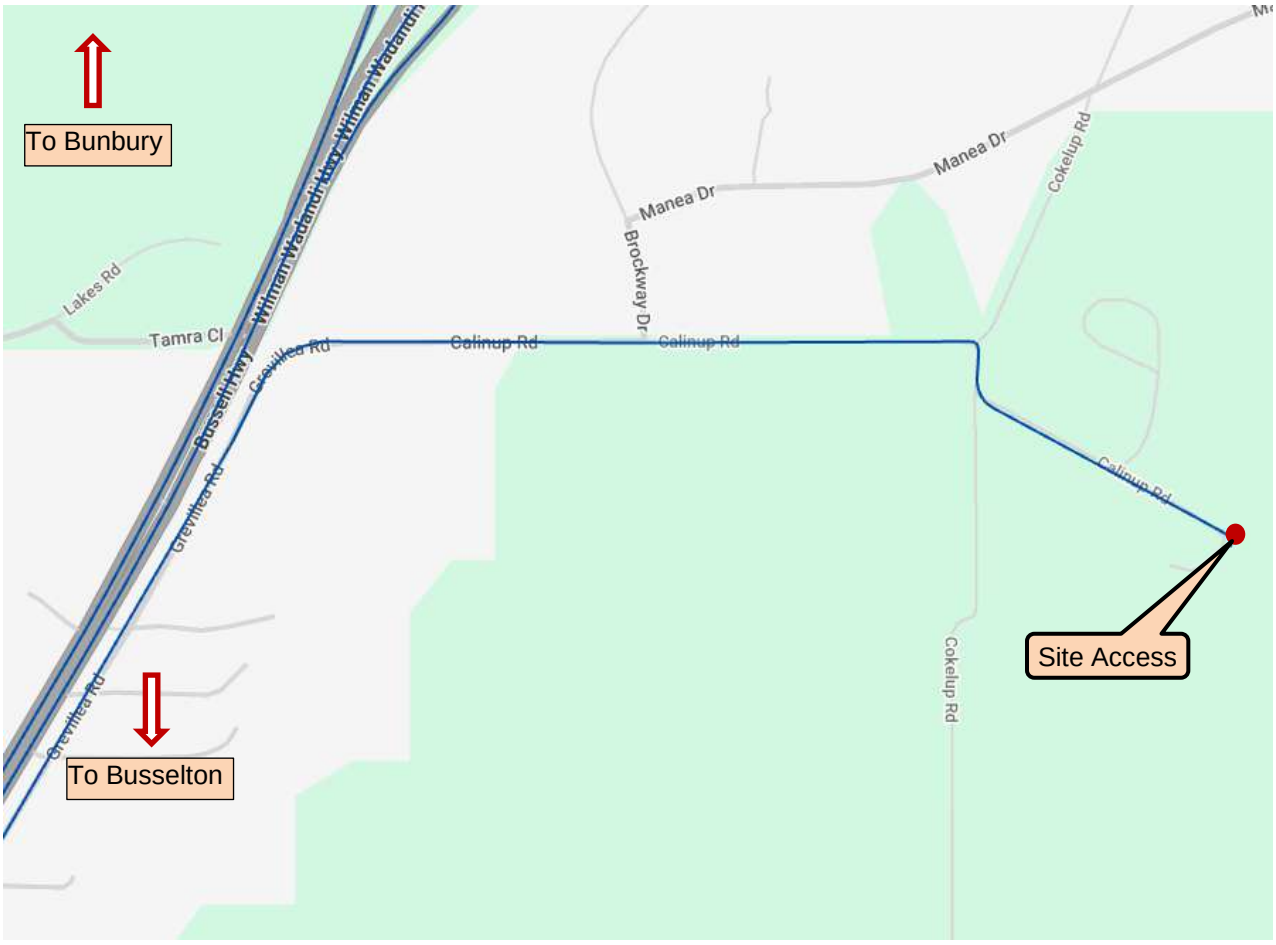


Source: MRWA Road Information Mapping System

1.4 RESTRICTED ACCESS VEHICLE (RAV) NETWORK

The entire length of Calinup Road, from Bussell Highway (SLK 0.00) to the Site (SLK 1.50), has been approved as a RAV 4.3 network as shown in **Figure 1-4**.

Figure 1-4 Existing RAV Network

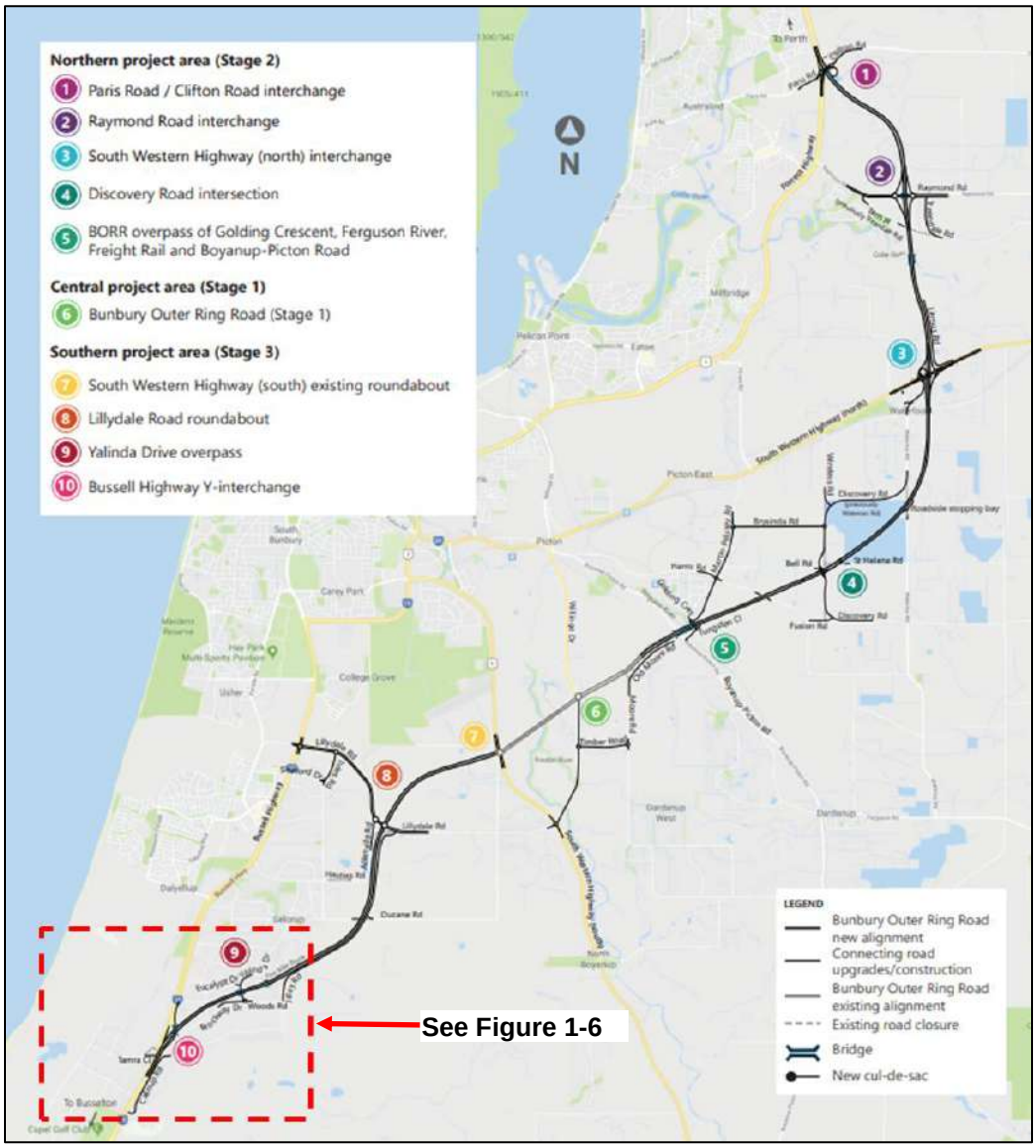


Source: MRWA HVS Network Map

1.5 BUNBURY OUTING RING ROAD PROJECT

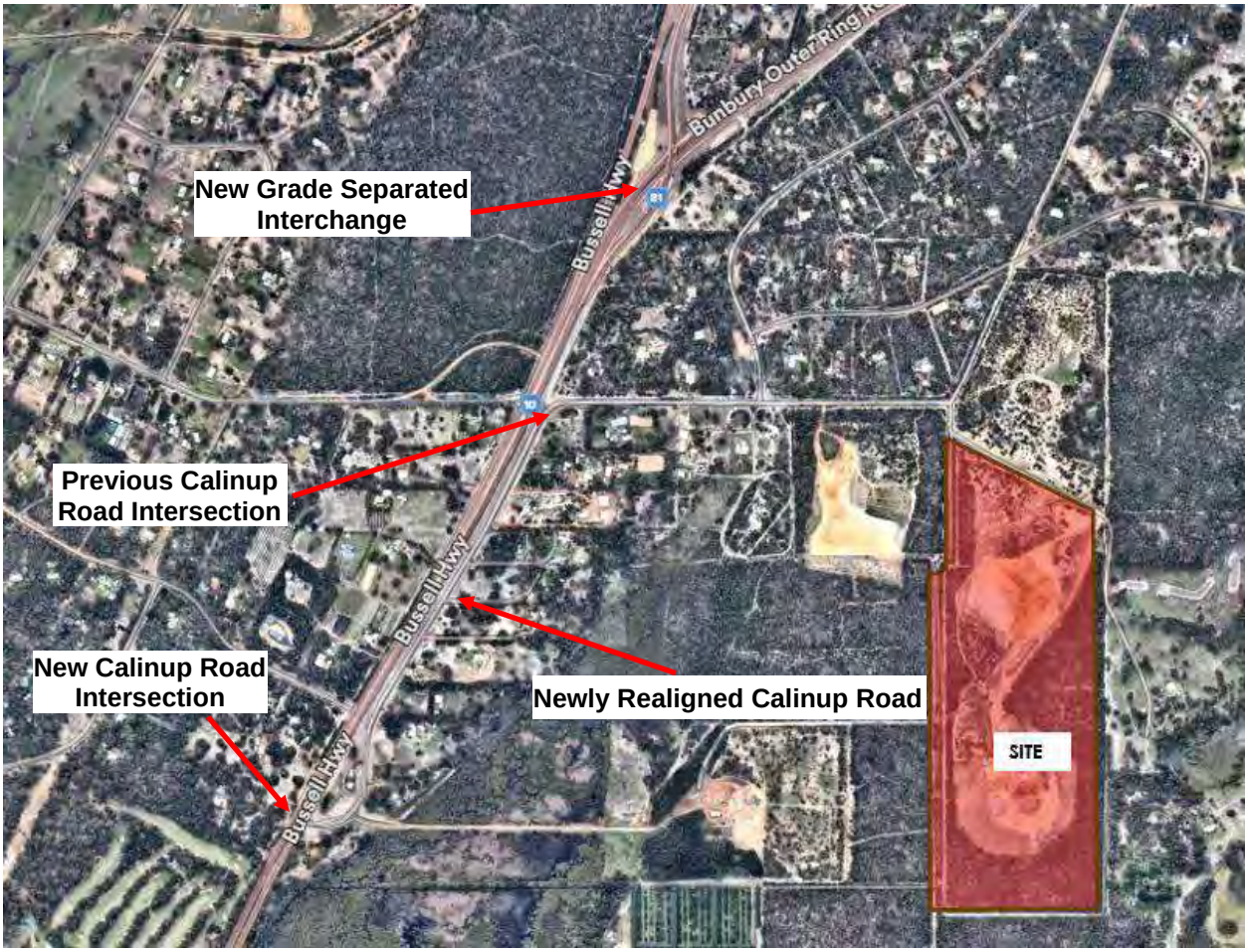
Bunbury Outer Ring Road now officially named the Wilman Wadandi Highway is a Main Roads Western Australia (MRWA) highway with a 27km circumferential road around Bunbury as shown in **Figure 1-5**. The project was completed in December 2024. The southern end of the project terminates the ring road with a Y-Interchange at Bussell Highway in the vicinity of the Calinup Road, which has been re-aligned to intersect Bussell Highway approximately 1.2km south as shown in **Figure 1-6.**

Figure 1-5 Bunbury Outer Ring Road Map



Source: MRWA Database

Figure 1-6 Inset for Figure 1-5



Source: MRWA Database

1.6 EXISTING TRAFFIC VOLUMES

Existing traffic data has been sourced from MRWA's Traffic Map and are summarised below in **Table 1-2**. It should be noted that the MRWA Traffic Count located on Calinup Road is a historic count with information provided prior to the completion of the relocated Calinup Road intersection and this has since been removed from MRWA's Traffic Map database.

Table 1-2 Traffic Volumes

Road Name	Source	Year	Average Weekday Daily Traffic Volume (% of Heavy Vehicles)
Calinup Road *East of Bussell Hwy (SLK 0.45)* Site 53155	MRWA Traffic Map	2019/2020	439 (48.1%)
Bussell Highway *North of Jaymon Road (SLK 12.0)* Site 50873	MRWA Traffic Map	2020/2021	17,655 (15.6%)

Source: MRWA Traffic Map

1.7 CRASH ASSESSMENT

A crash assessment for the surrounding road network of the Site has been completed using the Main Roads WA Reporting Centre. The assessment covers all the recorded accidents between 1 January 2020 and 31 December 2024.

Figure 1-7 provides an illustration on the location and severity of these crashes.

Figure 1-7 Crash Location

Source: MRWA Crash Reporting Centre

Results of the crash assessment are presented in **Table 1-3** to **Table 1-5.**

Table 1-3 Total Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Rear End	**-**	**-**	**-**	**5**	**-**	**5**
Sideswipe Same Direction	-	1	-	2	-	3
Right Angle	1	-	1	-	-	2
Hit Animal	-	-	1	1	-	2
Hit Object	-	-	1	-	-	1
Total	**1**	**1**	**3**	**8**	**-**	**13**

Table 1-4 Mid-Block Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Bussel Hwy	**-**	**1**	**1**	**7**	**-**	**9**
Lakes Rd	-	-	1	-	-	1
Total	**-**	**1**	**2**	**7**	**-**	**10**

Table 1-5 Intersection Crashes

Type of Crash	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Bussell Hwy - Calinup Rd	**-**	**-**	**-**	**-**	**-**	**-**
Bussel Hwy – Lakes Rd	-	-	-	1	-	1
Bussel Hwy – Jaymon Rd	1	-	1	-	-	2
Total	**1**	**-**	**1**	**1**	**-**	**3**

A summary of the crash data is as follows:

- 13 crashes were recorded within the vicinity of the Site.
- There was one fatal and one hospital crash recorded.
- No crashes recorded at the intersection with Calinup Road and Bussell Highway.

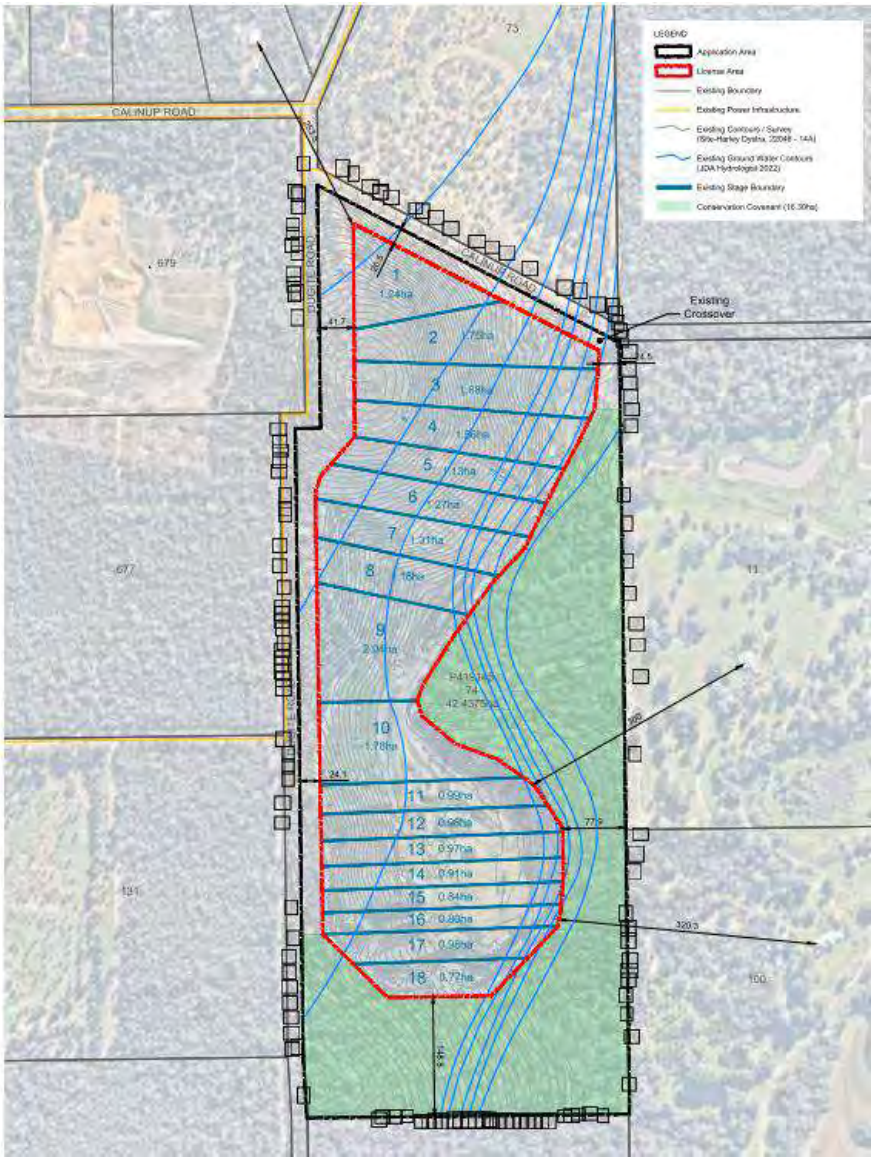
The number of crashes recorded on the road network in the vicinity of the Site are considered minimal and it is likely that the proposed development would not have a significant impact on the area's road safety.

2.0 PROPOSED DEVELOPMENT

2.1 PROPOSED LAND USES

The proposed development is for a sand extractive industry on a 42.4375ha property at the end of Calinup Road as shown in **Figure 2-1** (also provided in **Appendix B**). The proposal involves transporting materials from the pit to achieve the depth requirement.

Figure 2-1 Excavation Plan



Source: element

The figure above provides the topography of the mining pit with contour lines showing elevations in the area at its ultimate excavation stage. The mining pit will be divided into eighteen (18) extraction cells, following a staged removal process. Details on the quantity and characteristics of each extraction cells are provided in **Table 2-1**.

Table 2-1 Excavation Details

Block	Cut	Fill	Net Cut	Area	Area
	m^3	m^3	m^3	*ha*	m^2
1	87,270.257	0.096	87,270.2	1.24	12,370.529
2	180,014.839	0.037	180,014.8	1.75	17,537.972
3	182,132.455	0.319	182,132.1	1.68	16,791.995
4	197,730.211	1.442	197,728.8	1.56	15,626.943
5	130,081.648	12.712	130,068.9	1.13	11,333.780
6	138,620.699	0.677	138,620.0	1.27	12,708.311
7	140,045.393	0.436	140,045.0	1.31	13,105.664
8	82,512.414	0.849	82,511.6	1.18	11,782.141
9	123,511.120	51.631	123,459.5	2.04	20,398.654
10	69,820.130	42.876	69,777.3	1.79	17,869.681
11	43,486.985	48.785	43,438.2	0.99	98,95.592
12	50,249.221	58.237	50,191.0	0.98	9,839.457
13	51,651.073	14.920	51,636.2	0.97	9,687.434
14	51,457.792	1.468	51,456.3	0.91	9,121.923
15	55,572.886	1.264	55,571.6	0.84	8,407.540
16	63,312.690	0.672	63,312.0	0.80	8,032.073
17	68,540.493	0.641	68,539.9	0.98	9,847.523
18	34,600.062	0.296	34,599.8	0.77	7,742.477
Total	*1,750,610.368*	*237.358*	*1,750,373.0*	*22.21*	*222,099.689*

Source: Harley Dykstra Pty Ltd
**Floor set to MGL +2 metres*

Other technical conditions set forth this proposal include the following:

- A minimum of 2 metres separation to the maximum ground water level shall be maintained at all times;
- The maximum volume of material to be stockpiled on-site at any one time is 5,000m^3; and
- The maximum steepness of batter slopes of 1:4 shall be applied to all rehabilitation slopes.

2.2 ACCESS ARRANGEMENTS

The proposed main access point of the Site is via Calinup Road on the northeast corner of the Site as shown in **Figure 2-2**.

Figure 2-2 Site Access Arrangement

Source: Metromap (basemap imagery)

2.2.1 Proposed Haulage Route

The proposed haulage route for transport trucks coming in and out of the Site is via the existing RAV4.3 route as illustrated in **Figure 1-4**.

2.3 SWEPT PATH ANALYSIS

Swept path analysis were conducted to assess the manoeuvrability of transport trucks along the haulage route of the proposed development. Swept paths at the Site access, the route along Calinup Road and on the newly realigned Calinup intersection with Bussell Highway were considered in this section.

2.3.1 Swept Paths on Site Access

As the Site will be accessed by a RAV 4 vehicle, a swept path analysis for a 27.5m B-Double was conducted at the Site's access point. **Figure 2-3** and **Figure 2-4** shows the indicative swept path and appears to sufficiently cater for the entry and exit movement of a RAV 4.

Figure 2-3 Swept Path – Site Access (Ingress)

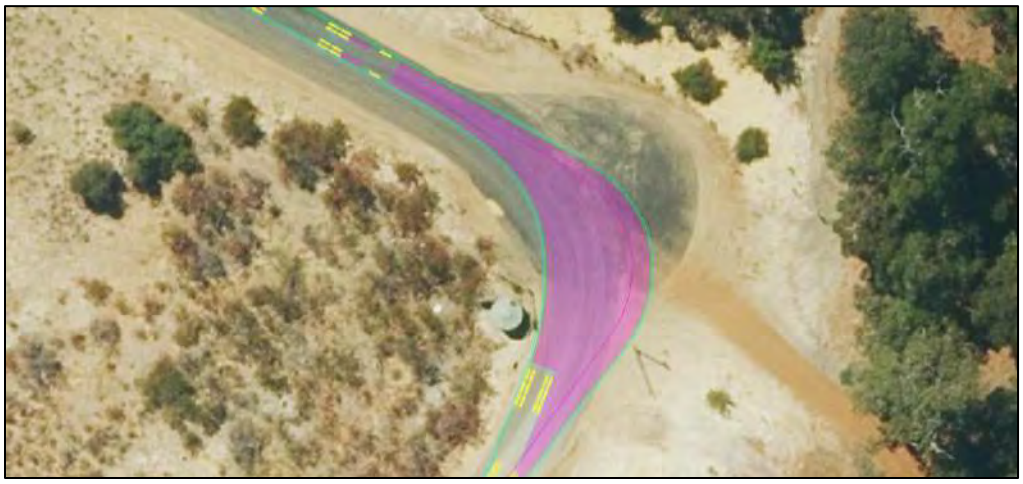


Figure 2-4 Swept Path – Site Access (Egress)

2.3.2 Swept Paths along Current Alignment of Calinup Road

As shown in the figure below, RAV4 vehicles can navigate the reverse intersection of Calinup and Cokelup Roads. However, it will require vehicles to maximise the entire carriageway when navigating through the bends of the intersection, similar with RAV3's. Hence, the recommendation of the RAV Assessment Report to retain radio communication along these bends is warranted.

Figure 2-5 Swept Path – Intersection of Calinup and Cokelup Roads

2.3.3 Swept Paths at the new Calinup Road and Bussell Highway intersection

A swept path analysis was undertaken at the new Calinup Road and Bussell Highway intersection to verify the manoeuvrability of RAV4 vehicles. **Figure 2-6** and **Figure 2-7** below illustrates that the new Calinup Road intersection is able to accommodate RAV 4 vehicles since it includes an acceleration lane for the safety and efficiency of right turning RAV movements.

Figure 2-6 Swept Path – Intersection of Calinup Rd and Bussell Hwy (Northbound)

Figure 2-7 Swept Path – Intersection of Calinup Rd and Bussell Hwy (Southbound)

2.4 HOURS OF OPERATION

The proposed development will be operational from 7:00am to 6:00pm during the weekdays (Monday to Friday), and from 7:00am to 12:00pm on Saturdays. The Site will not operate on Sundays or during Public Holidays.

3.0 TRIP GENERATION AND DISTRIBUTION

3.1 ESTIMATED TRAFFIC GENERATION

For the purpose of this assessment, the trip generation of the Site is calculated based on the ingress and egress movement of vehicles relative to the Site. A vehicle is likely to enter and exit the Site within the same day, generating two trips per day.

The proposal is expected to accommodate up to 65 loaded trucks per day (Weekday), generating up to maximum cap of 130 truck movements per day. This translates to approximately 12 truck trips per hour on a normal operating weekday. In addition to the trucks, the site is expected to accommodate approximately 2 employees during the regular operation day, generating up to 4 light vehicle trips per day.

Table 3-1 provides a tabular summary on the estimated trips for the proposed development.

Table 3-1 Estimated Traffic Generation

Estimated Trips	Weekdays *(11hrs operation per day)*		Saturdays *(5hrs operation per day)*	
	Daily	*Hourly (AM/PM peak)*	*Daily*	*Hourly (AM/PM peak)*
Trucks	130	12	59	12
Light Vehicles	4	2 (During peak hour)	4	2 (during peak hour)
Total	***134***	***14***	***63***	***14***

Based on the above, the development is expected to generate up to 134 and 63 trips per day on a typical weekday and Saturday as well as estimated to generate approximately 14 trips during the peak hours.

3.2 IMPACT ON SURROUNDING ROAD NETWORK

In comparison to the traffic volumes on the surrounding road network in **Section 1.6**, it can be assumed that the proposed development will not have a significant effect on the surrounding road network. According to the *WAPC Transport Impact Guidelines,* developments generating trips between 10 and 100 during peak hour periods are considered to have moderate impact.

The current loaded truck movements cap of 130 per day (weekday) has been approved and no further changes has been proposed by this development.

3.3 POTENTIAL SAFETY ISSUES

As discussed in the previous section, hauling operations pose a safety risk inside and outside of the Site. Other than a plan for traffic management, this report will briefly consider other potential safety issues.

3.3.1 Hazards from the Site

Another potential hazard from the Site that can affect the external transport network is eroded sand particles along pavement surfaces. Excessive amounts of sand can reduce contact friction between asphalt and tire treads, which can become a source of hazard during adverse weather conditions. In addition, stuck sand particles in the air could reduce the overall visibility along the road network during the night time, which might put road users at risk of collisions. Hence, it is pertinent that proper Site management be implemented to reduce such risks from materialising.

4.0 SUMMARY

This Transport Impact Statement outlines the transport aspects of the proposed development focusing on traffic operations and access. Included are discussions regarding traffic generation and potential issues.

This statement has been prepared in accordance with the *WAPC Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016).*

The following conclusions are made for the proposed development:

- The proposed development is located at the easternmost end of Calinup Road within Gelorup, Shire of Capel;
- The 42.4375-hectare property is proposed to be mined for its sand and is expected to generate an annual extraction of 288,000 tonnes of sand;
- The maximum depth of cut is proposed to be moved +2m of the MGL;
- Truck movements in and out of the Site is capped at 130 loaded truck trips per day;
- Recorded crash incidents within the subject area are minimal and is less likely to impose significant changes in the area's overall road safety.
- The proposed development is estimated to generate up to 130 daily truck trips and 4 light vehicle trips on operation days, which translate to approximately 14 peak hour trips during a typical weekday and Saturday; these values are minimal and can be considered to have a low to moderate impact.

Overall, the proposed development of a sand extractive industry at the end of Calinup Road is unlikely to have a substantial impact on traffic operations and safety of the existing surrounding road network.

APPENDICES

APPENDIX A WAPC CHECKLIST

Item	Status	Comments/Proposals
Proposed Development		
Proposed Land Use	Section 2	
Existing Land Uses	Section 1	
Context with Surrounds	Section 1	
Vehicular Access and Parking		
Access Arrangements	Section 2	
Public, Private, Disabled Parking Set Down / Pick-up	N/A	
Service Vehicles (non-residential)		
Access Arrangements	N/A	
On/Off-site Loading Facilities	N/A	
Service Vehicles (residential)		
Rubbish Collection and Emergency Vehicle Access	N/A	
Hours of Operation (non-residential only)	Section 2	
Traffic Volumes		
Daily or Peak Traffic Volumes	Section 3	
Type of Vehicles (e.g., cars, trucks)	Section 3	
Traffic Management on Frontage Streets	N/A	
Public Transport Access		
Nearest Bus/Train Routes	N/A	
Nearest Bus Stops/Train Stations	N/A	
Pedestrian/Cycle Links to Bus Stops/Train Station	N/A	
Pedestrian Access/Facilities		
Existing Pedestrian Facilities Within The Development (If Any)	N/A	
Proposed Pedestrian Facilities Within Development	N/A	
Existing Pedestrian Facilities On Surrounding Roads	N/A	
Proposals To Improve Pedestrian Access	N/A	
Cycle Access/Facilities		
Existing Cycle Facilities Within The Development (If Any)	N/A	
Proposed Cycle Facilities Within The Development	N/A	
Existing Cycle Facilities On Surrounding Roads	N/A	
Proposals To Improve Cycle Access	N/A	
Site-specific Issues	Section 3	
Safety Issues		
Identify Issues	Section 3	
Remedial Measures	N/A	

APPENDIX B ULTIMATE EXTRACTION PLAN

Works and Excavation Plan

Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: **22-332 CP01A** Staff: JL GW Checked: JL

0 80m

element.

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Appendix F – Weed and Dieback Management Plan

SANDPIT LOT 74 CALINUP ROAD GELORUP, SHIRE OF CAPEL

WEED AND DIEBACK MANAGEMENT PLAN

PREPARED FOR:

MCDOUGALL QUARRIES PTY LTD

AUGUST 2023

PREPARED BY:

Martinick Bosch Sell Pty Ltd
4 Cook Street
West Perth WA 6005
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MBS ENVIRONMENTAL

SANDPIT ON LOT 74 CALINUP ROAD GELORUP
WEED AND DIEBACK MANAGEMENT PLAN - REV 2

Distribution List:

Company	Contact name	Copies	Date
McDougall Quarries Pty Ltd	Kyle Jackson - Director	Electronic	4 August 2023
Element Advisory Pty Ltd	Daniel Lewis, Consultant - Planning	Electronic	4 August 2023

Document Control for Job Number: MDQEIL21

Document Status	Prepared By	Authorised By	Date
Draft Report	Ian Mullins	Kirsi Kauhanen	7 July 2023
Final Report V1	Ian Mullins	Kirsi Kauhanen	14 July 2023
Final Report V2	Ian Mullins	Kirsi Kauhanen	4 August 2023

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APPENDICES

Appendix 1: Full Species List From 1999/2000, 2011 and 2014 Surveys

Appendix 2: Designated Clean Down Area

1. INTRODUCTION

1.1 PURPOSE

McDougall Quarries Pty Ltd (McDougal Quarries) holds an existing Development Approval (DA) and Extractive Industry Licence (EIL) for a sand pit located on Lot 74 (Plan 419145) Calinup Road within the Shire of Capel (Figure 1, Figure 2). It is noted that Lot 74 was previously known as Lot 2 (Plan 45139). McDougall Quarries are currently commencing to pursue DA/EIL for the lowering of the pit floor in order to extract more sand from the site. To support the DA/EIL proposal, management plans for weeds and *Phytophthora cinnamomi* (dieback) are required to be submitted to the Shire of Capel for approval. Weed and dieback management measures partly overlap and for efficacy both have been addressed in this Weed and Dieback Management Plan (WDMP).

In developing the WDMP, consideration has been given to the *Biosecurity and Agriculture Management Act 2007* (BAM Act), the *Australian Weeds Strategy 2017-2027* developed by the Invasive Plants and Animals Committee, and the Dieback Working Group's (DWG 2021) Best Practice Guidelines for *Management of Phytophthora Dieback in Raw Material Industries* (the Guidelines). Consideration has also been given to the *Phytophthora Dieback Management Manual* (the Manual) produced by the Department of Biodiversity, Conservation and Attractions (DBCA 2020) and the *Dieback Hygiene Guidelines* by Southcoast Natural Resource Management (Southcoast NRM 2013).

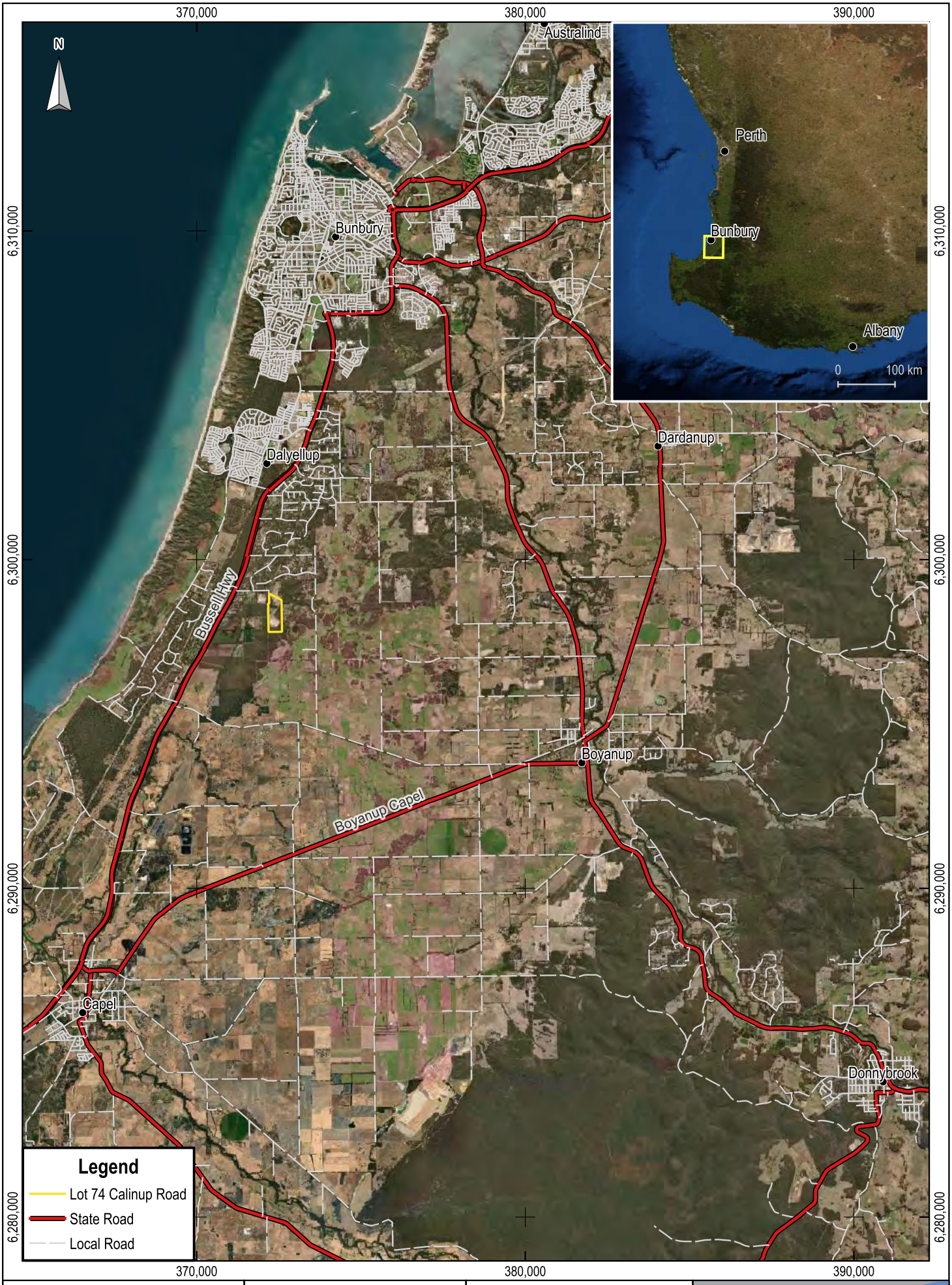
1.2 SCOPE AND OBJECTIVE

This WDMP has been developed to provide details of the existing environment and guidance around best management practices for weeds and dieback with the objective to minimise the risk of introduction and spread of weeds and dieback within Lot 74 (extractive area) and adjacent native vegetation and conservation covenant areas (Figure 2).

The scope of this WDMP includes the following:

- Description of the existing environment.
- Guidance on minimising the spread of weeds and dieback within, to, and from Lot 74, surrounding conservation covenant areas and adjacent retained native vegetation.
- Guidance on the management of weeds and dieback.

It should be noted that whilst this management plan aims to prevent introduction and spread of dieback within Lot 74, the presence/absence of dieback on the majority of Lot 74 cannot be determined and dieback is already known to be present in the general area (see Section 2.6).



Scale: 1:150000
Original Size: A4
Image: Copernicus Sentinel Data 2020
Grid: GDA94 / MGA zone 50
0 2.5 5 km

McDougall Quarries
Lot 74 Calinup Road, Gelorup

Figure 1

Location Plan

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MBS ENVIRONMENTAL

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Works and Excavation Plan

Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: **22-332 CP01A** Staff: JL GW Checked: JL

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2. Existing Environment

2.1 Climate

The climate of the project area is Mediterranean, with cool wet winters and hot dry summers. Bureau of Meteorology (BoM) Long-term average climate data for the closest meteorological station (Bunbury meteorological station [ID 009965] is located approximately 12 km north of the Project) is shown in Figure 3. The average annual rainfall is 683.2 mm, mean minimum temperatures range between 6.9˚C and 14.7˚C and mean maximum temperatures between 16.9˚C and 30.3˚C (BoM 2023).

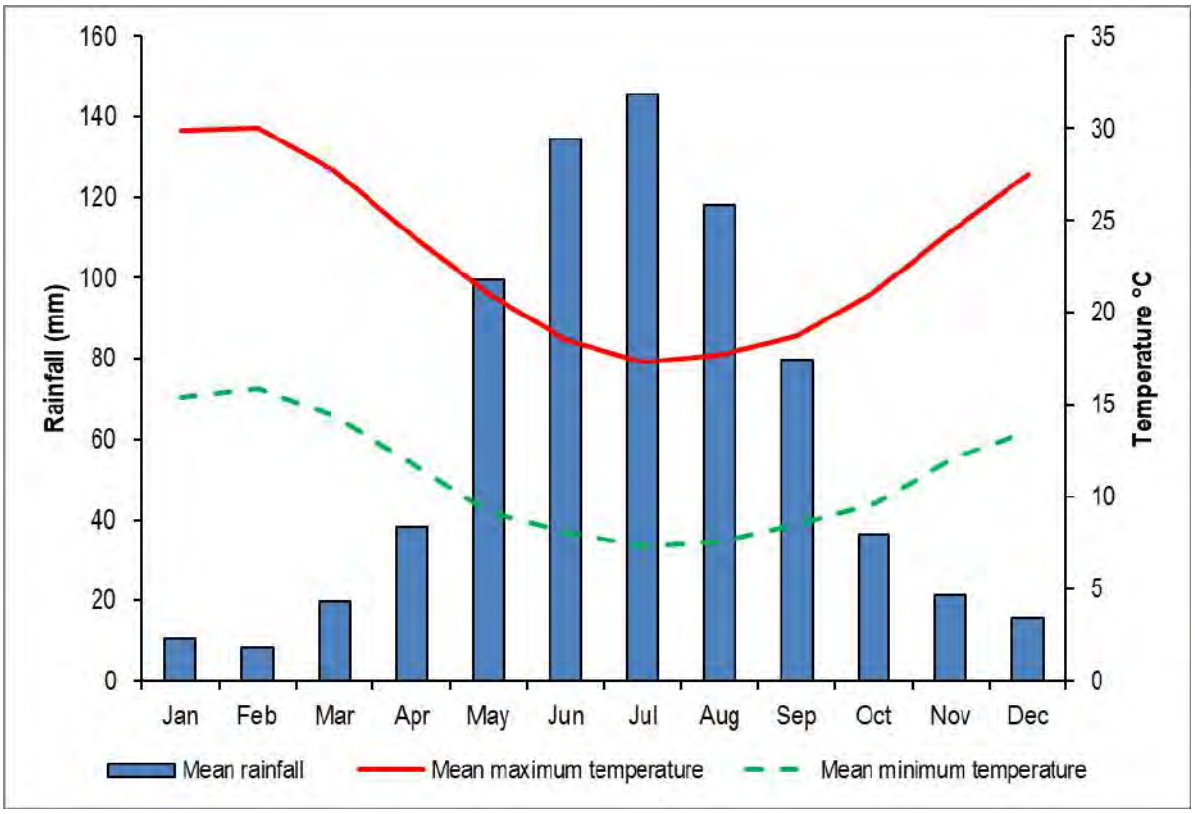

Figure 3: Long-term Rainfall and Temperature Data (1995-2023) for Bunbury Meteorological Station 9965 (BoM 2023)

2.2 Soils

The soils of Lot 74 comprise a mixture of aeolian sands known collectively as the Karrakatta Sand Unit, which is a sub-unit of the Spearwood Dune System. The Karrakatta sands are described as free-draining yellow or grey sands occurring with varying depths over limestone.

Existing sand extraction operations at Lot 74 has indicated that the soil profile consists of three distinct layers. A yellow sand layer up to 40 m thick is overlain by approximately 1.5 m of light brownish grey sand and about 100 mm of topsoil (Plate 1).

Plate 1: Sand Profile

2.3 VEGETATION

The majority of the proposed extraction area is already cleared and the remainder contains a landscape/vegetation units of open woodland *Eucalyptus. marginata* and *Corymbia calophylla* trees over open low woodland including *Agonis flexuosa* and Banksia species. This predominantly includes landscape/vegetation units B as described in Table 1 and shown in Figure 4.

Botanical surveys of Lot 74 were undertaken by Dr Ray Cranfield, in February 1999, to assess plant communities, species composition and habitats. Five landscape units were defined, all of which are components of the Karrakatta Vegetation and Landform Complex (Table 1 and Figure 4). As some species are less evident in February, a second survey to assess species composition with a particular focus on Declared Rare and Priority species, was undertaken in October 2000. No Declared Rare or Priority flora species were recorded on the property. Follow-up vegetation surveys were undertaken in October 2011 (MBS Environmental 2014a) and May 2014 (MBS Environmental 2014b) with the main objective of gathering more detailed information on species composition, density and cover to be used to prepare a Rehabilitation Plan.

A full species list from the 1999/2000, 2011 and 2014 surveys is provided as Table 1. In total the surveys on Lot 74 have recorded 72 native flora species and 10 weed species.

Table 1: Vegetation Units

Landscape Unit	Unit Description	Geomorphic Unit	Native Vegetation
A	Sandy rises and hill slopes supporting mixed eucalypt-*Xylomelum* spp. woodlands and over open scrub and heath.	Hilltop.	Open woodland of sparsely scattered *E. marginata* and *C. calophylla* trees over open low woodland consisting mainly of *Xylomelum occidentale*, *Agonis flexuosa* and *Banksia attenuata*. Tree cover 10–30%, health rating 4.
B	Gentle depression supporting mixed eucalypt-banksia woodlands over low open thickets and shrublands.	South-east facing hillside and saddle area with gentle depression.	Open woodland of very sparsely scattered *E. marginata* and *C. calophylla* trees over open low woodland of *A. flexuosa*, *B. attenuata* and *B. grandis*. Tree cover 2–10%, health rating 4.
C	Low gentle elevations supporting mixed eucalypt-agonis-banksia woodlands over low open scrub.	Gently sloping east facing hillside.	Open woodland of very sparsely scattered *E. marginata* and *C. calophylla* trees over open low woodland of *A. flexuosa*, *B. attenuata*, *B. grandis* and *X. occidentale*. Tree cover 2–10%, health rating 4.
D	Gentle undulating terrain supporting eucalypt-banksia woodlands over mixed low open scrub.	Valley head depression.	Open woodland of very sparsely scattered *E. marginata* and *C. calophylla* trees over low woodland of *A. flexuosa*, *B. attenuata*, *B. grandis* and *X. occidentale*. Tree cover 2–10%, health rating 4.
E	Low fringing dampland supporting mixed open woodlands over mixed low open shrublands.	Valley head depression and low-lying area.	Low open woodland of very sparsely scattered *A. flexuosa*, *B. attenuata*, *C. calophylla*, *E. marginata*, *Nuytsia floribunda* and *X. occidentale* trees. Tree cover 2–10%, health rating 4.

Source: MBS (2003) PER Table 7.

372,000 372,400 372,800

6,298,800 6,298,400 6,298,000

N

L679 L2 L11 A B C D E

Legend

- Dieback Uninfested Area
- Landscape Units
- Project Area
- Lot Boundary

Scale: 1: 4,000 Original Size: A3 Grid: GDA94 / MGA zone 50 (EPSG:28350) 0 100 200 m	McDougall Quarries Lot 74 Calinup Road, Gelorup	**Figure 4** **Landscape/Vegetation Units**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t: +61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au

2.4 LAND USE

Lot 74 is zoned rural. Land to the north and north west of Lot 74 is zoned rural residential while the land to the south, west and east is zoned rural. The land use of Lot 74 is exclusively sand extraction. Clearing of vegetation and extraction of sand occur in small sequential stages followed by progressive rehabilitation.

2.5 CURRENT WEED STATUS

Surveys undertaken since 1999 have identified ten weed species on Lot 74 (Table 2). No Declared Pest plant species or Weeds of National Significance (WONS) have been recorded at Lot 74.

None of the recorded weed species are limited to a particular part of Lot 74, but rather all are common throughout the property. Historical disturbance including logging, burning and grazing across the property has removed the majority of native understorey, which has been replaced by weed species. Weed control is undertaken across the property with monitoring indicating that weeds are not out-competing revegetation. The south east boundary of Lot 74 is adjacent to farmland, which results in an increase in the number of annual weed species, and therefore weed management is ongoing. In terms of current weed status, Lot 74 is seen as one uniform area for weed management, with no portions identified as being of higher risk than others or in need of special protection measures.

Table 2: Weeds Recorded in the Project Area and Their Status According to DPaW Southwest Weed Assessment

Scientific Name	Common Name	Current Distribution in South West	Invasiveness	Ecological Impacts	Feasibility of Control (Regional Scale)
Arctotheca calendula	Capeweed	Extensive	Moderate	Medium	Low
Briza maxima	Blow Fly Grass	Extensive	Rapid	Unknown	Low
Disa bracteata (previously called *Monadenia bracteata*)	South African Orchid	Extensive	Rapid	Unknown	Low
Ehrharta longiflora	Annual Veldgrass	Extensive	Rapid	Unknown	Low
Hypochaeris glabra	Flatweed	Extensive	Rapid	Medium	Medium
Lotus uliginosus	Greater Lotus	Unknown	Rapid	Unknown	Unknown
Lysimachia arvensis (previously called *Anagallis arvensis*)	Pimpernel	Extensive	Rapid	Unknown	Unknown
Phytolacca octandra	Inkweed	Low	Medium	Unknown	Medium
Ursinia anthemoides	Ursinia	High	Rapid	Unknown	Low
Vulpia myuros	Rat's Tail Fescue	High	Rapid	Unknown	Low

Weed distribution, invasiveness, ecological impact and feasibility of control based on DPaW 2013.

2.6 CURRENT DIEBACK STATUS

Initial assessment of dieback was made during the February 1999 vegetation survey, based on observations of health and general condition of indicator species. *Eucalyptus marginata* trees observed on Lot 74 showed signs of tip damage that was the result of other damaging agents and not *Phytophthora cinnamomi*. Other plants susceptible to dieback, especially *Banksia attenuata* and *Banksia grandis*, did not show signs of potential dieback infestation.

A dieback occurrence survey of the entire Lot 74 was undertaken in June 2015 by Bruno Rikli (BARK Environmental 2015); a qualified dieback interpreter registered with the then Department of Parks and Wildlife (DPaW), currently DBCA. Key findings of the survey were the following:

- One small 'Uninfested Area' (1.1 ha) was mapped at Gelorup Hill.
- The remainder of Lot 74 was assessed as 'Excluded Area' (57.5 ha).
- One positive dieback sample was collected outside the Lot 74 property boundary.

The Uninfested Area was located on top of Gelorup Hill (Figure 4) and was considered potentially protectable from dieback. Whilst the majority of the Uninfested Area fell within vegetation to be retained as the western setback, there was a small overlap of the Uninfested Area and the approved extraction area.

The Excluded Area had been either completely cleared in the past or been subject to significant historical vegetation disturbance and lacked sufficient indicator species to determine whether dieback was present or not. The positive dieback sample collected outside but adjacent to Lot 74 indicates that the pathogen is present in the general area. In the WA Dieback Map, the southern portion of Lot 74 and the some of the surrounds are mapped as 'Moderate Confidence Infested with *P. cinnamomi dieback in 2008* (Southcoast NRM 2023).

3. WEED MANAGEMENT

Weed management, monitoring and contingency measures that will be implemented as part of the sand extraction operations at Lot 74 are described in Table 3.

In relation to the Conservation Covenant area within Lot 74, the risk of introducing and spreading of weeds will be managed as follows:

- The Conservation Covenant area will be fenced to prevent unauthorised access.
- As far as possible, the area will only be accessed during dry soil (no soil movement) conditions.
- All vehicles will be required to arrive to the Conservation Covenant area clean. A clean-down area at the entrance to the sand pit can be utilised, if necessary, prior to entering the Conservation Covenant area.
- Vehicles will remain on designed tracks and fire breaks.

Table 3: Weed Management, Monitoring and Contingency Measures Within Lot 74 Extractive Areas

Issue	Standard Control Measures	Monitoring	Contingency Measures	Evidence
Introduction of new or existing weeds through project related site entry.	All vehicles, machinery, temporary buildings and other equipment will be required to arrive to the site clean of plant matter and soil. A designated clean-down area (see drawing in Appendix 2) will also be provided at the site entrance to be used on a needs basis.	Vehicles and machinery accessing the site are checked by pit staff.	Additional clean-down will be undertaken in the designated clean-down area if required.*	Inspection logs for vehicles and machinery accessing the site. Clean-down logs for use of the clean-down area.
	A sign will be established at the entrance to provide guidance regarding clean-down requirements.	None.	None.	Visual inspection of the sign during audit.
	The clean-down area and associated sump will be maintained weed free.	Designated Officer will monitor the clean-down area and associated sump for weed growth as part of the fortnightly site inspection.	Weeds emerging in the clean-down area or associated sump will be controlled either with manual removal or herbicide spray.	Fortnightly site inspection log. Visual inspection of clean-down area during audit.
	Any material brought to site will be weed free.	Designated Officer will inspect such materials brought to site.	Infested materials will not be accepted.	Inspection logs for materials brought in.
Introduction and spread of weeds through unauthorised site access.	Boundary fence and gate will be maintained to minimise unauthorised site access.	Designated Officer will monitor the condition of boundary fence and gate as part of the fortnightly site inspection. Gate monitoring also part of normal operations.	Broken fence or gate will be rectified as a matter of priority.	Fortnightly site inspection log.
Spread of existing weeds via movement of plant and vehicles within the project area. (Note: This is not currently seen as an issue due to the existing weeds being present through the site).	Movement of plant and vehicles will be limited to designated tracks and working areas that have been cleared of vegetation and topsoil.	Designated Officer will monitor appropriate movement of plant and vehicles.	Rules on movement of plant and vehicles will be reiterated to all staff as need be. The need for additional/alternative tracks and working areas will be assessed.	Visual inspection during audit.
	All parking and laydown areas will also be cleared of vegetation and topsoil.	Designated Officer will monitor the appropriate use and adequacy of parking and laydown areas as part of the fortnightly site inspection.	Rules on parking and laydown area will be reiterated to all staff as needs be.	Fortnightly site inspection log. Visual inspection during audit.

Issue	Standard Control Measures	Monitoring	Contingency Measures	Evidence
			The need for additional/alternative parking and laydown areas will be assessed.	
	Areas subject to active movement of vehicles (tracks, working areas, resource stockpiles, parking and laydown areas) will be maintained weed-free.	Designated Officer will monitor presence of weeds as part of the fortnightly site inspection.	Weeds emerging in any of these areas will be controlled either with manual removal or herbicide spray.	Fortnightly site inspection log. Visual inspection during audit.
Spread of existing weeds via movement of topsoil and plant matter within the Project area. (Note: This is not currently seen as an issue due to the existing weeds being present through the site).	As far as possible, removed topsoil and plant matter will be relocated to rehabilitation areas without stockpiling (will reduce double handling and associated spread of weeds).	None.	None.	None.
	An experienced weed management contractor will be engaged to assess and control weeds in topsoil stockpiles and rehabilitation areas to avoid development of a significant weed cover. Any weed control will aim to avoid impacts on native species.	Designated Officer will monitor site conditions as part of fortnightly site inspection and inform the weed management contractor if supplementary weed control is necessary.	Supplementary weed control will be undertaken on a needs basis.	Fortnightly site inspection log. Invoices from weed contractor.
Spread of existing weeds via wind blow to exposed areas.	The extent of disturbed (exposed), un-rehabilitated areas will be minimised through gradual clearing over several years and progressive rehabilitation.	None.	None.	Records of clearing and rehabilitation.
	An experienced weed management contractor will be engaged to assess and control weeds in disturbed (exposed), un-rehabilitated areas to avoid development of a significant weed cover. Any weed control will aim to avoid impacts on native species.	Designated Officer will monitor site conditions as part of fortnightly site inspection and inform the weed management contractor if supplementary weed control is necessary.	Supplementary weed control will be undertaken on a needs basis.	Fortnightly site inspection log. Invoices from weed contractor.
Compromised resilience of revegetation processes due to weed infestation.	An experienced weed management contractor will be engaged to assess and control weeds in revegetation areas to avoid development of a significant weed cover. Any weed control will aim to avoid impacts on native species.	Designated Officer will monitor site conditions as part of fortnightly site inspection and inform the weed management contractor if supplementary weed control is necessary.	Supplementary weed control will be undertaken on a needs basis.	Fortnightly site inspection log. Invoices from weed contractor.

** When additional clean-down is required in dry conditions, brush-down or blow-down is preferred over wash-down.*

4. DIEBACK MANAGEMENT

Whilst the majority of the Uninfested Area falls within vegetation to be retained as the western setback, there is some overlap of the Uninfested Area and the approved extraction area. The remaining Uninfested Area will be delineated in the field and clearly marked off to prevent further disturbance. The remainder of the Project Area falls within the Excluded Area classification. The presence or absence of dieback in this area cannot be determined and it will not be possible to assess whether the operations have introduced or spread dieback within the area in the future.

Dieback management, monitoring and contingency measures that will be implemented as part of the sand extraction at Lot 74 are described in Table 4 and have been developed to reduce the likelihood of introducing, spreading or exporting dieback. It is noted that the location of the positive dieback sample collected in the June 2015 dieback survey (BARK Environmental 2015) is outside the property boundary of Lot 74 and will not be accessed as part of the sand extraction project.

In relation to the Conservation Covenant area within Lot 74, the risk of introducing and spreading of dieback will be managed as follows:

- The Conservation Covenant area will be fenced to prevent unauthorised access.
- As far as possible the area will only be accessed during dry soil (no soil movement) conditions.
- All vehicles will be required to arrive to the Conservation Covenant area clean and leave the area clean. A clean-down area at the entrance to the sand pit will be utilised, if necessary, prior to entering the conservation covenant area.
- Vehicles will remain on designed tracks and fire breaks.

Table 4: Dieback Management, Monitoring and Contingency Measures Within Lot 74 Extractive Areas

Issue	Standard Control Measures	Monitoring	Contingency Measures	Evidence
Potential introduction of dieback through Project related site entry.*	All vehicles, machinery, temporary buildings and other equipment will be required to arrive to the site clean of any plant matter and soil. A designated clean-down area (see drawing in Appendix 2) will be provided at the site entrance to be used on a needs basis.	All vehicles and machinery accessing the site are checked by pit staff.	Additional clean-down will be undertaken in the designated clean-down area if required.#	Visual inspection of clean-down area during audit. Inspection logs for vehicles and machinery accessing the site. Clean-down logs for use of the clean-down area.
	A sign will be established at the entrance to provide guidance regarding clean-down requirements.	None.	None.	Visual inspection of the sign during audit.
	Drainage from the clean-down bay will be contained in a sump (see drawing in Appendix 2) and prevented from flowing into surrounding vegetation.	Designated Officer will monitor the clean-down area and the associated sump during any wash-down and as part of fortnightly site inspection.	If drainage containment is breached, the associated operations will cease immediately and will not recommence until the containment issue has been rectified.	Fortnightly inspection log. Visual inspection of clean-down area during audit.
Introduction of dieback into the Uninfested Area.	The remaining Uninfested Area will be delineated in the field and clearly marked off to prevent further disturbance. During rehabilitation no topsoil and plant matter should be respread within 20 m of the newly delineated Uninfested Area boundary. Dieback-free mulch or other alternative will be used in these areas.	Designated Officer to ensure topsoil and plant material from Excluded Areas is not respread adjacent to newly delineated Uninfested Area boundary.	None.	Record of communication regarding the dieback free status of materials brought to site.
Potential introduction of dieback through materials brought to site (e.g. seedlings or soil).*	Any soil, plant or other organic matter brought to site will come from dieback-free sources.	None.	None.	Record of communication regarding the dieback free status of materials brought to site.
Potential spread of dieback across the site via movement of vehicles and machinery; transfer of soil and	Movement of vehicles and machinery will be limited to designated tracks and working areas that have been cleared of vegetation and topsoil.	Designated Officer will monitor appropriate movement of plant and vehicles.	Rules on movement of plant and vehicles will be reiterated to all staff as needs be. The need for additional/alternative tracks and working areas will be assessed.	Visual inspection during audit.

Issue	Standard Control Measures	Monitoring	Contingency Measures	Evidence
vegetation, and drainage of water.*	As far as possible removed topsoil and plant matter will be relocated to rehabilitation areas without stockpiling (will reduce double handling and minimise spread of any dieback).	None.	None.	None.
	All tracks and working areas will be maintained as dry as possible, well drained and development of pools prevented.	Designated Officer will monitor the presence of pools and poor drainage on tracks and working areas as part of fortnightly site inspection.	Modifications/maintenance to tracks and working areas will be undertaken to resolve drainage issues.	Fortnightly inspection log. Visual inspection during audit.
Potential introduction and spread of dieback via unauthorised access to site.*	Boundary fence and gate will be maintained to minimise unauthorised site access.	Designated Officer will monitor the condition of boundary fence and gate as part of the fortnightly site inspection. Gate monitoring also part of normal operations.	Broken fence or gate will be rectified as a matter of priority.	Fortnightly site inspection log.
Compromised resilience of revegetation processes due to dieback.*	Management measures in this table should minimise the risk of introducing and spreading dieback.	Rehabilitation progress will be monitored (as per Rehabilitation Plan) and will record mortality amongst revegetation species (including dieback indicator species).	Contingency measures will be negotiated if dieback is found to impact on revegetation progress. Measures may include adjusting species mixture to more dieback resilient species.	Rehabilitation monitoring reports.
Export of dieback potentially present at the site.*	All vehicles, machinery, temporary buildings and other equipment will be required to leave the site clean of any plant matter and soil (excluding sand purchased). A designated clean-down area (Appendix 2) will be provided at the site entrance to be used on a needs basis.	All vehicles and machinery accessing the site are checked by pit staff.	Additional clean-down will be undertaken in the designated clean-down area if required.[#]	Visual inspection of clean-down area during audit. Inspection logs for vehicles and machinery accessing the site. Clean-down logs for use of the clean-down area.

** Majority of the project area classified as Excluded Area, meaning presence or absence of dieback cannot be determined. Consequently introduction or spread of dieback during the operations can also not be determined.*

[#] *When additional clean-down is required in dry conditions, brush-down or blow-down is preferred over wash-down.*

5. RESPONSIBILITIES

5.1 COMPANY

McDougal Quarries is responsible for the following:

- Ensuring the WDMP is implemented.

5.2 DESIGNATED OFFICER

The Designated Officer is responsible for the following:

- Monitoring and enforcing the implementation of the WDMP.
- Providing training as necessary to staff and visitors to ensure their awareness of the requirements of the WDMP.
- Undertaking the specified monitoring measures and implementing contingency measures when necessary.

5.3 EMPLOYEES AND CONTRACTORS

All employees and contractors are responsible for the following:

- Operating in line with the WDMP.
- Reporting any incidents to the Designated Officer.
- Implementing contingency measures in consultation with the Designated Officer when necessary.

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APPENDICES

Appendix 1: Full Species List From 1999/2000, 2011 and 2014 Surveys

FULL SPECIES LIST FROM 1999/2000, 2011 AND 2014 SURVEYS

Weed Species Identified on Lot 74 Calinup Road

Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Primulaceae	*Anagallis arvensis (name change to Lysimachia arvensis)*	Pimpernel	Annual grass	1999-2000 2011	X	X	X		
Asteraceae	*Arctotheca calendula*	Cape weed	Annual herb	2011	X	X	X		X
Poaceae	*Briza maxima*	Blowfly grass	Annual grass or herb	1999-2000 2011	X	X	X	X	X
Poaceae	*Erhartia longifolia*	Annual veldgrass	Annual grass	1999-2000 2011	X				
Asteraceae	*Hypochaeris glabra*	Smooth catsear	Perennial or annual herb	1999-2000 2011	X	X		X	X
Fabaceae	*Lotus uliginosus*	Greater lotus	Perennial herb	1999-2000					X
Orchidaceae	*Monadenia bracteata (name change to Disa bracteata Sw.)*	South African orchid	Perennial herb	1999-2000			X		
Phytolaccaceae	*Phytolacca octandra*	Red ink plant	Perennial herb or shrub	1999-2000	X	X			X
Asteraceae	*Ursinia anthemoides*	Ursinia	Annual herb	2011	X			X	
Poaceae	*Vulpia myuros*	Rat's tail fescue	Annual grass	1999-2000					X

Native Flora Species Identified on Lot 74 Calinup Road

Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Anarthriaceae	*Lyginia barbata*	-	Sedge	1999-2000		X	X		
Apiaceae	*Platysace filiformis*	-	Shrub or herb	1999-2000		X			
Apocynaceae	*Alyxia buxifolia*	Dysentery Bush	Shrub	1999-2000	X				

Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Araliaceae	*Trachymene pilosa*	Native Parsnip	Herb	1999-2000 2011	X	X	X	X	X
Asparagaceae	*Lomandra integra*	-	Lily (herb)	1999-2000 2011	X	X		X	
Asparagaceae	*Sowerbaea laxiflora*	Purple Tassels	Shrub or herb	1999-2000	X				
Asparagaceae	*Thysanotus patersonii*	-	Herb	1999-2000 2011	X				
Asteraceae	*Waitzia suaveolens*	-	Herb	1999-2000 2011	X	X		X	X
Commelinaceae	*Cartonema philydroides*	-	Herb	1999-2000					X
Cyperaceae	*Lepidosperma squamatum*	-	Shrub or herb	1999-2000	X				
Cyperaceae	*Schoenus grandiflorus*	Large Flowered Bogrush	Herb	1999-2000	X				
Dasypogonaceae	*Dasypogon bromeliifolius*	Pineapple Bush	Shrub or herb	1999-2000		X			
Dilleniaceae	*Hibbertia cuneiformis*	Cutleaf Hibbertia	Shrub	2011, 2014			X		
Dilleniaceae	*Hibbertia hypericoides*	Yellow Buttercups	Shrub	1999-2000 2011, 2014	X	X	X	X	X
Dilleniaceae	*Hibbertia racemosa*	Stalked Guinea Flower	Shrub	1999-2000 2011, 2014	X	X	X	X	
Droseraceae	*Drosera sp.*	-	Herb	2011, 2014	X	X	X	X	X
Ericaceae	*Conostephium pendulum*	Pearl Flower	Shrub	1999-2000			X		
Ericaceae	*Leucopogon capitellatus*	-	Shrub	1999-2000	X	X			
Ericaceae	*Leucopogon propinquus*	-	Shrub	1999-2000 2011, 2014	X	X	X	X	X
Fabaceae	*Acacia huegelii*	-	Shrub	1999-2000		X			
Fabaceae	*Acacia pulchella*	Prickly Moses	Shrub	1999-2000 2011, 2014	X	X		X	X
Fabaceae	*Acacia saligna*	Orange Wattle	Shrub	1999-2000	X				
Fabaceae	*Acacia stenoptera*	Narrow Winged Wattle	Shrub	1999-2000		X			
Fabaceae	*Bossiaea eriocarpa*	Common Brown Pea	Shrub	1999-2000 2011, 2014	X	X	X	X	X

Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Fabaceae	*Daviesia divaricata*	Marno	Shrub or tree	1999-2000 2011, 2014	X	X	X	X	X
Fabaceae	*Daviesia incrassata*	-	Shrub	1999-2000	X				
Fabaceae	*Gompholobium tomentosum*	Hairy Yellow Pea	Shrub	1999-2000		X	X		
Fabaceae	*Hardenbergia comptoniana*	Native Wisteria	Vine	1999-2000 2011, 2014	X	X	X	X	
Fabaceae	*Hovea trisperma*	Common Hovea	Shrub	1999-2000	X		X		
Fabaceae	*Jacksonia sternbergiana*	Stinkwood	Shrub or tree	1999-2000	X	X			
Fabaceae	*Kennedia prostrata*	Scarlet Runner	Vine or shrub	1999-2000 2011, 2014	X				X
Fabaceae	*Mirbelia spinosa*	-	Shrub	1999-2000			X		
Geraniaceae	*Pelargonium littorale*	-	Herb	1999-2000	X				
Goodeniaceae	*Dampiera linearis*	Common Dampiera	Herb	1999-2000	X				
Haemodoraceae	*Conostylis aculeata*	Prickly Conostylis	Shrub or herb	1999-2000 2011, 2014	X	X	X	X	X
Haemodoraceae	*Haemodorum paniculatum*	Mardja	Lily (herb)	1999-2000			X		
Haemodoraceae	*Phlebocarya ciliata*	-	Herb	1999-2000	X				
Hemerocallidaceae	*Tricoryne elatior*	Yellow Autumn Lily	Herb	1999-2000					X
Iridaceae	*Patersonia occidentalis*	Purple Flag	Shrub or herb	1999-2000	X	X	X		
Juncaceae	*Juncus kraussii*	Sea rush	Reed or herb	1999-2000	X				X
Lamiaceae	*Hemiandra pungens*	Snakebush	Creeper or shrub	1999-2000		X			
Lauraceae	*Cassytha racemosa*	Dodder Laurel	Parasite vine	1999-2000	X				
Loranthaceae	*Nuytsia floribunda*	Christmas Tree	Tree	1999-2000 2011, 2014		X		X	X
Myrtaceae	*Agonis flexuosa*	Peppermint	Tree or shrub	1999-2000 2011, 2014	X	X	X	X	X
Myrtaceae	*Corymbia calophylla*	Marri	Tree	1999-2000 2011, 2014	X	X	X	X	X

Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Myrtaceae	*Eucalyptus marginata*	Jarrah	Tree	1999-2000 2011, 2014	X	X	X	X	X
Myrtaceae	*Kunzea ericifolia*	Spearwood	Shrub	1999-2000 2011, 2014	X	X	X	X	X
Myrtaceae	*Melaleuca thymoides*	-	Shrub	1999-2000 2011, 2014	X	X	X		X
Orchidaceae	*Caladenia flava*	Cowslip Orchid	Herb	2011	X	X			
Orchidaceae	*Caladenia longicauda*	Common White Spider Orchid	Herb	2011				X	
Orchidaceae	*Drakaea sp?*	-	Herb	2011	X				
Orchidaceae	*Leporella fimbriata*	Hare Orchid	Herb	2014	X				
Orchidaceae	*Thelymitra crinita*	Blue Lady Orchid	Herb	1999-2000 2011	X		X		
Orobanchaceae	*Orobanche minor*	Lesser Broomrape	Parasite herb	1999-2000					X
Phyllanthaceae	*Phyllanthus calycinus*	False Boronia	Shrub	1999-2000 2011, 2014	X	X	X	X	X
Podocarpaceae	*Podocarpus drouynianus*	Wild Plum	Shrub or tree	1999-2000		X			
Polygonaceae	*Muehlenbeckia adpressa*	Climbing Lignum	Shrub or climber	1999-2000		X			
Proteaceae	*Adenanthos meisneri*	-	Shrub	1999-2000		X	X		X
Proteaceae	*Persoonia longifolia*	Snottygobble	Shrub or Tree	1999-2000 2011, 2014	X	X	X	X	
Proteaceae	*Banksia attenuata*	Slender Banksia	Tree or shrub	1999-2000 2011, 2014	X	X	X	X	X
Proteaceae	*Banksia grandis*	Bull Banksia	Tree or shrub	1999-2000 2011, 2014	X	X	X	X	X
Proteaceae	*Persoonia saccata*	Snottygobble	Shrub	1999-2000		X			
Proteaceae	*Petrophile linearis*	Pixie Mops	Shrub	1999-2000		X			
Proteaceae	*Xylomelum occidentale*	Woody Pear	Tree or shrub	1999-2000 2011, 2014	X	X	X	X	X
Ranunculaceae	*Clematis sp.*	-	Vine	1999-2000	X				
Restionaceae	*Desmocladus fasciculatus*	-	Herb	1999-2000 2011	X			X	

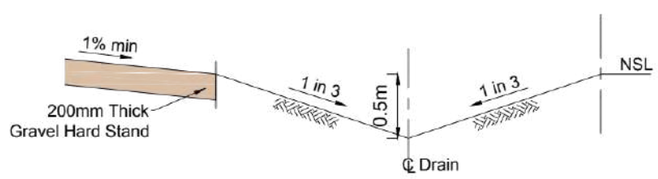
Family	Taxa	Common Name	Life Form	Survey	Landscape Unit				
					A	B	C	D	E
Restionaceae	*Hypolaena exsulca*	-	Sedge or herb	1999-2000	X	X	X		X
Rutaceae	*Philotheca spicata*	Pepper and Salt	Herb	1999-2000			X		
Santalaceae	*Exocarpus aphyllus*	Leafless Ballart	Shrub	1999-2000	X				
Stylidiaceae	*Stylidium sp.*	-	Herb	1999-2000 2011	X		X		
Violaceae	*Hybanthus calycinus*	Wild Violet	Shrub or herb	1999-2000	X				
Xanthorrhoeaceae	*Xanthorrhoea brunonis*	-	Shrub or tree	1999-2000 2011, 2014	X	X	X	X	X
Zamiaceae	*Macrozamia riedlei*	Zamia	Shrub or tree	1999-2000 2011, 2014	X	X	X	X	X

APPENDIX 2: DESIGNATED CLEAN DOWN AREA

INSET A

LOCATION

TYPICAL SWALE CROSS-SECTION



STORMWATER CALCULATIONS

Gravel Hard Stand Area: 90m²
Stormwater Storage Requirement: 1.40m³
(1m³ per 65m²)
Swale Storage per m: 0.75m³
Swale Storage provided: 15m³

LEGEND

- Property Boundaries
- Existing Fence
- Existing Gate
- Existing Sealed Road
- Existing Rock Pitched Drainage Swale
- Proposed 200mm Thick Gravel Hard Stand
- Proposed Rockpitched Soakage Swale
- 1% Min Drainage Fall

	McDougall Quarries Lot 74 Calinup Road, Gelorup	**A2**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t: +61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au
		Wash Down Hard Stand	

\\mbssvr\working\McDougall Quarries\Calinup Road\Management Plans\Weed and Dieback\Shire 2023\GIS\MQ_Calinup Rd Weed and Dieback Management Plan_2023.qgz 01/08/2023 A2 - Washdown Hardstand

Appendix G – Dust Management Plan

SANDPIT LOT 74 CALINUP ROAD GELORUP SHIRE OF CAPEL

DUST MANAGEMENT PLAN

PREPARED FOR:

MCDOUGALL QUARRIES PTY LTD

AUGUST 2023

PREPARED BY:

Martinick Bosch Sell Pty Ltd
4 Cook Street
West Perth WA 6005
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MBS ENVIRONMENTAL

MARTINICK BOSCH SELL PTY LTD
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MBS ENVIRONMENTAL
environmental and geoscience consultants

LOT 74 CALINUP ROAD GELORUP
DUST MANAGEMENT PLAN

Distribution List:

Company	Contact Name	Copies	Date
McDougall Quarries Pty Ltd	Kyle Jackson, Director	Electronic	22 August 2023
Element Advisory Pty Ltd	Daniel Lewis, Planning Consultant	Electronic	22 August 2023

Document Control for Job Number: MDQEIL21

Document Status	Prepared By	Authorised By	Date
Draft Report	Kirsi Kauhanen, Sharon Rose	Kristy Sell	18 August 2023
Final Report	Kirsi Kauhanen, Sharon Rose	Kristy Sell	22 August 2023

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1. INTRODUCTION

1.1 PURPOSE

McDougall Quarries Pty Ltd (McDougall Quarries, the applicant) are applying for a Development Application (DA) and Extractive Industry Licence (EIL) for extraction of sand on Lot 74 on Plan 419145 (previously Lot 2 on Diagram 45139) along Calinup Road in Gelorup (the property) within the Shire of Capel (Figure 1, Figure 2). The Shire of Capel requires that a Dust Management Plan (DMP) is prepared for EIL purposes.

This DMP was prepared in accordance with the Department of Environment and Conservation's (DEC) guidance *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DBCA 2011). This DMP should be read in conjunction with the DA report.

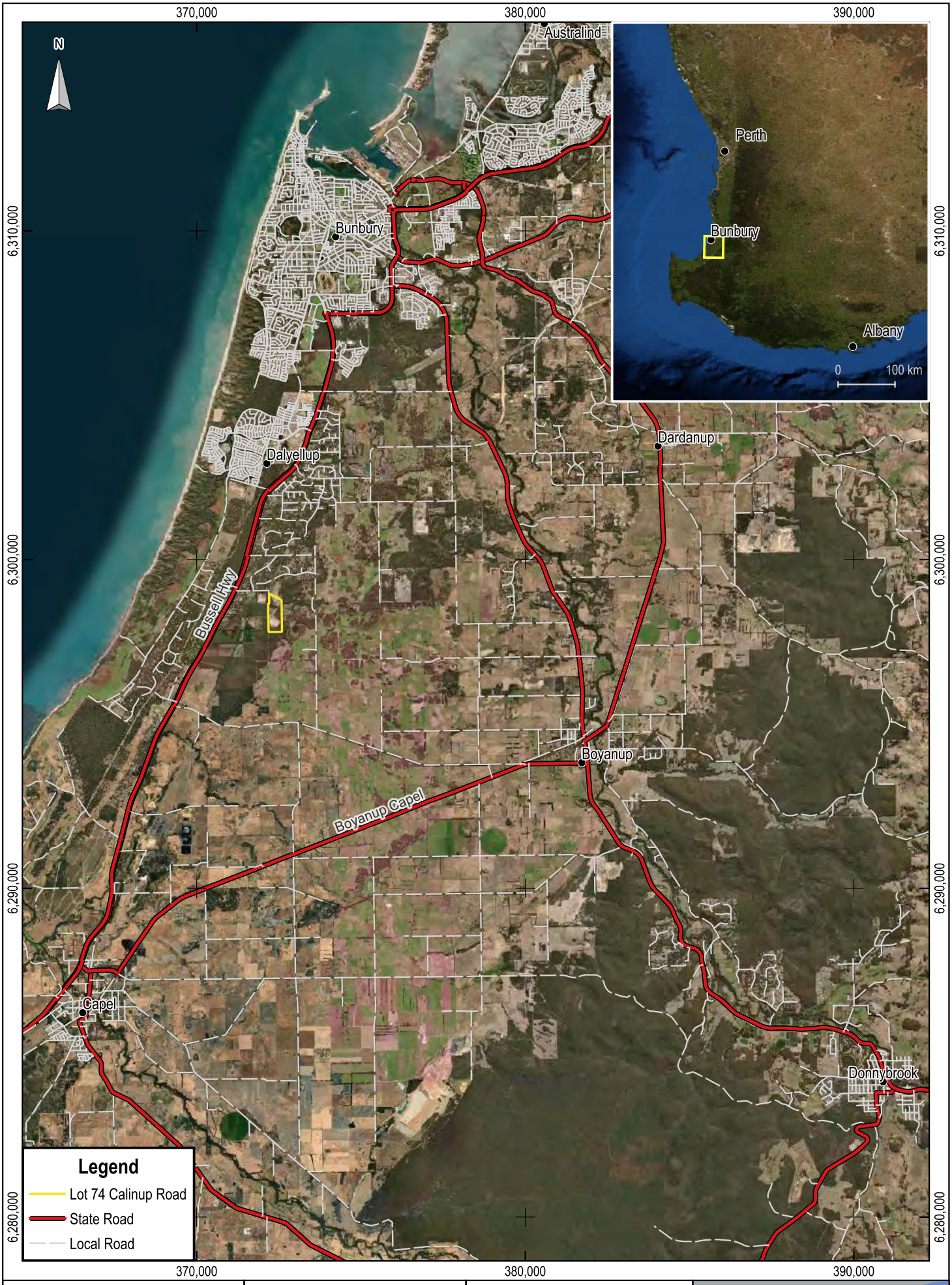
1.2 SCOPE

The scope of this DMP includes the following:

- Description of the existing environment and identification of sensitive receptors.
- Identification of potential sources of dust associated with the operations.
- Identification of roles and responsibilities.
- A site risk assessment for dust.
- Description of appropriate dust prevention, monitoring, and mitigation measures.
- A dust complaints process.

1.3 OBJECTIVE

The objective of this DMP is to minimise dust emissions generated from the sand extraction operations.



Scale: 1:150000
Original Size: A4
Image: Copernicus Sentinel Data 2020
Grid: GDA94 / MGA zone 50
0 2.5 5 km

McDougall Quarries
Lot 74 Calinup Road, Gelorup

Figure 1

Location Plan

Martinick Bosch Sell Pty Ltd
4 Cook St
West Perth WA 6005
Australia
t: +61 8 9226 3166
info@mbsenvironmental.com.au
www.mbsenvironmental.com.au

MBS ENVIRONMENTAL

\\mbssvr\working\McDougall Quarries\Calinup Road\GIS-Common\Calinup Rd Location Plan.qgz 01/08/2023

Works and Excavation Plan

Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: **22-332 CP01A** Staff: JL GW Checked: JL

0 80m

element.

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2. Existing Environment

2.1 Climate

The climate of the project area is Mediterranean, with cool wet winters and hot dry summers. Bureau of Meteorology (BOM) long-term average climate data for the closest meteorological station (Bunbury, approximately 12 km north of the property) is shown in Figure 3. The average annual rainfall is 730.4 mm, mean minimum temperatures between 7.3°C and 15.9°C, and mean maximum temperatures between 17.3°C and 30°C (BOM 2023).

Long-term wind roses for Bunbury (BOM 2023) indicate prevailing winds comprise morning easterlies and afternoon westerlies (Appendix 1).

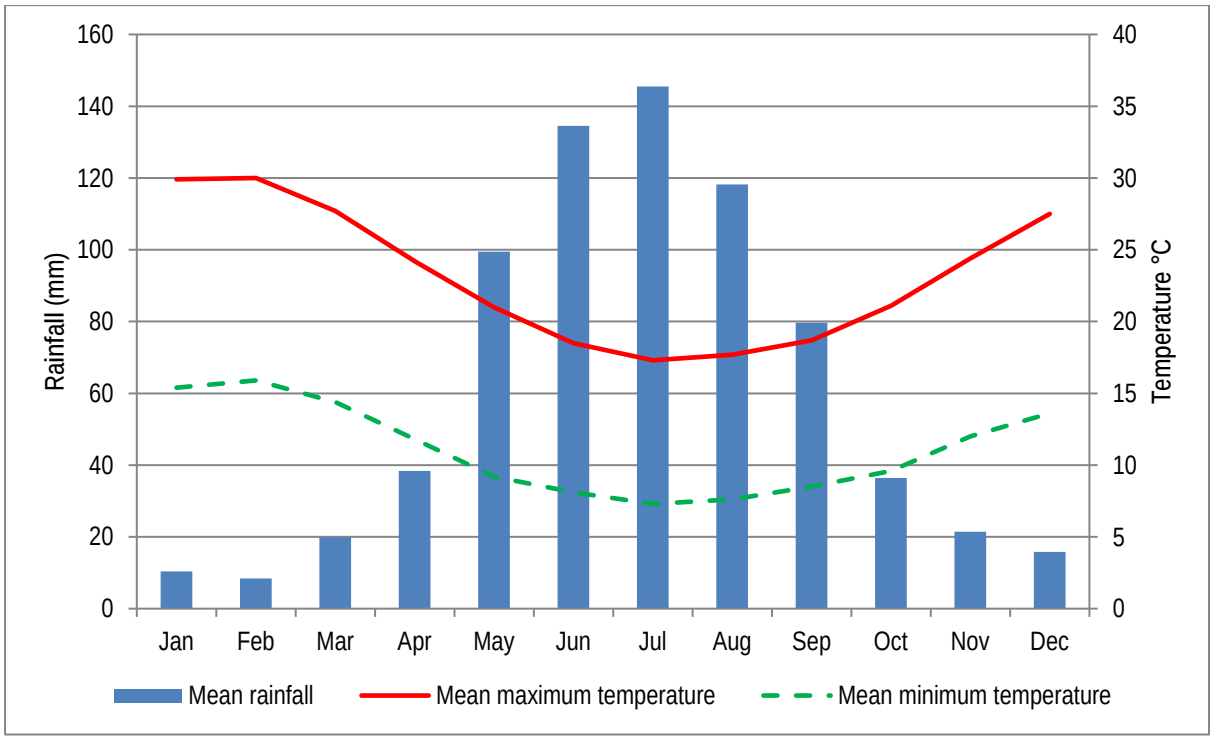

Figure 3: Long-term Rainfall and Temperature Data (1995–2023) for Bunbury Meteorological Station 9965 (BOM 2023)

2.2 Land Use

Lot 74 is located approximately 12 km south of Bunbury in the Shire of Capel (Figure 1). The property is zoned Rural by the Shire of Capel *Town Planning Scheme No. 8* (2023) and in the *Greater Bunbury Region Scheme* (2014). Land to the north of Lot 74 is zoned rural or rural residential while the land to the south, west, and east is zoned rural. The land use of Lot 74 is exclusively sand extraction that is followed by rehabilitation to native vegetation.

2.3 Landform and Soils

Local topography is dominated by Gelorup Hill and the associated ridgeline running along the western boundary of Lot 74, as illustrated in Figure 4. The highest point on Lot 74 is Gelorup Hill in the northwest corner at 58 m Australian Height Datum (AHD). The lowest point is at 16 mAHD along the eastern property boundary.

Lot 74 is located at the interface of Spearwood and Pinjarra soil systems, with the Bassendean soil system also intersecting a small area in the northeast corner (DPIRD-064). The extraction area falls mostly within Spearwood S1b phase, which is described as dune ridges with deep siliceous yellow brown sands or pale sands with yellow-brown subsoil and slopes up to 15%. The eastern side of the property is mapped as Pinjarra P1a phase, which is described as flat to very gently undulating plain with deep acidic mottled yellow duplex soils, shallow pale sand to sandy loam over clay, imperfect to poorly drained and generally not susceptible to salinity (DPIRD-027).

2.4 VEGETATION

The proposed extraction area has been largely cleared with revegetation under way as shown in Figure 4. Remnant native vegetation is retained outside the extraction area on the western, eastern and southern sides. This vegetation comprises mostly open woodland of *Eucalyptus marginata* and *Corymbia calophylla* over open low woodland including *Xylomelum occidentale*, *Agonis flexuosa*, and *Banksia* species (Cranfield 1999 and 2000, MBS Environmental 2014a and 2014b). Remnant native vegetation is also present on all adjacent properties.

2.5 SENSITIVE RECEPTORS

Lot 74 and the surrounding properties are zoned rural and rural residential (Shire of Capel 2023) with a mix of residential dwellings, agriculture, extractive industry, and remnant native vegetation.

The primary sensitive receptors in the area are residential dwellings. The closest receptor is a residential dwelling to the northwest on Lot 74, located 253 m from the proposed EIL area.

Sensitive receptors are summarised in Table 1 and shown in Figure 4. It is noted that there is another active sand extraction area on adjacent Lot 679 and Lot 677 as shown in Figure 4.

Table 1: Closest Sensitive Receptors to Proposed Extractive Operations

Property Details	Distance and Direction from Operations	Type of Receptor
Lot 31 (Plan 39524)	253 m northwest	Residential dwelling
Lot 11 (Plan 20508)	300 m east	Residential dwelling
Lot 100 (Diagram 92124)	320 m east	Residential dwelling
Lot 32 (Plan 18827)	337 m northwest	Residential dwelling
Lot 30 (Plan 39524)	372 m north	Residential dwelling
Lot 33 (Plan 18827)	397 m northwest	Residential dwelling
Lot 34 (Plan 18827)	498 m northwest	Residential dwelling

371,700 372,600 373,500

6,300,000 6,299,100 6,298,200 6,297,300

N

27 28 30 31 32 33 34 167 679 1 677 131 187 186 11 12 100

498m 337m 397m 253m 372m 300m 320m

Legend

- Lot 74 Boundary
- Extraction Area
- 1 km Buffer
- 500 m Buffer
- Residences
- Contours (2m)

371,700 372,600 373,500

Scale: 1: 10,000
Original Size: A3

Grid: GDA94 / MGA zone 50 (EPSG:28350)

0 250 500 m

McDougall Quarries
Lot 74 Calinup Road, Gelorup

Figure 4

Local Topography and Closest Sensitive Receptors

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MBS ENVIRONMENTAL

\\mbssvr\working\McDougall Quarries\Calinup Road\Management Plans\Dust - EIL\2023\GIS\MQ_Calinup Rd Dust Management Plan_2023.qgz 17/08/2023 F4 Topo and Closest Sensitive Receptors

3. POTENTIAL SOURCES OF DUST

The proposed project layout is shown in Figure 2. Potential sources of dust associated with the sand extraction operations include:

- Vegetation clearing, topsoil stripping, and stockpiling activities.
- Sand extraction, stockpiling, and loading activities.
- Wind borne dust from exposed surfaces, including cleared land, topsoil and resource stockpiles, and tracks.
- Vehicle movements on internal unsealed tracks.
- Loading of haulage trucks.
- Poorly contained truck loads.
- Rehabilitation works, including final contouring, ripping, and spreading of topsoil and other materials.

4. SITE RISK ASSESSMENT

Dust potentially generated as part of the sand extraction operations is expected to be free of contaminants and pollutants. The adverse effects of dust generation from the site would typically be 'nuisance dust'.

A risk assessment was prepared based on DEC's *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC 2011). The risk assessment for the proposed extractive operations is provided in Appendix 2. It calculates the risk of dust impacts and the need for management controls based on the nature of the site and the proposed operations as well as the proximity of sensitive receptors and prevailing winds. Prevailing summer winds are morning easterlies and afternoon westerlies and these have been taken into consideration in the risk assessment.

A site classification score of 325 was calculated for the on-site works, placing this development in the 'Low Risk' category (between 200 and 399 points). Based on the Low Risk classification, the following are typically required (DEC 2011):

- A contingency plan detailing activities to be undertaken should dust impacts occur.
- Monitoring requirements.

These requirements are addressed in the Section 5.

The main sensitive receptor is the closest residential dwelling, which is located 253 m northwest of the extraction area. The residence is well-screened by vegetation and is not downwind of the site under prevailing summer afternoon winds that have the most potential to generate dust (Appendix 1). The other nearby residences are located further away from the extractive operations and are also screened by vegetation. Therefore, dust impacts to these residences are not likely to be significant with dust management actions in place (see Section 5). It is noted that no dust complaints have been received as part of the current operations.

5. Dust Management Actions

5.1 Dust Prevention

The Site operator will implement the following measures to prevent dust generation from site activities:

- Vegetation clearing and topsoil removal will only be undertaken on days of conducive wind strength and conditions to ensure windblown dust is minimised.
- Vegetation clearing and ground disturbance will be gradual in nature and proceed in stages (Figure 2).
- Revegetation to native vegetation will also be progressive in nature and proceed in stages, closely following completion of sand extraction (Figure 2).
- Topsoil stockpiles will be no greater than 2 m in height and other stockpiles will not exceed 4 m in height.
- A vehicle speed limit of 20 km/h will be implemented across the Site.
- A water cart with a capacity greater than 10,000 L will be available when required and will undertake preventative watering of access tracks, working areas, and stockpiles during dry periods.
- Trucks leaving the site will be required to have their load covered and tailgates and draw-bars clear of dust producing material prior to entering Calinup Road. Appropriate signage will be erected at the site exit advising truck drivers to cover loads and clean their vehicle as required prior to entering public roads.

5.2 Dust Monitoring and Mitigation

The Site operator will implement the following measures to monitor and mitigate dust generation from site activities:

- Visual monitoring of dust generation from the operations will be undertaken on an ongoing basis.
- Should excessive dust generation be observed onsite and there is a risk of dust being blown off site, additional watering of dust sources with the water cart will be organised. Alternative dust controls, such as chemical dust suppressants, may also be considered for more persistent sources of dust.
- When weather conditions negate the effectiveness of dust prevention and mitigation measures, and dust continues to be blown off site, the dust generating activities will cease until conditions improve and compliance with this DMP can be achieved.

5.3 Dust Complaints

The dust complaints process is outlined as follows:

- A sign will be erected at the entrance to the extraction site to advise the public on the appropriate contact in the event of a complaint.
- In the event of receiving a complaint, the EIL licensee will complete a Dust Complaint Form (Appendix 3), investigate, and resolve complaint within four hours as far as practicable.
- A copy of the completed Dust Complaint Form will be forwarded to the Shire of Capel for their records.
- If required, a review of the DMP will be undertaken to refine dust prevention, monitoring, and mitigation measures.

6. ROLES AND RESPONSIBILITIES

Roles and responsibilities with respect to dust management are outlined in Table 2.

Table 2: Roles and Responsibilities

Role	Responsibilities
EIL Licensee	• Will have overall responsibility for the dust management of the operations. • Will provide information for site operators and truck drivers on dust management objectives, and dust management measures to be undertaken on site (prevention, monitoring, and mitigation). • Will be responsible for resolving any persistent dust management issues. • Will be responsible for administering the dust complaints process.
All personnel	• Will be familiar with potential sources of dust associated with own role and how to minimise dust generation. • Will implement the dust prevention, monitoring and mitigation measures as described in this plan and as advised by the EIL Licensee. • Will be responsible for reporting any persistent dust management issues to the EIL Licensee.

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APPENDICES

APPENDIX 1: WIND ROSES

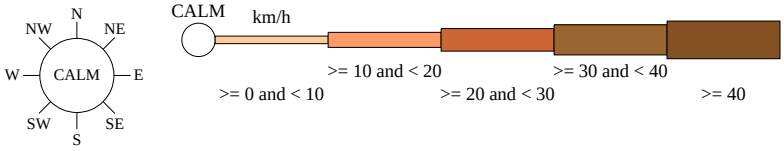
Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 10 Aug 2022)

Custom times selected, refer to attached note for details

BUNBURY

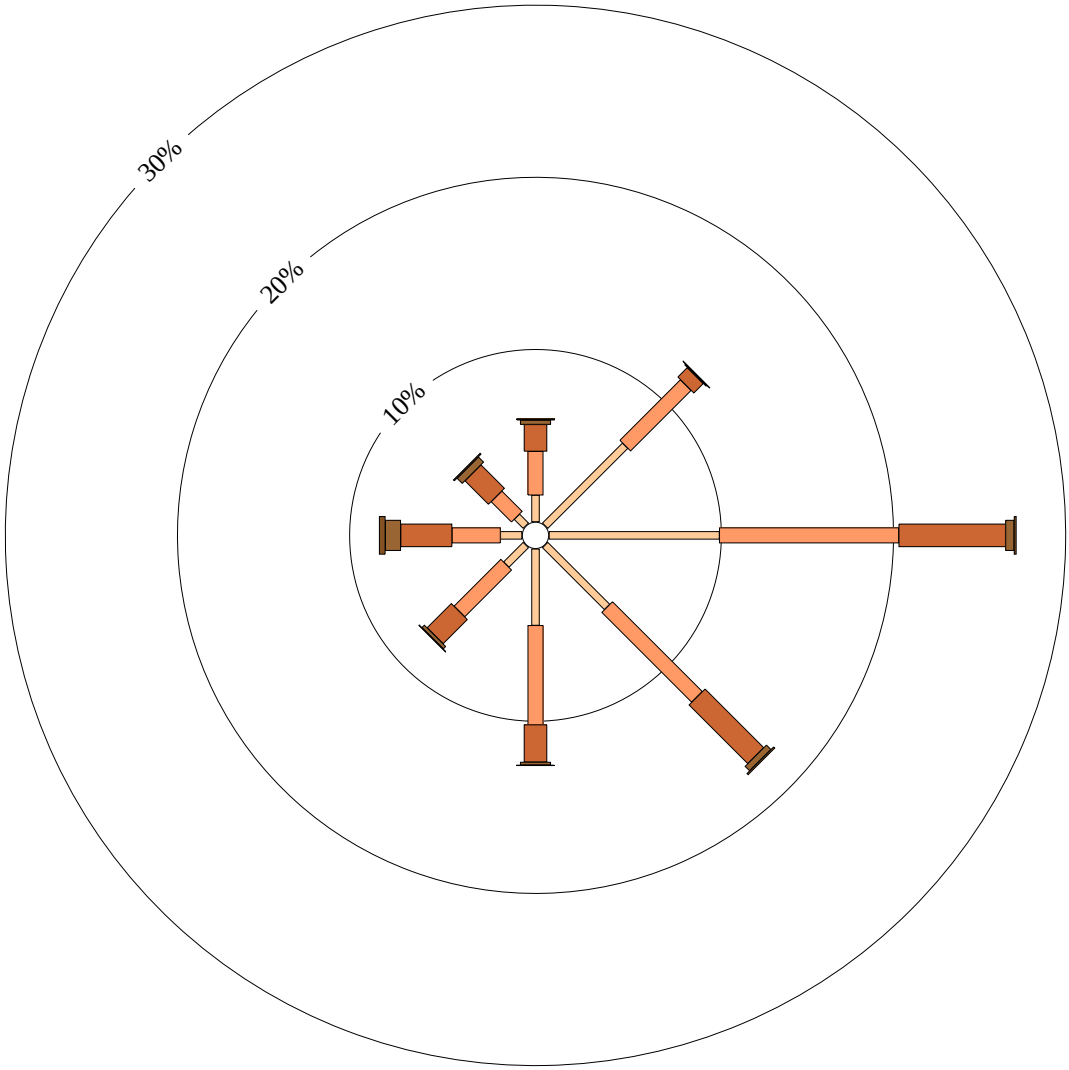
Site No: 009965 • Opened Nov 1995 • Still Open • Latitude: -33.3567° • Longitude: 115.6447° • Elevation 5.m

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



9 am
9648 Total Observations

Calm 4%



Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 10 Aug 2022)

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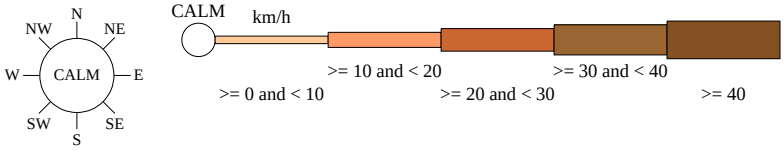
BUNBURY

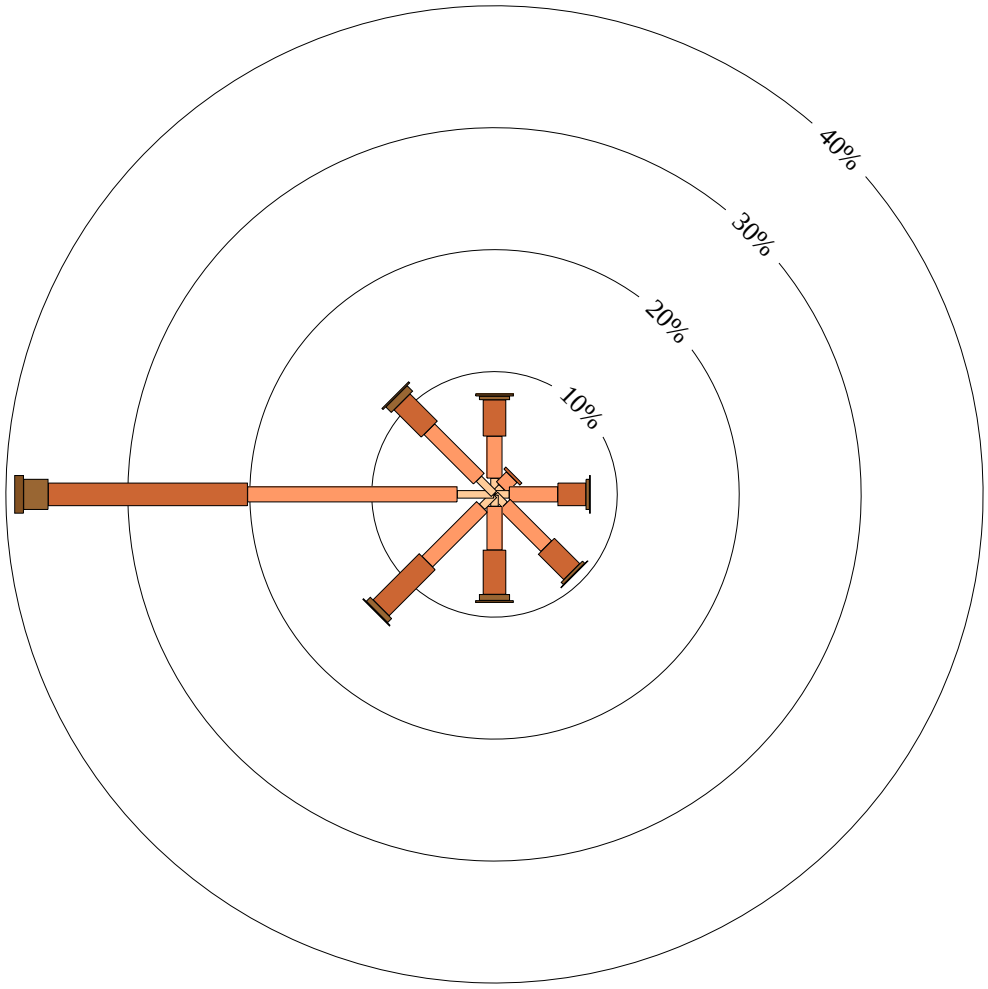
Site No: 009965 • Opened Nov 1995 • Still Open • Latitude: -33.3567° • Longitude: 115.6447° • Elevation 5.m

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



3 pm
9627 Total Observations

Calm *



Appendix 2: Risk Assessment

Site Risk Assessment/Classification for Activities Generating Uncontaminated Dust

Part A: Nature of site

Item	Score Options				Allocated Score
1. Nuisance potential of soil, when disturbed	Very low……1	Low……2	Medium ……4	High……6	4
2. Topography and protection provided by undisturbed vegetation	Sheltered and screened ...1	Medium screening ..6	Little screening ……12	Exposed and wind prone……18	6
3. Area of site disturbed by the works	Less than 1 ha……..1	Between 1-5 ha 3	Between 5-10 ha 6	More than 10 ha…….9	6
4. Type of work being done	Roads or shallow trenches .1	Roads, drains, and medium depth sewers 3	Roads, drains, sewers and partial earthworks .6	Bulk earthworks and deep trenches . 9	9
				TOTAL score for Part A	25

Part B: Proximity of site to other land uses

Item	Score Options				Allocated Score
1. Distance of other land uses from site	More than 1 km……1	Between 1 km and 500 ….6	Between 100 m and 500 m 12	Less than 100 m…….18	12
2. Effect of prevailing wind direction (at time of construction) on other land uses	Not affected……..1	Isolated land uses affected by one wind direction……6	Dense land uses affected by one wind direction……9	Dense/sensitive land uses highly affected by prevailing winds ..12	1
				TOTAL score for Part B	13

Site Classification Score (A x B) = 325

APPENDIX 3: DUST COMPLAINT FORM

LOT 74 Calinup Road, Gelorup
DUST COMPLAINT FORM

Complaint Date:

Complaint Time:

Received by:

Complainant's Details:

Name:

Address:

Tel:

Complaint Details:

Actions taken:

Actions recorded by:

Date:

Copy to Shire of Capel ☐ (tick)

Appendix H – Rehabilitation Implementation Plan

tranen
revegetation southwest

Sandpit - Lot 74 Calinup Road, Gelorup
Revegetation Implementation Plan
McDougall Quarries
P979A-01-06
August 2023

PERTH

11 Vincent Street
Bayswater WA 6053
p 9284 1399

SOUTHWEST

20 Possum Place
Vasse WA 6280
p 9754 2643

Disclaimer

This report has been prepared by Tranen Revegetation Southwest solely for the benefit and use of the client.

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Document Control				
Rev	**Date**	**Description**	**Author**	**Review**
0	06.06.22	Initial Draft Report	IM	MB
1	28.06.22	MBS and McDougall Quarries comments	MB	AJ
2	20/7/22	SAT comments	MB	AJ
3	5/9/22	Additional SAT comments	MB	AJ
4	14/9/22	Minor SAT comments	MB	MB
5	12/4/23	Change to extraction area	MB	MB
6	4/8/23	Minor Client edits	MB	MB

Table of Contents

1 INTRODUCTION

Tranen Revegetation Southwest (Tranen) were commissioned by MBS Environmental (MBS) on behalf of McDougall Quarries Pty Ltd to prepare a Revegetation Implementation Plan for a sand pit located on Lot 74 Calinup Road, Gelorup within the Shire of Capel (Appendix 1 – Site Map).

Multiple revisions of an existing Rehabilitation Management Plan have been prepared for the site by MBS since 2014 to satisfy ministerial statement conditions (MS 767 and MS 969) as well as requirements from the Shire of Capel (the Shire) prior to issuing an Extractive Industry Licence (EIL). The latest approved revision (Revision 3) of the Rehabilitation Management Plan was finalised in 2016 (MBS, 2016) and was prepared for the previous operator APH Contractors Pty Ltd. The site changed ownership in 2020 with the current owners being McDougall Quarries Pty Ltd (the Proponent).

The Proponent submitted a new Development Approval (DA) to the Shire in February 2021 proposing further extraction and changes to batter angles (i.e., from 1:6 [vertical to horizontal] to 1:4) to reflect the original proposal assessed and subsequently approved by the Environmental Protection Authority (EPA) in 2014. The amended Rehabilitation Management Plan that includes the 1:4 batter slope, shall require approval by the EPA Services in addition to the DA and EIL approval. The Shire requested more detailed and specific plans for revegetation of the site to provide certainty around achieving rehabilitation objectives, as well as to guide the Shire in setting bond allocations, and this Rehabilitation Implementation Plan (RIP) was prepared for that purpose. The Shire approved the RIP Rev 3 (September 2022) in November 2022.

In 2023, the Proponent is pursuing changes to the DA area (to extract all of the MS 767 approval area) and lowering of the pit floor. This has triggered a review and revision of this RIP.

1.1 Scope and Purpose

The scope of this Revegetation Implementation Plan includes all future rehabilitation at the site based on the proposed future sand extraction works proposed in the southern portion of the lot (Section 2.2). It is not retrospective for rehabilitation already completed including rehabilitation in previously excavated areas in the northern portion of Lot 74.

This Revegetation Implementation Plan will not replace the Rehabilitation Plan prepared under MS 767 but rather the two documents will exist in parallel for the two separate approval processes (i.e. Revegetation Implementation Plan for the local government DA/EIL process and the Rehabilitation Plan for the state government environmental approval process). The Revegetation Implementation Plan is an operational document that provides an additional level of practical detail regarding the implementation of the Rehabilitation Plan.

2 BACKGROUND

2.1 Site Location and Description

Lot 74, Calinup Road is located in Gelorup in the Shire of Capel approximately 11 km south of the Bunbury CBD. Calinup Road and the site are accessible via Bussell Highway which runs north to south between Bunbury and Capel. Lot 74 covers a total area of 58.7 ha, of which 16.28 ha is located north of Calinup Road and 42.42 ha south of Calinup Road (MBS 2016).

Current land uses directly adjacent to the site include bushland and rural residential developments to the north, bushland and wetland areas to the east and south, and bushland and sand mining operations (by others) to the west. Remnant native vegetation on Lot 74 and surrounding land has historically been subject to various land-uses including logging, animal grazing, sand mining and rural residential developments. This is further discussed in Section 3.3.

There are no surface water features or wetlands within the site however there are numerous mapped wetlands within proximity to the site. The closest wetland features include a group of 'multiple use wetlands' to the east of the site, the closest of which is mapped directly adjacent to the eastern boundary of Lot 74. The closest significant wetlands are 'conservation category' wetlands (names unknown) located approximately 200 m to the east of the south-eastern portion of Lot 74 and another approximately 700 m to the west of Lot 74 (DBCA 2022a). The nearest Environmentally Sensitive Area (ESA) is located approximately 700 m to the west of the site and is associated with the conservation category wetland previously mentioned (DWER 2022a).

As part of Ministerial Statement MS 767 a conservation covenant was established within the eastern and southern parts of Lot 74, directly abutting the current southern mining area. No other conservation areas or reserves are located within or immediately adjacent to the site (DBCA 2022b). The closest conservation reserve is the Tuart Forest National Park located approximately 5.5 km south-west of the site. An EPA Redbook Recommended reserve is located approximately 1 km to the west of the site on the western side of Bussell Highway (DBCA 2022c).

2.2 Sand Extraction Works

A works and excavations plan has been developed for Lot 74 and is shown in Appendix 3. The area south of Calinup Road has been split into 18 blocks as per MS 767; however, the previously approved EIL area excluded block 1 and portions of blocks 2-3. These excluded blocks have now been proposed to be included in the EIL area.

The staging of rehabilitation shall progressively follow sand extraction stages which are proposed to start at block 18 and proceed north to block 1. Each block shall be rehabilitated progressively as excavation activities are completed allowing the next stage of extraction to occur. How quickly the extraction shall occur through each block is not able to be accurately determined as this is based on consumer demand for the sand resource and may take several years.

Rehabilitation in each block shall be similar in approach in terms of landform creation, soil preparation and stabilisation, and tubestock and seed. The only difference shall be in the

quantities of materials (i.e. mulch, tubestock and seed). Implementation strategies and methodologies are detailed further down in this plan (Sections 5 to 8).

2.3 Objectives of Rehabilitation

Objectives for rehabilitation for the southern portion of Lot 74 align with relevant conditions within ministerial statements including:

a) The area of rehabilitation following decommissioning shall be not less than the area cleared for the implementation of the proposal.
b) The vegetation shall have comparable plant species composition to that which occurred prior to clearing and excavation.
c) The vegetation shall be self-sustaining and composed of plant species native to the local area.
d) The vegetation shall have comparable densities and abundances of plant species to those which occurred prior to clearing and excavation.

Species lists (specified in Appendix 5) and management zones (described in Sections 5.2 to 5.4) have been designed to fulfil the requirements of the above conditions as well as maximise the success of revegetation in the modified post extraction environment.

Remnant vegetation on Lot 74 belongs to one vegetation unit, the Karrakatta Vegetation and Landform Complex (MBS 2016) and the upper batters are considered suitable to re-establish this type of upland woodland community. Towards the base of the batters and on the pit base the topography and soil profile has been heavily modified, hence it is unlikely to support the original vegetation communities that existed prior to excavation works. The groundwater level is closer to the surface and therefore alternate vegetation communities must be considered for these areas. As specified in sections 5.2 to 5.4, the management zones have therefore been designed to transition from an upland woodland community to a transitional community that sits between an upland and dampland community.

Completion criteria (Section 8.3) have been developed based on the above objectives, pre-clearance survey data as well as Tranen's experience on similar projects. These completion criteria set out the overall outcomes of revegetation works (i.e. topsoil, weed cover, density and diversity).

3 ENVIRONMENTAL CONTEXT

3.1 Landform and soils

As described by MBS (2016) the great majority of the extraction areas and therefore rehabilitation areas fall within the Spearwood Dune landform unit which is comprised of gently undulating dunes, ridges and plains. Along the eastern boundary, the extraction area intersects the Pinjarra system comprising poorly drained coastal plain with variable alluvial and aeolian soils. Natural slopes on Lot 74 have been shown to vary between approximately 1:6 to 1:20 (vertical:horizontal). Previous rehabilitation undertaken within current extraction areas developed embankments on a 1:6 slope (MBS 2016).

The soils within the rehabilitation areas comprise a mixture of aeolian sands known collectively as the Karrakatta Sand Unit, which is a subunit of the Spearwood Dune System. Karrakatta sands are described as being free draining yellow or grey sands occurring with varying depths over limestone. MBS (2016) describes a soil profile consisting of three distinct layers including a thick yellow sand layer (up to 40 m thick), overlain by light brown, grey sand (approximately 1.5 m thick) and a thin topsoil layer (approximately 100 mm).

During recent site visits by Tranen there were several topsoil stockpiles noted within the site that appeared to have originated from previous clearing by previous owners. These stockpiles are over 1 year old and were shown to be dominated by various weed species meaning the environmental benefit would likely be low as any native recruitment would be minimal and weed germination high.

Plate 1: Example topsoil stockpile dominated by weeds.

3.2 Hydrology

There are no surface water features or wetlands within the site however there are wetlands directly adjacent to the south-eastern portion of Lot 74. There are also numerous other wetlands in proximity to Lot 74, some of which are conservation significant (previously described in Section 2.1).

Groundwater monitoring and modelling for Lot 74 was undertaken by JDA in 2021 and 2022 (JDA 2022). This included data from on-site monitoring bores as well as data from DWER long-term monitoring bores. Based on JDA (2022), maximum groundwater levels within the extraction/revegetation area are expected to vary from approximately 13-14 mAHD in the east to approximately 8mAHD in the northwest as show in Appendix 4 (Figure 10 from JDA 2022 report).

Previous approvals assumed maximum groundwater level was nearly 18 mAHD and set pit floor level at 20 mAHD to allow for 2 m separation distance from maximum groundwater level. However, based on JDA (2022), the maximum groundwater level is expected to be much lower than previously estimated. As a result, the final contour plan has been revised to lower the pit floor so that it takes into consideration JDA (2022) while retaining at least 2 m separation distance from the maximum groundwater level.

3.3 Pre-existing Vegetation Assessment

Between 1999 and 2014 multiple botanical surveys were undertaken on Lot 74. The detailed scope and findings of these studies are presented in MBS (2016) however the key findings relevant to pre-existing vegetation are summarised below:

Vegetation communities

- Remnant vegetation on Lot 74 belongs to one vegetation unit, the Karrakatta Vegetation and Landform Complex. This consists predominantly of open forests of *Eucalyptus gomphocephala – Corymbia calophylla* and woodlands of *E. marginata – Banksia* species.
- Surveys undertaken support the description of the entire extraction area as one vegetation unit, being a low forest of *Agonis flexuosa*, *Eucalyptus marginata*, *Corymbia calophylla* and *Banksia* species with occasional *Xylomelum occidentale* over scrub or thicket of *Kunzea ericifolia* over very sparse dwarf scrub of mainly *Hibbertia hypericoides* and *Macrozamia riedlei* over grasses and weed species.

Flora

- In total the surveys on Lot 74 have recorded 72 native species and 10 weed species.
- No Threatened or Priority Flora have previously been recorded

Density

- Upper storey has been found to have a combined average density of 631 plants per hectare and middle storey 605 plants per hectare. Combined average density could not be determined for the understorey due to the lack of density data for *H. hypericoides* (due to the growth habit of the species, it was not possible to accurately count individual plants).

Condition

- Native understorey densities on the site were very low. As a result of previous disturbance, much of the ground was bare or covered by weed species, with native

understorey limited to lone individuals or small clusters. In a May 2014 study, five of the 18 understorey quadrats (2 x 2 m) recorded no native species and 11 out of the 18 recorded native species cover as <1%.

- Remnant vegetation has been subject to selective logging, burning and grazing. Native understorey has been completely removed and replaced by introduced species, mainly grasses and other small weeds. Remnant vegetation condition was assessed as degraded to good utilising vegetation condition scale by Keighery (1994).

Weeds

- In total 10 weed species have been recorded. Of these, five are annual species, namely *Briza maxima*, *Ehrharta longiflora*, *Lysimachia arvensis* (previously *Anagallis arvensis*), *Hypochaeris glabra* (sometimes short-lived perennial) and *Vulpia myuros*, one is a shrub species, *Phytolacca octandra*, and four are herb species, *Lotus uliginosus*, *Disa bracteata* (previously *Monadenia bracteata*), *Arctotheca calendula* and *Ursinia anthemoides*.
- It is anticipated that the south-east boundary of Lot 74, which is adjacent to farmland, may influence an increase in the number of annual weed species. No Declared Pest plant species have been recorded at Lot 74.
- None of the recorded 10 weed species are limited to a particular part of Lot 74, but rather all are common throughout the property. Weed cover across the property is relatively uniform, with no areas being weed free. Weeds have to a large degree replaced native understorey.

Degradation is evident within remnant vegetation, particularly in the understory, and has occurred over a long period of time (since at least the late 70's) as a result of logging, animal grazing and sand mining. During a recent site visit by Tranen, there were no visible signs of recent or historic fire which may have contributed to a lack of understory recruitment from the topsoil and suffocation by weeds. It is therefore difficult to determine what the 'climax community' would have looked like, if there had been no, or very little historic disturbance.

3.4 Pathogens

In terms of dieback, the Lot 74 has been largely classified as Excluded Area, meaning the presence of dieback cannot be determined (MBS, 2016). A small area (approximately 1 ha) on top of Gelorup Hill was mapped as uninfested, the majority of it outside the extraction area. For the purposes of the sand extraction and revegetation, the pit will be considered potentially dieback infested. The areas on Lot 74 outside the extraction area will be considered potentially dieback free (even though this is unlikely) and will be 'no-go' zones for the extractive operations to reduce potential introduction and spread of dieback. There are no specific restrictions in place that shall affect rehabilitation efforts within the site (i.e., the movement of topsoil from the clearing areas to the rehabilitation areas) however a separate Weed and Dieback Management Plan has been prepared to Shire of Capel requirements and shall be followed by all personnel, machinery and vehicles entering the site to ensure no introduction of dieback infestations or other pathogens occurs during rehabilitation activities.

3.5 Site Stability

As described above, Lot 74 is a free draining sand and does not support any natural surface drainage features. The highly permeable nature of the deep sand profile limits surface water flow to low levels and as such water erosion is not anticipated to be a significant issue. This was further observed during Tranen's site visit where no obvious signs of water erosion were

observed. Re-contouring of the site to a 1:4 slope shall increase the probability of surface water erosion and therefore measures have been proposed within this plan to mitigate this potential.

Wind erosion may occur, particularly at the height of summer due to drier soil conditions and during earth moving activity. During summer, strong winds are generally experienced either from west to south westerly direction (sea breeze) or from the east. Lot 74 on the eastern flank of the Gelorup ridge is sheltered from the west to south westerly winds but is more open to the eastern winds (MBS 2016). Tranen's proposed approaches to minimising erosion are further described in subsequent sections.

3.6 Herbivores

Herbivores have the potential to severely compromise rehabilitation success by grazing on native seedlings. During Tranen's site inspection, Kangaroos within and surrounding the site were observed as being abundant and there were some minor signs of rabbit activity identified on the boundary of the sand pit. In addition, given previous disturbance at the site and surrounding properties, the likelihood of access by sheep, cows and horses may also compromise rehabilitation success unless proper mitigation measures are applied. Tranen proposes fencing to mitigate the impact from herbivores and details are provided in subsequent sections of this plan.

3.7 Climate

The regional climate is described as warm Mediterranean, with winter rainfall of 600 to 1000 mm and five to six dry months per year (Beard 1990). The closest meteorological station (ID 009965) is located in Bunbury, approximately 12 km north of the Project, and has been operating since 1995. Mean annual rainfall is 728.6 mm and mean maximum temperature is 17.3ºC in July and 30.0ºC in February (BoM, 2022)

Prevailing summer winds are light south-easterlies in the early hours of the morning and at night with stronger south-westerlies present during the day. The winter wind pattern is dominated by the eastward progression of rain bearing low pressure systems and associated cold fronts with winds in a south-westerly to north-westerly arc (BoM, 2022).

Evaporation rates for the project site are estimated on the basis of data collected at Medina Research Station, which is located close to the coast and has a similar rainfall to Bunbury. On average, evaporation is estimated to exceed rainfall between September and April (MBS 2016).

3.7.1 Climate Change

Climate change modelling and future projections for NRM regions within Australia have been undertaken by CSIRO and the Bureau of Meteorology through the 2015 initiative *Climate Change in Australia* (CSIRO & BoM 2015). The subject site falls within the Southern and South-Western Flatlands West (SSWFW) sub-cluster which comprises NRM regions in the southwest of WA. Key conclusions from the work include high to very high confidence predictions that the following trends shall occur in the SSWFW subcluster:

- Average temperatures shall continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- A continuation of the trend of decreasing winter rainfall is projected with high confidence. Spring rainfall decreases are also projected with high confidence. Changes in other seasons are unclear, although downscaling suggests a continuation of the observed autumn declines.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- Mean sea level shall continue to rise and height of extreme sea-level events shall also increase (very high confidence).
- A harsher fire-weather climate in the future (high confidence).
- On annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall. However, SSWFW is one region of the world with very high model consensus on forced drying during the observed period and in the near-term.

3.7.2 Climate Change Consequences for Revegetation

Little is known about the ability of native flora species in the southwest to adapt to a changing climate especially with specific reference to the targeted species of this revegetation program, and which also occur in surrounding remnant vegetation. Some work has been undertaken on WA Eucalyptus species and their capacity to cope with a changing climate (DEC 2013). This

work (which was limited to three Eucalyptus species) showed evidence that species which are widespread, having evolved under highly variable environments, retain high potential to adjust to environmental change, through either phenotypic plasticity or locally adapted sub-populations, or both (DEC 2013).

As shown in Table 1 the species targeted have geographic ranges which span across large portions of Western Australia across multiple IBRA regions which by their very nature represent geographically distinct bioregions based on climate, geology, landform, native vegetation and species information. Based on the wide geographic spread of the target species and the findings of DEC (2013), it could be speculated that these species have a strong propensity to adjust to changes in climate, however it is acknowledged that this has not been verified in the literature for the target species (Appendix 5). It is further considered that if the potential of these species to adapt to climate change was found to be lacking then the implications would extend far beyond the subject revegetation works.

Table 1: Targeted revegetation species and their geographic range

Species	Common Name	IBRA regions										
		Carnarvon	Coolgardie	Avon Wheatbelt	Esperance Plains	Geraldton Sandplains	Great Victorian Desert	Jarrah Forrest	Mallee	Swan Coastal Plain	Warren	Yalgoo
Acacia pulchella	Prickly Moses			✓	✓	✓		✓	✓	✓	✓	✓
Adenanthos meisneri								✓		✓	✓	
Agonis flexuosa	Peppermint				✓	✓		✓		✓	✓	
Allocasuarina humilis	Dwarf Sheoak			✓	✓	✓		✓	✓	✓	✓	
Banksia attenuata	Slender Banksia			✓	✓	✓		✓	✓	✓	✓	
Banksia grandis	Bull Banksia			✓	✓	✓		✓	✓	✓	✓	
Bossiaea eriocarpa	Common Brown Pea			✓	✓	✓		✓		✓		
Conostylis aculeata	Prickly Conostylis			✓	✓	✓		✓	✓	✓	✓	✓
Corymbia calophylla	Marri			✓	✓	✓		✓		✓	✓	
Daviesia divaricata	Marno			✓		✓		✓		✓	✓	
Daviesia physodes						✓		✓		✓		
Dianella revoluta	Blueberry Lily	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Eremaea pauciflora			✓	✓	✓	✓		✓	✓	✓		
Eucalyptus marginata	Jarrah			✓	✓	✓		✓	✓	✓	✓	
Gompholobium tomentosum	Hairy yellow pea			✓	✓	✓		✓	✓	✓	✓	✓
Hakea lissocarpha	Honey Bush			✓	✓	✓		✓	✓	✓	✓	
Hardenbergia comptoniana	Native Wisteria				✓	✓		✓		✓	✓	
Hibbertia cuneiformis	Cutleaf Hibbertia				✓			✓		✓	✓	
Hibbertia hypericoides	Yellow Buttercups			✓	✓	✓		✓	✓	✓	✓	
Hibbertia racemosa	Stalked Guinea Flower	✓			✓	✓		✓	✓	✓	✓	✓
Hypocalymma angustifolium	Whyte mrytle			✓	✓	✓		✓	✓	✓	✓	
Jacksonia furcellata	Grey stinkwood			✓	✓	✓		✓	✓	✓	✓	
Kennedia prostrata			✓	✓	✓	✓		✓	✓	✓	✓	✓
Kunzea ericifolia	Spearwood				✓			✓		✓	✓	
Macrozamia riedlei	Zamia			✓	✓			✓	✓	✓	✓	
Melaleuca thymoides				✓	✓			✓	✓	✓	✓	
Patersonia occidentalis	Purple flag		✓	✓	✓	✓		✓	✓	✓	✓	✓
Phyllanthus calycinus	False Boronia			✓	✓	✓		✓	✓	✓	✓	✓
Xanthorrhoea brunonis	Grasstree			✓	✓	✓		✓	✓	✓	✓	✓
Xylomelum occidentale	Woody Pear							✓		✓	✓	

3.8 Existing and Future Uses

Current land uses on Lot 74 include sand mining activities, rehabilitated land and remnant bushland. As part of Ministerial Statement MS 767 a conservation covenant exists within the eastern and southern parts of Lot 74. Surrounding properties include a mixture rural residential (north), sand mining (west), farmland (east) and remnant bushland (north, east, south and west). There are several mapped wetlands in proximity to Lot 74, the majority of which are categorised as 'multiple use wetlands' which are wetlands described as having few remaining important attributes and functions. Two conservation wetland areas are however close by including one approximately 200 m to the east of the Lot 74 boundary and another approximately 700 m to the west of Lot 74 (DBCA 2022a). Although the "conservation category wetland" category includes descriptions of wetlands which support a high level of attributes and functions, it is noted that both wetlands are located in highly disturbed environments on farmland which are likely contributing to the weeds on Lot 74.

Proposed future land uses shall include further sand mining with progressive rehabilitation activities, and continuation of conservation covenant in place. Following the cessation of sand mining, rehabilitation and ongoing rehabilitation maintenance activities shall occur until completion criteria are reached. Rehabilitation activities on Lot 74 shall establish vegetation communities that align with the objectives specified in Section 2.3. Weeds on Lot 74 shall require maintenance especially in the early years to establish native species however given the condition of surrounding remnant vegetation and weed load from adjacent farmland (including from conservation wetland areas) there shall always likely be a strong presence of weeds.

4 RISK ASSESSMENT

A risk assessment has been undertaken in order to identify all known risks to the revegetation works to reduce uncertainty around delivering the objectives described in Section 2.3. The risk assessment has been based on templates within the *Biodiversity Conservation Trust – Revegetation Plan Template*, developed by the NSW Government (2020). Where appropriate, terminology has been altered within the likelihood of occurrence, consequence and evaluation criteria to ensure relevance to the WA context and the project context.

The risk assessment has considered major risks in each phase of the revegetation works being:

- Pre-installation (planning and material sourcing)
- Installation (landform, site preparation, revegetation, weed/herbivore management)
- Post installation (revegetation progress, site maintenance, access and weather)

Risks were assessed prior to mitigation measures with several risks in the 'High' category meaning an undesirable level of risk to rehabilitation objectives. Following mitigation measures proposed within this plan, all risks were able to be downgraded to the 'Medium' or 'Low' categories meaning risks can be managed to achieve rehabilitation objectives with proposed controls.

The full risk assessment is located in Appendix 6 and within Table 7.

5 IMPLEMENTATION STRATEGY

Implementation shall occur progressively, with each stage being rehabilitated upon completion of sand extraction (refer to Section 2.2 and Appendix 3). Each stage shall be similar in approach in terms of landform creation, soil preparation and stabilisation, and tubestock and seed. The only difference shall be in the quantities of materials (i.e. mulch, tubestock and seed) for each stage. Appendix 5 details the recommended species and their corresponding quantities for the revegetation activities proposed in each management zone.

Landform creation and stabilisation, weed management and kangaroo control shall be the greatest factors in determining the success of the rehabilitation program. Initially, a 1500 mm high kangaroo fence shall be installed around the perimeter of the site to protect future predatory grazing on the rehabilitation works. Upon the completion of a stage, the batters shall be re-contoured to a 1:4 slope that shall create a stable landform profile that blends in with the surrounding environment and topography. A concentrated weed control program can then be implemented to target problematic weeds in each stage. Without weed and herbivory competition and a stable landform, the native vegetation shall have a greater chance of returning to a locally represented natural ecosystem long-term.

All batters shall be reprofiled to achieve a 1:4 slope. The batters shall either have site topsoil or a constructed topsoil utilising subsurface soils and site and/or imported mulch, spread across the face of the batters. Large woody debris from onsite may be placed over the upper face of the batters to provide additional stabilisation as well as habitat. No woody debris shall be imported to site. Mulch shall be installed, and then vertically track-rolled utilising tracked earthmoving equipment (i.e. dozer or posi-track) to assist in soil stabilisation and create holding points for native seed to reduce wash-out of seed down the slope.

The following section provides a summary of the overarching revegetation strategy for each of the three management zones.

- Management Zone 1 – Upper Batter
  - Post -extraction landform 29m AHD to 58m AHD
  - Maximum groundwater level approximately 21m-50m below ground surface
- Management Zone 2 – Lower Batter
  - Post -extraction landform 15m AHD to 29m AHD
  - Maximum groundwater level approximately 2m-21m below ground surface
- Management Zone 3 – Pit Base
  - Post -extraction landform 11m AHD to 15m AHD
  - Maximum groundwater level approximately 2 m below ground surface

Management Zones are also shown in Appendix 7.

5.1 General

5.1.1 Signage

Signage advising the public, contractors, and employees that rehabilitation works are being progressively undertaken shall be placed on the entry gate into the active site. In addition, rehabilitation areas where there is a direct interface with access tracks and turnarounds shall be clearly delineated with a visible barrier and signage installed stating 'rehabilitation works in progress'.

5.1.2 Fencing and Site Protection

To assist in minimising the impact of kangaroo grazing on the rehabilitation works, a 1500 mm high kangaroo fence with a 1200mm wide rabbit skirt (900mm high and 300mm bent at right angles on the surface) shall be installed around the perimeter of the property along existing fire breaks to minimise any clearing. The type and condition of the fence shall need to satisfy the Fencing Local Law 2016.

An additional rabbit control baiting program may be undertaken onsite if deemed necessary based on confirmed evidence of rabbit activity.

5.1.3 Staging of Works

Rehabilitation works shall be staged over several years depending on how quickly each stage of excavation occurs. The exact timing of the completion of each stage shall vary depending on the market demand for the resource at the time. Upon completion of each stage of sand extraction, it shall be rehabilitated to ensure the batters are stabilised as soon as practicable. Based on the sand extraction schedule (Section 2.2), rehabilitation shall occur starting from Stage 18 and then continue in a northern direction to Stage 1. This is to limit any potential disturbance to the rehabilitation post-extraction, which could impact its success.

Details on the approach taken for each stage and their associated management zones can be found in Sections 5.2, 5.3 and 5.4.

5.2 Management Zone 1 – Upper Batter

The upper batter spans the majority of the EIL perimeter, except in the east where the site is at a lower elevation. This area spans from the top of the batter down towards the toe. In most staging areas, the upper batter ranges in elevation between 29 – 58 AHD. However, this shall vary as some batters may be smaller than others. Depth to maximum groundwater levels will vary as described in Section 3.2 and Section 5.

Once the 1:4 reprofiling of the batters has been completed, site topsoil or a constructed topsoil shall be spread evenly across the upper batter face. For soil stability, dust suppression, seed retention and increasing soil microbial activity, a thin layer of mulch (if not already in the topsoil) shall be spread across the area. The batter shall then be ripped to a depth of 300-500mm at 2 metre intervals along the contour to assist in breaking compaction and water infiltration. The topsoil / mulch shall then be driven over with tracked earthmoving machinery up and down the face of the batter to create imprints in the soil (track-rolled). This shall assist in soil stability

and seed retention. Large woody debris may also be placed in isolated clumps across this zone to assist in slowing water flow and providing habitat for fauna and flora. Weed control shall then be completed to target any weed germination that has occurred due to the soil disturbance.

Native seed and a cover crop of native everlastings shall be broadcast over this area at a rate of 4 kg/ha and 5 kg/ha respectively. Seedlings shall be installed at 1 plants / 20m^2.

5.3 Management Zone 2 – Lower Batter

The lower batter zone elevation is between 15 – 29 AHD. The groundwater level is closer to the surface and therefore an alternate vegetation community must be considered for this area. Depth to maximum groundwater levels will vary as described in Section 3.2 and Section 5.

From the interface with the upper batter to the toe (approx. 35 metres up the slope), the area shall be a 1:4 slope with either site topsoil and/or a constructed topsoil thinly spread across the face. Mulch (if not a constructed topsoil) shall be thinly spread across the area for soil stability and then ripped to a depth of 300-500mm at 2 metre intervals along the contour. A machine shall then be used to vertically track the batter to create micro-niches for seed entrapment. Small woody debris may also be spread across this zone for additional soil stability and habitat. Weed control shall then be completed to target any weed germination that has occurred due to the soil disturbance.

Native seed shall be broadcast at a rate of 4 kg/ha and everlastings at 5 kg/ha. Seedlings shall be installed at 1 plants / 20m^2.

5.4 Management Zone 3 – Pit Base

This zone is highly modified and would not support the original vegetation communities that existed prior to excavation works commencing. It is closer to the water table and is located at the base of a 1:4 slope and therefore the soil is likely to hold more moisture than it had previously. This zone shall be a transition area between a woodland and a dampland, consisting of species that can tolerate some higher levels of moisture in the soils. Depth to maximum groundwater levels will vary as described in Section 3.2 and Section 5.

For dust suppression, moisture retention, and to increase microbial activity in the soil, the Pit Base shall be mulched to a depth of 25mm using either site based or imported dieback and weed free mulch.

The Pit Base zone is expected to be highly compacted due to large earthmoving and heavy vehicle movements during the excavation works. The area shall be cross ripped to a depth of 500mm at 2 metre intervals to break compaction which shall assist in water infiltration and root penetration. Scarification to a depth of 50mm shall then be completed in-between the rip lines. Weed control shall occur pre and post ripping and scarification to target weed germination that is likely to occur pre and post disturbance.

Sections of this zone shall be used for access and vehicle turnarounds for the entire duration of the excavation works. These areas shall likely be rehabilitated last once all excavation works have been completed onsite. Once excavation works are completed, the limestone access track shall be removed using earthmoving machinery and taken offsite to achieve successful rehabilitation of this area. The recovered limestone may be reused elsewhere by

the client. Soil tests along the entire access track post-removal shall be undertaken to determine soil properties (ie. pH). Should the pH be lower or higher than 5 to 5.5, then additional soil amendments and an adjustment to the species mix may be required for a successful outcome. Post-testing, the area shall be ripped to a depth of 500mm at 2 metre intervals and scarified to a depth of 50mm prior to seeding.

No topsoil has been proposed for this zone due to limited topsoil resources, which support original vegetation communities not suited to this area. Native seed shall be broadcast at a rate of 2.5 kg/ha. No cover crop is required for this area given stability and seedlings shall be installed at 1 plants / 20m^2.

6 ADVANCE PLANNING AND MANAGEMENT

6.1 Vegetation Retention and Clearing

Clearing of remnant vegetation and previous rehabilitation works shall occur as part of these excavation works. All efforts shall be made, where possible, to limit the amount of native vegetation to be cleared during excavation works. Prior to any clearing works occurring, all efforts shall be made to harvest any plants, cuttings, or seed material possible that could be used in the rehabilitation of the site.

6.2 Topsoil Recovery

6.2.1 Topsoil Stockpiles (Existing)

There are several existing topsoil stockpiles onsite that originated from previous clearing undertaken by the previous owner. As these stockpiles are over a year old and are dominated by various weed species on the surface, it is likely that the environmental benefit would be low as native recruitment would be minimal and weed germination high. Where possible, these existing stockpiles shall have the top first 200mm of the topsoil removed and buried to a depth of equal to or greater than 500mm within the embankments to limit weed germination across the site. By removing this top layer, it removes a large amount of the weed seed bank present, allowing the remaining material to be deemed suitable to be used as topsoil and spread across the site. If the top 200mm of the stockpiles were used there could be a high weed burden which would have an impact on seed germination and shall likely require intensive weed management to bring it under control.

6.2.2 Topsoil Stockpiles (Future)

There shall be some clearing of existing bushland (Banksia woodland) and previously completed rehabilitation. The areas of existing bushland are degraded, with a dominant overstorey and non-existent middle and understorey structure. The lack of middle and understorey species is due to grazing pressure from kangaroo's and rabbits. There was evidence of natural recruitment during the site inspection, indicating that there is a good seed bank present in the topsoil, and therefore it shall be utilised onsite. The first 50 mm of soil shall be stripped, as it contains around 94% of the seed bank, and this shall be stripped and stockpiled separately. If possible direct transfer is the preferred option as it is the most successful for regeneration potential (direct transfer from one area to another). Should the topsoil need to be stockpiled, then the stockpile shall be up to a maximum of 2 m tall, with a flat top to maximise surface area and prevent erosion and loss of material. It is recommended that stockpile be left for no longer than 2-3 weeks, as the regeneration from topsoil when spread significantly drops if left longer than this.

Most of the topsoil to be utilised onsite shall be extracted in Stages 5, 6, 7 and 9, and shall therefore likely be used in rehabilitating Stages 10, 9, 8 and 7. This may change depending on the demand for the resource, as additional Stages may be ready for rehabilitation during this time.

6.2.3 Topsoil Construction

Constructed topsoil shall be obtained by mixing subsoil with mulch and composted material. The topsoil shall either be constructed at a third-party location or onsite, depending on the availability of space at the time. All details regarding topsoil construction and installation should be recorded in the Topsoil Records template in Appendix 9. The estimated characteristics of the topsoil and stockpile configuration for the constructed topsoil (MRWA, 2016) are:

- Two parts mulch to one part soil (7-10% compost (this combination is optimal for achieving a C:N ratio of 30 or 40:1);
- Windrows of less than 3 m;
- Well mixed to ensure pasteurization;
- Moisture content of 45 to 65%;
- Oxygen content of between 12 to 14%;
- Stockpiled for a period of 6 to 10 weeks; and
- At least one turn following initial incorporation of materials to re-oxygenate and reactive stockpile.

6.3 Erosion Management

Water erosion is not anticipated to be a significant issue across the site given highly permeable nature of the deep sand profile limits surface water flow. Wind erosion may occur in drier conditions with high winds. After topsoil is spread, mulch shall be applied across the batters to stabilise the soil surface, assist with moisture retention, and mitigate any erosion from occurring. Mulch shall only be spread in areas with natural topsoil as constructed topsoil shall already have mulch incorporated within it. The batters shall then be ripped along the contour and tracked vertically.

6.4 Mulch Supply

6.4.1 Site Mulch

There shall be clearing occurring to access sand deposits. This cleared material shall either be mulched shortly after being cleared and stockpiled, or the woody debris shall be stockpiled and mulched later depending on the time of year the clearing occurs. Mulch to be screened at a nominal range of 10mm to 50mm diameter.

6.4.2 Imported Mulch

There shall be insufficient quantities of mulch to complete the rehabilitation works, and mulch shall need to be imported from offsite. Any mulch that is to be brought onsite must have originated from a dieback free area that is of similar vegetation type and/or has been composted for a period of between 3-6 months so that any pathogens and weed seeds are likely to have been neutralised. Mulch to be a nominal 10 – 50mm in diameter.

6.5 Native Seed, Cutting, and Transplant Recovery

Prior to any clearing occurring at the site, efforts should be made to recover as much seed and plant material as possible that can be used in the rehabilitation program. This may also include transplanting some species such as *Xanthorrhoea sp.* Any remaining material required for the implementation of the program shall be sourced from within a 50 km radius from the site, if possible. Should the range need to be extended due to the availability of suitable material approval shall be sought from the relevant government authority.

6.6 Dieback Management

A Weed and Dieback Management Plan has been developed for this site. The plan shall be followed by all personnel, machinery and vehicles entering the site, and requires all machinery, vehicles, and equipment to be cleaned down prior to being onsite to remove any foreign soil and seeds entering the site.

7 IMPLEMENTATION METHODOLOGY

The implementation program shall commence with provenance seed and cutting recovery, landform creation (batter), site preparation (including fencing and mulching) and weed management, and then followed by seed broadcasting and seedling planting. Species selected shall be sourced locally from the vegetation both within site and surrounding areas where possible, as the plants propagated shall already be adapted to the local environmental conditions.

The techniques listed below are based on best management practices that Tranen believe are the most practical and cost effective for the site conditions and appropriate to meet the required outcomes for the site.

7.1 Weed Management

Ongoing weed management shall occur during the extraction works to ensure adequate control of weeds onsite. Once a rehabilitation area has been formed (i.e. batter) and topsoil and mulch have been installed, two weed control events shall occur on rehabilitation areas prior to commencement of seeding and tubestock works.

An initial weed control event shall be undertaken to target any weed germination that has occurred due to the initial disturbance, and an additional follow-up control shall occur once the ripping has been completed to target any secondary germination. This shall occur for each stage area once they are ready for rehabilitation. The role of the weed control program is not to eradicate the weeds, but to manage them in order to allow the natives to establish themselves and create a self-sustaining ecological community.

Herbicides shall be selected for the target species, considering the surrounding environment and the constraints this may present. Where appropriate, selective herbicides (i.e., grass or broadleaf-specific) shall be favoured over general knockdown herbicides to keep off-target damage to a minimum. In some instances, alternative control methods such as manual removal shall be considered where appropriate. Below is a list of the common herbicides that will likely be used onsite.

Herbicide	Use
Glyphosate Biactive	Broadleaf and grasses
Fluazifop	Grass specific
Metsulfuron-methyl	Geophytes

All herbicide application records are to be kept as required under Department of Health WA regulations (an example of a record sheet for this project can be found in Appendix 9). Only herbicides authorised for use in Australia are to be used.

7.2 Surface Preparation

7.2.1 Bulk Earthworks (including Topsoil and Mulch Spreading)

- **Management Zone 1 – Upper Batter:** The batters with a slope of 1:4 shall be formed ensuring that the batter is reprofiled into the surrounding landform at the top. Either topsoil sourced from clearing works onsite, or a constructed topsoil consisting of a blend of subsoil and mulch shall be spread across the face of the batter at a depth of approx. 50 mm, utilising earthmoving equipment such as a dozer, loader and/or posi-track skid steer. the topsoil / mulch shall then be driven over with tracked earthmoving machinery up and down the face of the batter to create imprints in the soil (track-rolled).

  Mulch shall then be installed to a depth of 25 mm by mechanical and manual means. A posi-track or similar shall be utilised for the bulk of the spreading, and some minor manual raking to finish off levels. The site shall then be ripped on the contour to break compaction. The topsoil / mulch shall then be driven over with tracked earthmoving machinery up and down the face of the batter to create imprints in the soil (track-rolled) prior to seeding and tubestock installation.

- **Management Zone 2 – Lower Batter:** The bulk earthworks shall be similar to that of the Management Zone 1 – Upper Batter approach with a 1:4 slope (landform creation and topsoil and mulch spreading).

- **Management Zone 3 – Pit Base:** The base of the pit shall be mulched to a depth of 25mm by mechanical and manual means. A posi-track or similar shall be utilised for the bulk of the spreading, and some minor manual raking to finish off levels. The site shall then be cross ripped to a depth of 500mm to break compaction and aerate the soil and then scarified to a depth of 50mm.

Testing of the soil strata shall be carried out in each of the Management Zones across the entire site post landform re-creation. This information is to:

1. Assist in the design and construction of the topsoil;
2. Provide a baseline for carbon and decompaction for Zone 3; and
3. To assist in further refining the species mix if required.

7.2.2 Topsoil Respreading

Prior to the topsoil being spread across the site, testing of the following parameters shall be completed to ensure it is suitable for rehabilitation:

- Organic carbon
- pH
- Plant available nutrients
- Molar Ethanol Droplet (MED) test

Topsoil sourced from clearing works onsite, or a constructed topsoil consisting of a blend of subsoil and mulch shall be spread across the face of the batters at a depth of approx. 50 mm, utilising earthmoving equipment such as a dozer, loader and/or posi-track skid steer. No topsoil is proposed for the pit base due to the following reasons:

- There are limited topsoil resources available on-site;
- Topsoil contains species from the original vegetation communities which are not likely to be suitable in these areas; and
- Stability is unlikely to be an issue on the pit base.

7.2.3 Erosion Management

Although water erosion is not anticipated to be an issue onsite due to the highly permeable soils present, additional management control involving surface preparation techniques shall be used to further assist water infiltration and stabilisation. These controls include installing a 25 mm mulch layer across the batter face, ripping across the contours, vertically tracking of the mulch and the installation of woody debris.

After a major storm event the site shall be inspected for any erosion within 5 days the event. Shall significant water erosion be present then additional measures to rectify the issue and stabilise shall be undertaken. These may include but not be limited to rock placement, matting and coir logs. Any mitigation works completed shall be reinspected two weeks post-install to ensure it remains in-tact and again after the next major storm event to determine success and if further modification may be required.

Wind erosion is not expected to be an issue as mulch shall be applied to the batters.

7.2.4 Ripping/ Scarification

Following bulk earthworks, where it is specifically mentioned, the management zones shall be ripped to aerate and decompact the soil from the civil works to improve vegetation establishment. Rip lines are to be installed at 2 m intervals across the contour of the slope at an optimal depth of 300-500 mm using a dozer with a single tine. Ripping shall not occur any deeper than this, as it may result in the buried weed infested topsoil being re-introduced to the surface. Rip lines shall be spaced at two metre intervals where possible across the management zones.

Where specified, scarification shall occur immediately prior to the broadcast of seed. Scarification shall occur in the first 50 mm of soil, any greater than this may result in the seed being buried too deep. Scarifying to the above specification creates micro-niches that create optimum conditions for the seeds to germinate in.

7.2.5 Coarse Woody Debris

There may be some woody debris located onsite and/ or from remnant vegetation clearing activities that could be utilised on the steep slopes to provide additional stabilisation and habitat creation. Any large pieces of woody debris shall be placed in Management Zone 1 as a priority to assist in sediment capture and encourage fauna utilisation as it is located near existing vegetation. Smaller pieces of debris can be used in Management Zone 2 for additional stabilisation and habitat, and Management Zone 3 for habitat creation as required. It is estimated that a total of 2 Tonne shall be available onsite.

Any material that is identified as suitable during the vegetation clearing shall be stockpiled and installed across each Stage as they become available for rehabilitation. No woody debris is to be imported to site for hygiene and disease reasons.

7.3 Mulching

To access some of the sand resources onsite, vegetative matter shall be cleared. This larger woody material shall then be coarsely mulched and stockpiled for use post-bulk earthworks

for each stage. Following bulk earthworks (landform re-creation and topsoil installation) on the batters, the mulch shall be spread to a depth no greater than 25 mm to provide dust suppression, erosion control and provide additional carbon for soil microbiological activity. The mulch shall then be track-rolled vertically via machine to create micro-niches which shall assist seed capture.

The mulch on the pit base shall be spread to a depth of 50mm to provide dust suppression and to increase the quantity of carbon in the soil to encourage microbial activity.

The exact volume of site mulch available is inconclusive until the clearing works are completed, however it is estimated that approximately 200 m3 of mulch will be available onsite. Should mulch need to be imported from offsite due to insufficient quantities available onsite, the mulch should ideally be sourced locally (where possible), composted for a period of 3-6 months, and regularly turned over during this period prior to being brought onto site. All mulch shall be either certified as meeting the Australian Standard for composts, soil conditioners and mulches (AS 4454-2012) or all efforts made to match these standards. The heat build-up and regular turning over of the stockpiles will assist in killing any weed seeds, pathogens and diseases (i.e. dieback) that may be present prior to being brought onto site. Mulch application shall occur on all three Management Zones.

7.4 Fence Installation

There are high kangaroo populations within and surrounding the site, which shall impact the success of the rehabilitation through grazing pressure. A “rural style” kangaroo fence shall be installed along the property boundary along the existing firebreaks. The fence shall be 1500 mm high and shall be composed of ringlock and steel posts. Box strainers shall be used at all changes in direction.

A rabbit-proof skirt shall also be attached to the ringlock fence. This involves a 1200 mm wide chicken wire skirt being connected to the base of the fence, with the bottom 300 mm bent at right angles, and placed on a level surface (where possible) and/or covered with soil.

7.5 Access Track

At present, there is a limestone access track and truck turnaround located within the site. This track shall remain until the sand extraction activities have concluded, upon which it shall be removed prior to being rehabilitated. The limestone material (approx. depth of 300mm) shall be stripped using various earthmoving machinery before being carted offsite and used by the client elsewhere. A total of approx. 6.5T of limestone material would need to be removed. This area shall form part of Management Zone 3.

Access shall also be required along all the properties firebreaks to allow for ongoing fence maintenance.

7.6 Species Selection and Plant Allocations

The species are to be based on reference ecosystems both adjacent and/or within the site as well with similar soil and hydrological properties. Species shall only be indigenous to the local area, with a focus on more common species with the highest likelihood of success and that are readily available.

A proposed species list and associated quantities for each of the management zones can be found in Appendix 5.

7.7 Provenance Seed Collection and Supply

A provenance seed and cutting collection program shall commence over the spring and summer periods and shall occur over several years depending on the staged extraction of the sand and the areas that are ready for rehabilitation. Seed shall be collected from onsite and within 50 km of the site, where possible. Should species or insufficient quantities not be collected within this provenance range, material shall be sourced from other local areas. The seed and cuttings collected shall be used in seedling propagation and direct seeding activities.

7.8 Seedling Propagation

All seedlings shall be sourced from NIASA certified nurseries, with preference given to local suppliers where possible. All tubestock shall be either forestry tubes or deep cells.

7.9 Direct Seeding

Direct seeding of suitable native species shall be undertaken. This shall occur in either vertically tracked areas or areas where scarification has taken place. The species mix shall be selected based on available native species, with a particular focus on species that have a higher probability of establishing via seed.

Direct seeding is to be undertaken at the recommended rate of 4 kg per hectare, using a native seed mix suitable for site conditions for the batters. Using 4 kg of the seed specified in Appendix 5, it is expected that a total in excess of 140,000 stems per hectare may be achievable, taking into consideration variabilities in seed viability germination and environmental factors that may result in a 30% loss of germinants after the first year.

The seed shall be pre-treated and then pre-coated with mycorrhizal fungi mix prior to being hand broadcast. Hand broadcasting is the preferred method as it ensures even and adequate coverage. The expected death rate of germinants from seed over the first three years can be found below. This is a very preliminary estimate only, based on previous experiences with projects of a similar nature. Germination rates and survival from direct seeding is highly variable due to a wide range of environmental factors.

Year	Native Germination Expected Death Rate
1	50 - 70%
2	20 - 30%
3	10 - 20%

Native everlastings shall also be hand broadcast at a rate of 5 kg/ha as a cover crop to provide soil stability as well as protection for native germinants. Over several years everlasting densities shall reduce as native germinants begin to establish and increase in height.

7.10 Seedling Planting

Planting of tubestock shall be undertaken along the rip lines at the required density and species distribution. Planting shall be via planting tubes to ensure safety of operators and provide accurate and effective planting. A single 10 g native fertiliser tablet shall be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants. Planting is only proposed for species where seed is difficult to collect, and cuttings were used. Seedlings would be planted at a density of 1 plant / 20m^2 (500 stems / ha).

Below is a table that outlines the expected seedling death rate for the first three years post-install. This is an estimate only based on previous experiences with projects of a similar nature.

Year	Native Tubestock Expected Death Rate
1	30 - 50%
2	10 - 30%
3	<5 - 10%

7.11 Works Schedule

The extraction staging plan can be found in Appendix 2. Staging shall commence from cell 18 and working in a northerly direction to cell 1.

An indicative works schedule has been developed for rehabilitation based on estimated extraction projections and is detailed in Appendix 8.

8 POST-INSTALLATION MANAGEMENT

Rehabilitation success depends not only on the installation program and timing, but also upon the post-installation management and frequent review of methods and procedures. Regular monitoring is required to track progress and identify any problems before they have any serious impacts. Maintenance of weeds and native vegetation shall ensure maximum survival and growth rates and indicate any site related influences

8.1 Rehabilitation Monitoring

As rehabilitation shall occur progressively as each stage is completed, monitoring shall need to be undertaken over several years or potentially longer depending on the demand for the resource. Each of the rehabilitation stages shall be monitored bi-annually and maintained (as required) for a 2-year period after installation. After a two-year period, these stages shall then be monitored annually in Spring. The final monitoring shall occur 5 years after the entire site has been rehabilitated. At present it is unclear when this shall be.

A total of two monitoring quadrats per hectare shall be established. The quadrats shall be square 10m x 10m in size and randomly established, ensuring representation of all vegetation types and rehabilitation management zones. Each quadrat shall be clearly marked, and the corner of the quadrat GPS marked. A photo of the quadrat shall be taken from the NW corner. Within the quadrat a 1m x 1m quadrat shall be setup to capture seed germination. The following quantitative and qualitative data shall be recorded within each quadrat:

Quantitative Data	Qualitative Data
Density (stems / m^2) native vegetation	The health of native vegetation
Native species present (species richness)	The health of weeds
Weed species present	Soil movement
Projected native foliage cover (% cover)	Fauna and pest activity
Total weed cover	Comparison of quadrats to remainder of site
Vegetation structure representation by stem count	

In addition to the quadrats, a total of 8 photo monitoring points shall also be established across the site to provide qualitative data and a direct visual capture of progress. Fence droppers shall be used, and the direction of the photo shall be recorded to ensure consistency with each monitoring assessment.

A visual assessment of the entire site through site traverses is to be undertaken as part of each monitoring event to provide a broader picture of success and identify the progress of areas that are not captured by the quadrat data.

Additional informal monitoring of site progress is to be undertaken regularly in addition to formal monitoring events where possible.

A report is to be provided for each monitoring event to document the findings and provide recommendations for any additional actions required to achieve the project targets. The revegetation contractor shall undertake the field monitoring assessment and provide this data to the environmental consultant to compile the report.

8.2 Site Maintenance

This plan has been designed to maximise the chances of a success by the early identification of factors that may have the biggest impact and finding solutions for their management. There are however a number of factors outside of normal control which may influence the outcome such as adverse weather conditions (i.e. droughts and storms), unauthorised access, and pests and diseases. The monitoring shall identify these issues and so that they can be dealt with in an appropriate manner.

Maintenance activities may include:

- On-going weed management (spring, summer, autumn and winter);
- Re-planting in areas of poor response (winter);
- Fence inspection / repair (monthly); and
- Disease and pest control (as required).

Weeds shall almost certainly continue to have an impact on the rehabilitation progress and their management shall be the principal maintenance activity. The extent of weed control required for spring, summer, autumn and winter weeds shall be determined through the monitoring.

Remedial planting operations shall be required if the seed germination or seedlings are not progressing towards the defined success targets. Direct seeding shall only be used as a remedial action if the surface can be appropriately prepared. Otherwise, seedling planting shall be the preferred revegetation method. In some instances, it may be more cost effective to re-start the revegetation operation rather than continuing in problematic areas. This shall be established through the monitoring program.

8.3 Completion Criteria and Success Targets

Table 2 below shows the overall completion criteria and interim targets for the revegetation works, developed for the purposes of the Revegetation Implementation Plan to satisfy Shire of Capel approval processes. These criteria go beyond the requirements of the MS 767 Rehabilitation Plan, particularly regarding stem density that has been set high as a precautionary measure for slope stability.

Table 2: Completion criteria for the Revegetation Implementation Plan

Aspect	Completion criteria	Interim Targets	Primary Assessment Method
Landform	Batter angles do not exceed 1:4 [vertical to horizontal]	Final landform is in accordance with the final contour plan for those areas already rehabilitated.	Survey pickup
Soil Profile	All rehabilitated batters contain 50 mm of topsoil as either: • Topsoil from proposed clearing; or • Constructed topsoil utilising subsurface soils and site and/or imported mulch.	Topsoil has been replaced in those areas already rehabilitated.	Site preparation plans/ earthworks logs
Slope Stability	Slopes are stable	Potential threats to slope stability are identified and mitigated.	Quadrat / site traverse
Vegetation – Species Composition	≥80% of species represented after 3 years	• First year - 90% of species planted / seeded represented • Second year - 85% of species planted / seeded represented	Quadrat / site traverse: Species count
Vegetation – Density	Flat areas at 5 years: • Upper storey (trees) ≥500 plants per hectare • Middle storey ≥ 1,000 plants per hectare • Lower storey ≥ 1,500 plants per hectare Slopes at 5 years*: • Upper storey (trees) 500 – 800 plants per hectare • Middle storey 3,000 – 5,000 plants per hectare • Lower storey ≥ 5,000 plants per hectare	<u>First year</u> Flat areas: • Upper storey 1,700 plants per hectare • Middle storey 3,500 plants per hectare • Lower storey 5,000 plants per hectare Slopes: • Upper storey 2,500 plants per hectare • Middle storey 10,000 plants per hectare • Lower storey 15,000 plants per hectare <u>Second year</u> Flat areas: • Upper storey 1,200 plants per hectare • Middle storey 2,500 plants per hectare • Lower storey 3,000 plants per hectare Slopes: • Upper storey 2,000 plants per hectare	Quadrat: Native stem density count

		• Middle storey 8,000 plants per hectare • Lower storey 10,000 plants per hectare	
Vegetation – Condition	Vegetation is self-sustaining (i.e. evidence of plant maturity, flowering and seed set observed).	Potential threats to establishing self-sustaining vegetation are identified and mitigated.	Quadrat: Native stem density count and plant growth
Vegetation – Extent	All areas disturbed for the implementation of the project are rehabilitated.	Progressive rehabilitation follows gradual clearing.	Ongoing rehabilitation monitoring
Weed Management	≤10% weed cover	Weed control undertaken and weeds not out-competing the revegetation.	Quadrat / site traverse: Projected weed cover

*The high stem density rates for the slopes have been set as a precautionary measure for slope stability (for the purposes of this Revegetation Implementation Plan only) and are not necessary for the achievement of overall rehabilitation obligations under MS767

9 CONTINGENCY AND MANAGEMENT ACTIONS

Contingency actions are only required if progress towards completion criteria is not being achieved. Contingency actions therefore would only be undertaken during the post-installation phase of works.

Some activities such as weed control, translocation, tubestock planting and direct seeding can result in variable outcomes, due to uncontrollable or unpredictable factors like extreme weather events, seasonal variation in rainfall or temperature and differences in landform, soil or biology. In addition, if predation (by rabbits for example) and/or physical disturbance (such as vandalism) occur these factors may impact outcomes within management areas.

Rehabilitation works shall move at the pace of sand extraction which shall be determined by demand for sand resources. It is anticipated that extraction works should be complete within a period of five years (length of EIL approval), however this will depend on the demand for the resource. Upon completion of all extraction and rehabilitation activities an additional three years of monitoring and maintenance shall be undertaken to ensure completion targets are met.

As extraction in each block is completed, the same block shall be rehabilitated meaning each rehabilitated block(s) may vary by multiple years in age. Having rehabilitation blocks of multiple ages shall allow greater scope to learn as rehabilitation progresses to refine the approach to the site conditions leading to overall greater success.

The primary method of developing contingency actions shall be from both formal and informal monitoring specified in Section 8.1. A report is to be provided for each monitoring event to document the findings and provide recommendations for any additional actions required to achieve the project targets. These contingency measures may include:

- On-going weed management,
- Re-planting in areas of poor response;
- Erosion repair;
- Fence repair; and
- Disease and pest control.

10 RECORD KEEPING, AUDITING AND REPORTING

Record keeping and reporting requirements under ministerial conditions are specified within MBS (2016) and shall continue to be undertaken by McDougall Quarries Pty Ltd and others as directed. Tranen shall provide information to supplement and support wider reporting through regular monitoring reports to be provided bi-annually for a 2-year period after installation, then annually during spring thereafter, up to 5-years post installation.

Monitoring reports shall contain the following information:

- The date(s) each area was revegetated;
- The locations of each revegetated area;
- Descriptions of revegetation activities undertaken for the monitoring period;
- Summary of quadrat data for all vegetation types and rehabilitation management zones
- Photo of quadrat (NW corner)
- Photos from additional monitoring points (8 in total)
- Comments from visual assessment by site traverses
- Recommendations for any contingency measures.

In addition to the above monitoring and record keeping, Tranen understand that the Shire requires 3rd party auditing of the rehabilitation works in order to maintain transparency. Tranen's reports and other data can be provided to the Shire if requested to facilitate this process.

11 REVISIONS

Revisions and amendments to the plan may be required in the event that:

- The scope of works changes from that described in Section 1.1;
- Improvements to the rehabilitation approach are discovered during implementation and post installation management phases; and test
- Monitoring results indicate that progress towards completion criteria is not satisfactory.

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Appendix 1 Site Location Map

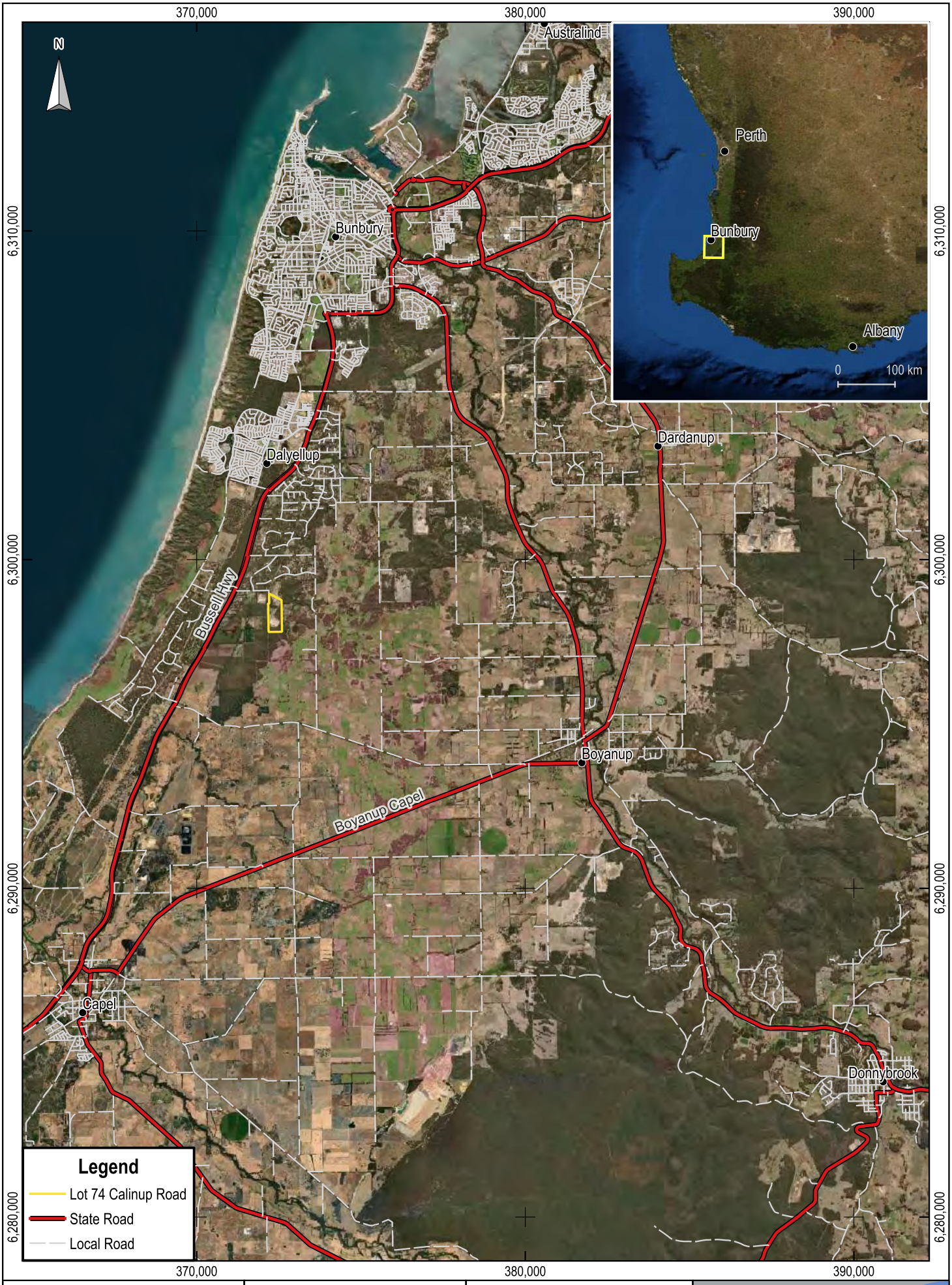

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Image: Copernicus Sentinel Data 2020
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0 2.5 5 km

McDougall Quarries
Lot 74 Calinup Road, Gelorup

Figure 1

Location Plan

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MBS ENVIRONMENTAL

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Appendix 2 Previous Rehabilitation and Existing Stockpile Locations and Condition

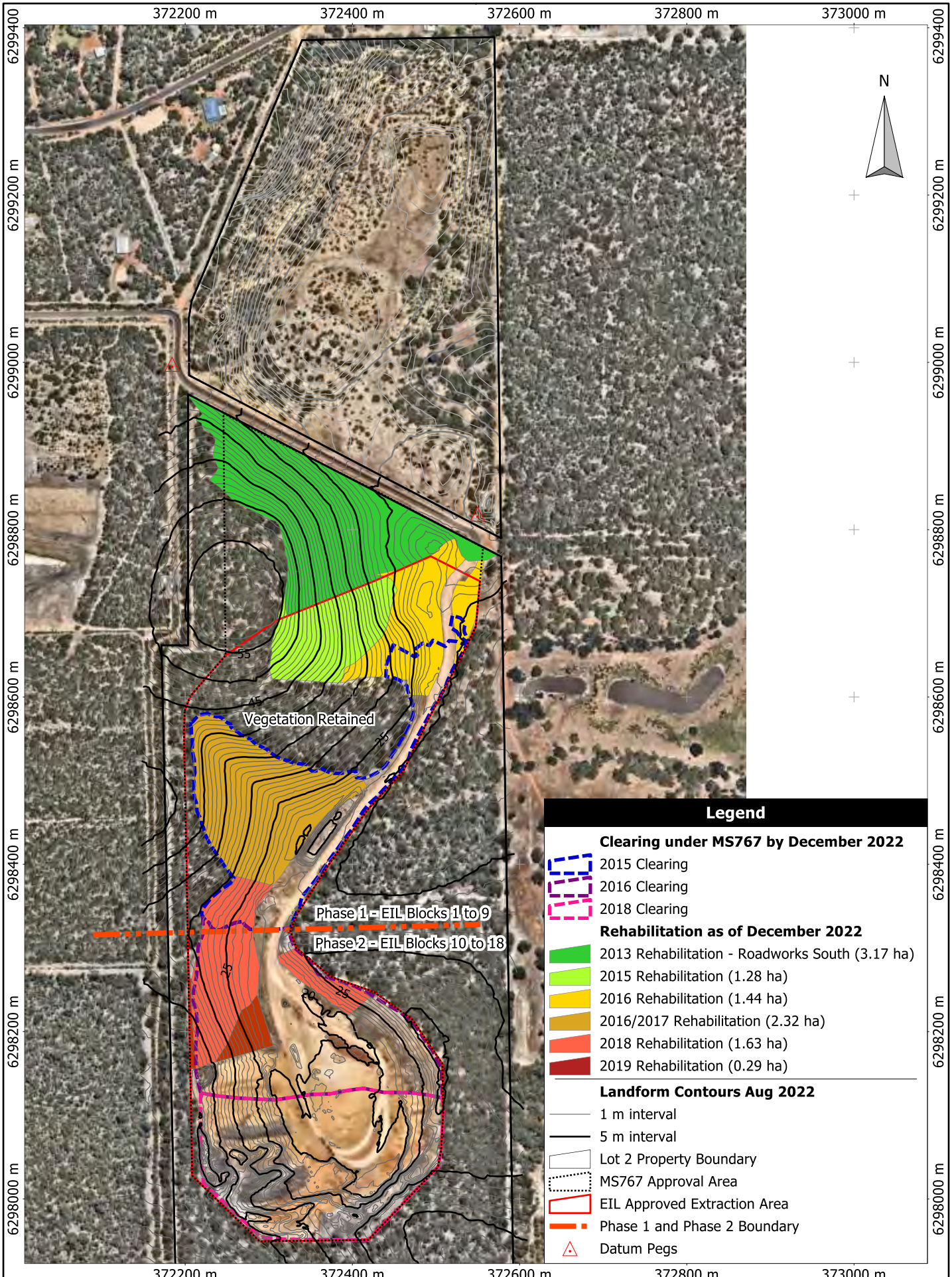
tranen revegetation southwest

Project: Lot 74 Calinup Rd Sand Pit RIP
Project Number: P979A
Client: McDougall Quarries

Drawing: Prior Rehabilitation Works Condition
Drawing Number: P979A-03
Revision: 1

Date: 14/08/23
Drawn By: MSB

N



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Aerial Photo: Dec 2022
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0 100 m

McDougall Quarries Pty Ltd
Sandpit on Lot 74
Calinup Road Gelorup

Figure 1

Recent Activities

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tranen revegetation southwest

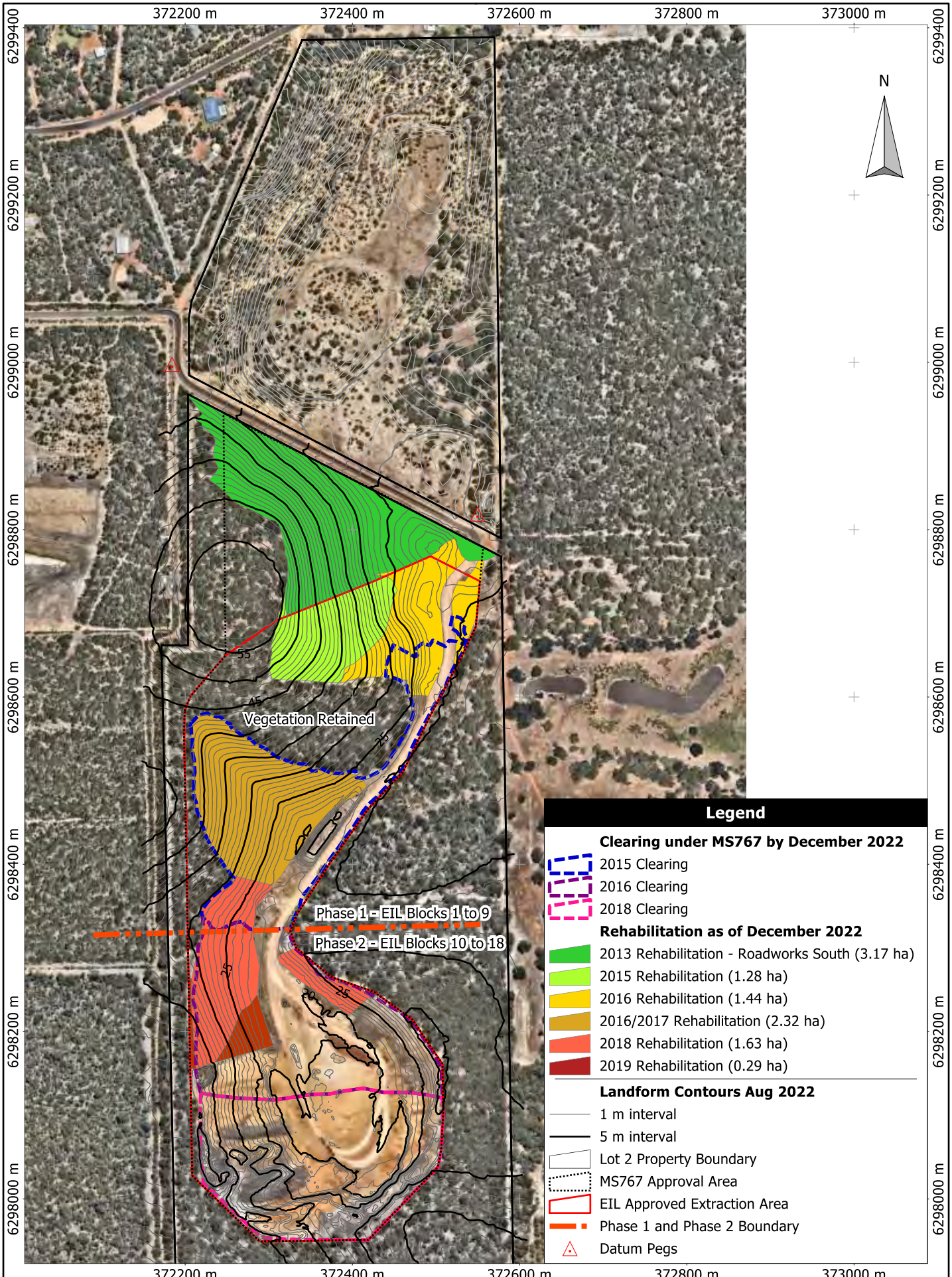
Project: Lot 2 Calinup Rd Sand Pit Rehabilitation Implementation Plan
Project Number: P979A

Drawing: Existing Topsoil Location and Condition
Drawing Number: P979A-04
Revision: 0

Date: 25/07/22
Drawn By: MSB

N

Appendix 3 Site Plan, Works and Excavation Plan



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Aerial Photo: Dec 2022
Grid: MGA94(50)
0 100 m

McDougall Quarries Pty Ltd
Sandpit on Lot 74
Calinup Road Gelorup

Figure 1

Recent Activities

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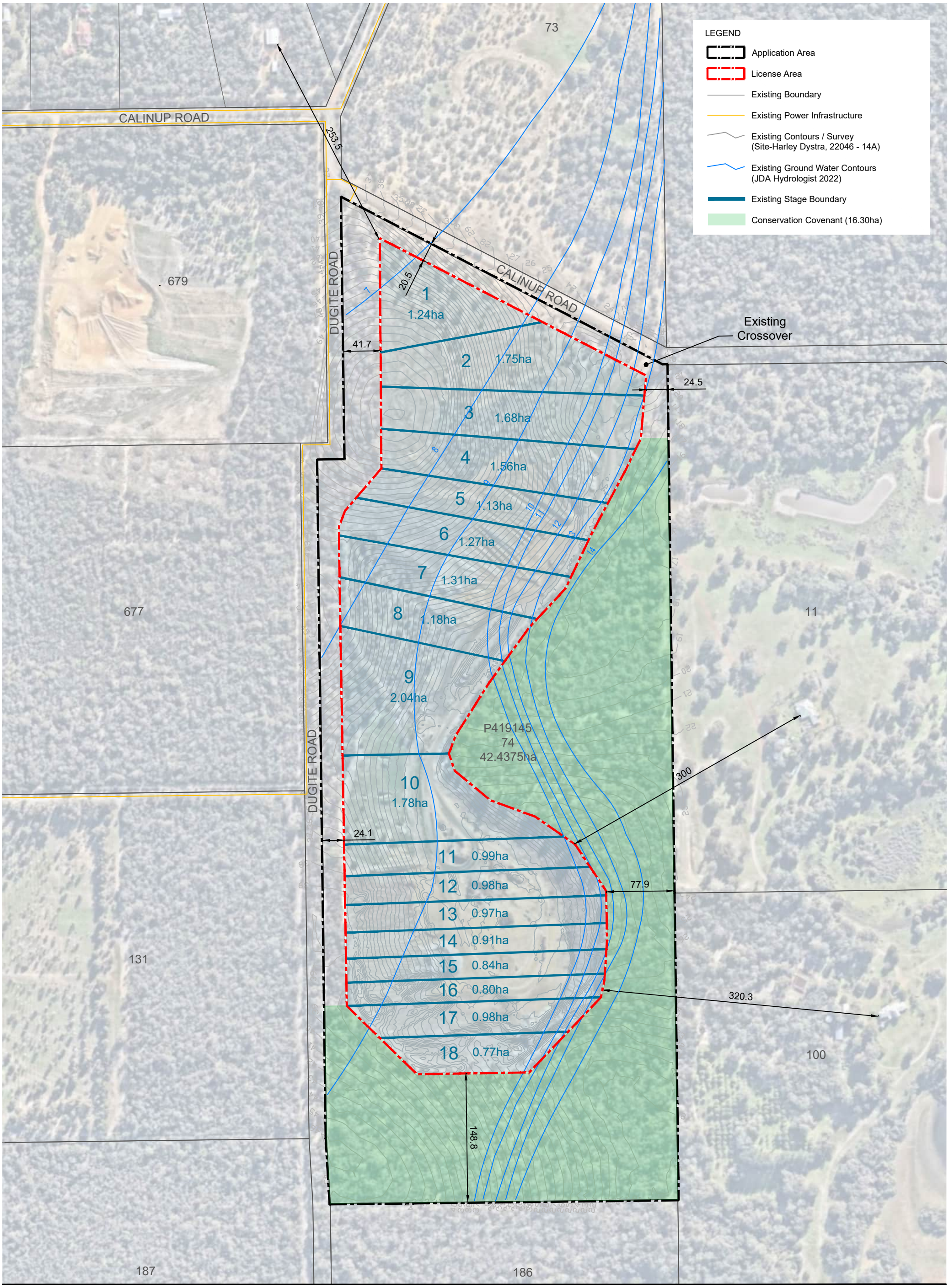
Appendix 4 Estimated Maximum Groundwater Level Contours



Works and Excavation Plan

Lot 74 Calinup Road, Gelorup

Date: 31 Jul 2023 Scale: 1:4000 @ A3 1:2000 @ A1 File: **22-332 CP01A** Staff: JL GW Checked: JL

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Appendix 5 Species and Quantities – Seedlings and Seed

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LOT 74 CALINUP RD SAND PIT REHABILITATION
MASTER SPECIES LIST

Species	Form	Seed / Tubestock / Cuttings	MANAGEMENT ZONES			Propagation	
			Upper Batter	Lower Batter	Pit Base	Difficulty	Lead Time (months)
Agonis flexuosa	T	S, T	x	x	x		
Banksia attenuata	T	S, T	x	x			
Banksia grandis	T	S, T	x				
Corymbia calophylla	T	S, T	x	x	x		
Eucalyptus marginata	T	S, T	x	x			
Xylomelum occidentale	T	S, T	x	x		Y	18
Acacia pulchella	S	S	x	x	x		
Adenanthos meisneri	S	C	x	x	x	Y	12
Allocasuarina humilis	S	S, T	x	x			
Bossiaea eriocarpa	S	S, T	x	x			
Daviesia divaricata	S	S, T	x	x			
Daviesia physodes	S	S, T	x	x	x		
Eremaea pauciflora	S	S	x	x	x		
Gompholobium tomentosum	S	S, T	x	x	x		
Hakea lissocarpha	S	S, T		x	x		
Hibbertia cuneiformis	S	C	x	x		Y	12
Hibbertia hypericoides	S	C	x	x		Y	12
Hibbertia racemosa	S	C	x	x		Y	12
Hypocalymma angustifolium	S	S, T		x	x		
Jacksonia furcellata	S	S, T	x	x	x		
Kunzea glabrescens	S	S	x	x	x		
Macrozamia riedlei	S	S	x	x		Y	18
Melaleuca thymoides	S	S	x	x	x		
Phyllanthus calycinus	S	S, T	x	x			
Xanthorrhoea brunonis	S	S, T	x	x		Y	18
Conostylis aculeata	H	S, T	x	x	x		
Dianella revoluta	H	S, T	x	x			
Hardenbergia comptoniana	H	S	x	x	x		
Kennedia prostrata	H	S	x	x	x		
Patersonia occidentalis	H	S	x	x	x		
Rhodanthe chlorocephala*	H	S	x	x			

S = Seed
T = Tubestock
C = Cuttings
X = Priority species
* = cover crop only

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LOT 72 CALINUP RD SAND PIT REHABILITATIION
SEED SPECIES AND QUANTITIES

Rehabilitation Zone - Native Seeding	Area (m2)	Rate (kg / ha)	Total Seed (kg)
Management Zone 1 - Upper Batter	59,017	4	23.607
Management Zone 2 - Lower Batter	52,454	4	20.982
Management Zone 3 - Pit Base	110,013	2.5	27.503
TOTAL	**221,484**		**72.092**

			MANAGEMENT ZONES										
Species	Form	Seed / Tubestock / Cuttings	Upper Batter			Lower Batter			Pit Base			SEED INFORMATION	
			%	Qty (kg)	Est No Germinants	%	Qty (kg)	Est No Germinants	%	Qty (kg)	Est No Germinants	Seeds / gm	Est. Germination Rate
Agonis flexuosa	T	S, T	4	0.944	56,656	5	1.049	62,945	6	1.650	99,012	600	10%
Banksia attenuata	T	S, T	7	1.652	9,915	6	1.259	7,553				10	60%
Banksia grandis	T	S, T	5	1.180	10,127							11	78%
Corymbia calophylla	T	S, T	7	1.652	14,872	6	1.259	11,330	8	2.200	19,802	15	60%
Eucalyptus marginata	T	S, T	7	1.652	7,932	6	1.259	6,043				16	30%
Xylomelum occidentale	T	S, T	5	1.180	1,511	4	0.839	1,074				2	64%
Acacia pulchella	S	S	9	2.125	135,763	6	1.259	80,443	9	2.475	158,171	90	71%
Adenanthos meisneri	S	C											
Allocasuarina humilis	S	S, T	3	0.708	79,673	3	0.629	70,813				450	25%
Bossiaea eriocarpa	S	S, T	3	0.708	130,876	3	0.629	116,322				420	44%
Daviesia divaricata	S	S, T	3	0.708	9,915	3	0.629	8,812				50	28%
Daviesia physodes	S	S, T	3	0.708	13,173	3	0.629	11,708	5	1.375	25,578	60	31%
Eremaea pauciflora	S	S	4	0.944	141,641	4	0.839	125,890	10	2.750	412,549	1000	15%
Gompholobium tomentosum	S	S, T	5	1.180	256,842	4	0.839	182,624	10	2.750	598,471	640	34%
Hakea lissocarpha	S	S, T				3	0.629	29,962	8	2.200	104,732	68	70%
Hibbertia cuneiformis	S	C											
Hibbertia hypericoides	S	C											
Hibbertia racemosa	S	C											
Hypocalymma angustifolium	S	S, T				2	0.420	157,362	8	2.200	825,098	1500	25%
Jacksonia furcellata	S	S, T	4	0.944	64,210	5	1.049	71,337				200	34%
Kunzea glabrescens	S	S	3	0.708	382,430	3	0.629	339,902	6	1.650	891,105	1800	30%
Macrozamia riedlei	S	S		100*			100*					63 / kg	
Melaleuca thymoides	S	S	4	0.944	425,395	4	0.839	378,088	8	2.200	991,217	850	53%
Phyllanthus calycinus	S	S, T	3	0.708	23,371	3	0.629	20,772				330	10%
Xanthorrhoea brunonis	S	S, T	3	0.708	14,872	5	1.049	22,031				60	35%
Conostylis aculeata	H	S, T	5	1.180	708,204	4	0.839	503,558	5	1.375	825,098	2400	25%
Dianella revoluta	H	S, T	2	0.472	2,243	5	1.049	4,983				95	5%
Hardenbergia comptoniana	H	S	3	0.708	6,586	3	0.629	5,854	4	1.100	10,231	30	31%
Kennedia prostrata	H	S	6	1.416	12,748	5	1.049	9,442	5	1.375	12,376	30	30%
Patersonia occidentalis	H	S	2	0.472	2,833	5	1.049	6,294	8	2.200	13,202	300	2%
TOTAL			**100**	**23.607**	**2,511,787**	**100**	**20.982**	**2,235,143**	**100**	**27.503**	**4,986,642**		
Est. No. Germ Per Hectare					**425,604**			**426,115**			**453,278**		

S = Seed
T = Tubestock
C = Cuttings
X = Priority species
* no of seeds
% = percentage by weight of the seed mix

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LOT 74 CALINUP RD SAND PIT REHABILITATION
SEEDLING SPECIES AND QUANTITIES

Rehabilitation Zone	Area (m2)	Density (plants / m2)	Total Tubestock
Management Zone 1 - Upper Batter	59,017	0.05	2,951
Management Zone 2 - Lower Batter	52,454	0.05	2,623
Management Zone 3 - Pit Base	110,013	0.05	5,501
TOTAL	**221,484**		**11,075**

			MANAGEMENT ZONES					
Species	Form	Seed / Tubestock / Cuttings	Upper Batter		Lower Batter		Pit Base	
			%	Qty	%	Qty	%	Qty
Agonis flexuosa	T	S, T	8	236	6	157	10	550
Banksia attenuata	T	S, T	8	236	6	157		
Banksia grandis	T	S, T	5	148				
Corymbia calophylla	T	S, T	8	236	6	157	5	275
Eucalyptus marginata	T	S, T	8	236	6	157		
Xylomelum occidentale	T	S, T	5	148	4	105		
Acacia pulchella	S	S						
Adenanthos meisneri	S	C	3	89	5	131	10	550
Allocasuarina humilis	S	S, T	3	89	5	131		
Bossiaea eriocarpa	S	S, T	5	148	5	131		
Daviesia divaricata	S	S, T	3	89	5	131		
Daviesia physodes	S	S, T	3	89	5	131	10	550
Eremaea pauciflora	S	S						
Gompholobium tomentosum	S	S, T	3	89	5	131	5	275
Hakea lissocarpha	S	S, T			3	79	15	825
Hibbertia cuneiformis	S	C	5	148	3	79		
Hibbertia hypericoides	S	C	5	148	5	131		
Hibbertia racemosa	S	C	7	207	5	131		
Hypocalymma angustifolium	S	S, T			3	79	20	1100
Jacksonia furcellata	S	S, T	5	148	5	131	15	825
Kunzea glabrescens	S	S						
Macrozamia riedlei	S	S						
Melaleuca thymoides	S	S						
Phyllanthus calycinus	S	S, T	3	89	3	79		
Xanthorrhoea brunonis	S	S, T	5	148	5	131		
Conostylis aculeata	H	S, T	5	148	5	131	10	550
Dianella revoluta	H	S, T	3	89	5	131		
Hardenbergia comptoniana	H	S						
Kennedia prostrata	H	S						
Patersonia occidentalis	H	S						
TOTAL			**100**	**2958**	**100**	**2621**	**100**	**5500**

S = Seed
T = Tubestock
C = Cuttings
X = Priority species

Appendix 6 Risk Assessment

A risk assessment has been undertaken in order to identify all known risks to the revegetation works to reduce uncertainty around delivering the objectives described in Section 2.3. The risk assessment has been based on templates within the *Biodiversity Conservation Trust – Revegetation Plan Template*, developed by the NSW Government (2020). Where appropriate, terminology has been altered within the likelihood of occurrence, consequence and evaluation criteria to ensure relevance with the WA context and the project context.

The detailed risk assessment is located within Table 7 below.

Table 3: Likelihood of occurrence table

Consequence	Likelihood				
	A Rare	B Unlikely	C Possible	D Likely	E Almost Certain
1 Insignificant	L	L	L	M	M
2 Minor	L	L	M	H	H
3 Moderate	L	M	H	H	H
4 Major	M	H	H	E	E
5 Catastrophic	H	H	E	E	E

Table 4: Likelihood rating table

Likelihood rating			
Rank	Descriptor	Frequency	Description
A	Rare	Shall occur once every 30 years Once in 30 years or less frequent.	The event may occur in exceptional circumstances. Not likely to occur, but it's not impossible.
B	Unlikely	Shall occur once in 10 years. Could occur once in 10 years or multiple times over 20 years.	The event could occur at some time, usually requires a combination of circumstances to occur.
C	Possible	Shall occur once every 5 years. Once in 5 years or multiple times over 10 years.	The event should occur at some time. Is sporadic, but not uncommon
D	Likely	Once per year. Once in a year or so.	Known to re-occur approximately annually
E	Almost Certain	Shall occur more than once a year. Multiple times in a year.	The event is expected or known to occur often.

Table 5: Consequence rating

Consequence rating		
Rank	Descriptor	Environmental
1	Insignificant	No impact of delivery of revegetation objectives
2	Minor	Short term or low-level long-term impact on revegetation objectives
3	Moderate	Long term impact significantly limiting revegetation objectives
4	Major	Extensive, long term impact on revegetation objectives with uncertain outcomes
5	Catastrophic	Impacts are irreversible and/or permanent

Table 6: Risk evaluation criteria

Rank	Acceptance evaluation *This decision should be considerate of compliance requirements and As Low As Reasonably Practicable (ALARP)*	Description
Extreme	**Unacceptable risk to rehabilitation objectives**	Revegetation shall not proceed without further controls to reduce risk.
High	**Undesirable risk to rehabilitation objectives**	Works shall only proceed with Shire approval and risk mitigation recorded
Moderate	**Monitor activity and ongoing risk**	Work may proceed with ongoing monitoring of control measures.
Low	**Acceptable proceed**	Work may proceed, working in accordance with planned controls.

Table 7: Risk assessment summary table

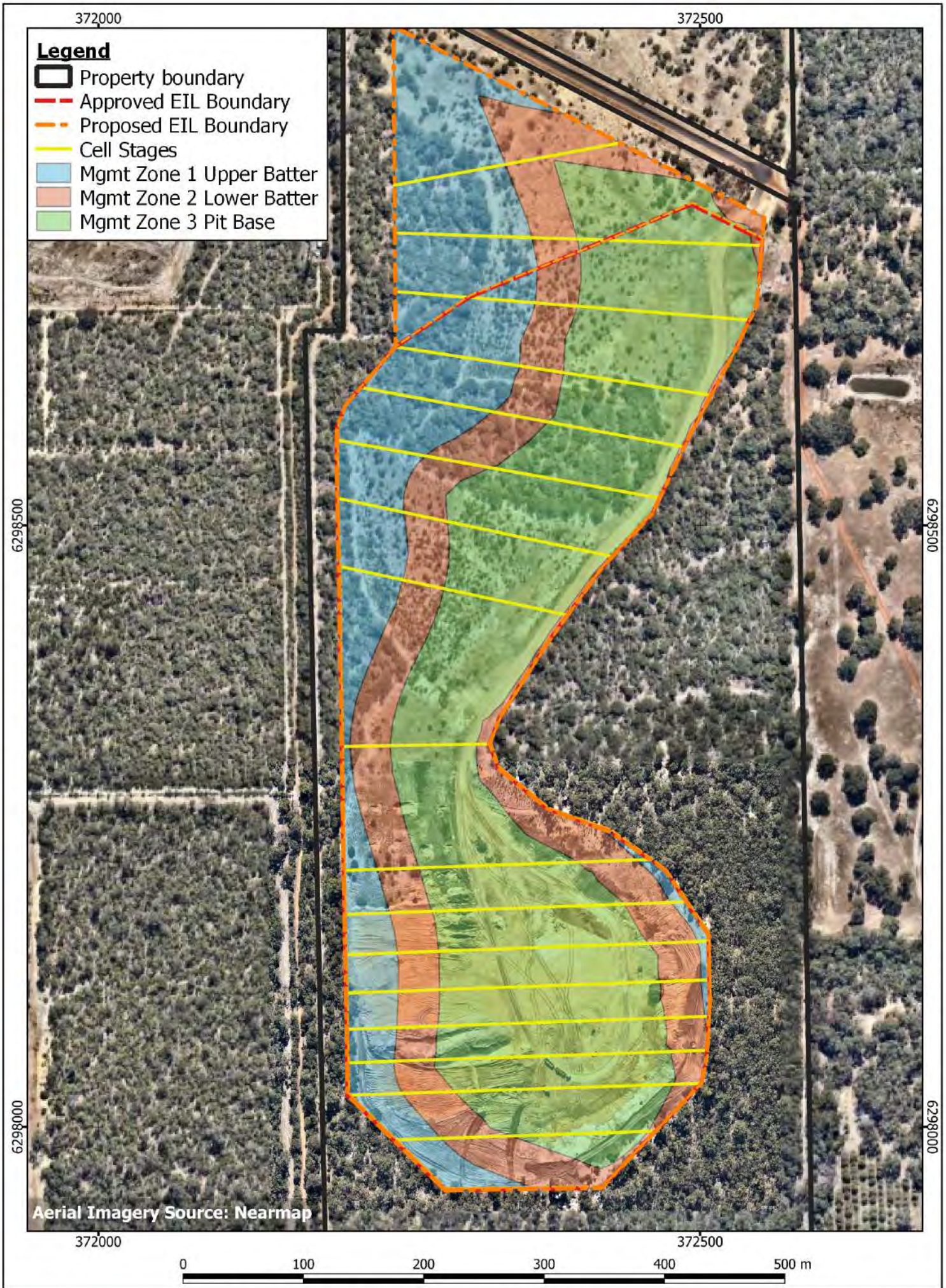
Section of revegetation plan	Risk description	Likelihood	Consequence	Initial risk rating	Mitigation action	Likelihood	Consequence	Revised risk rating
Pre-installation phase								
6.1, 6.5, 7.7	Poor recovery of native plants, cuttings and seed material from on-site as well as within 20 km of the site.	C	2	M	• Planned recovery programs by appropriately skilled contractors including any required regulatory permits in place prior to clearing activities • Provenance seed and cutting collection programs over the spring and summer period over several years in line with works schedule (Section 7.11). • Seed collected from remnant vegetation onsite as well as within 50 km of the site in order to source necessary amounts for rehabilitation. • Top 50mm of topsoil within existing bushland (proposed for clearing) stripped for use in rehabilitation. Ideally topsoil shall be directly transferred to rehab area however if stockpiled then no greater than 2 m in height storage timeframe to be minimised as far as practical (less than 3 weeks).	B	2	L
7.6 and Appendix 5	Poor selection of native species and lack of suitability based on climatic, topographic and hydrological factors.	B	3	M	• Management zones developed and species selected on reference ecosystems both adjacent and/or within the site as well with similar soil and hydrological properties. • The species mix for direct seeding shall be selected based on available native species, with a particular focus on species that have a higher probability of establishing via seed. • Transition community species to be used in highly modified landform areas noting the expected hydrological and soil conditions (i.e. pit base and lower batters).	A	3	L
7.8	Seedlings supplied for rehabilitation works are of poor quality.	C	2	M	• All seedlings sourced from NIASA certified nurseries, with preference given to local suppliers where possible. • All tubestock shall be either forestry tubes or deep cells. • Tubestock shall be inspected in the nursery prior to dispatch and any poorly established, root bound and/or nutrient deficient plants rejected.	A	2	L
6.4	Insufficient quantities of mulch for rehabilitation activities	C	2	M	• Source mulch from on-site from remnant vegetation proposed for clearing. Cleared material shall either be mulched shortly after being cleared and stockpiled, or the woody debris shall be stockpiled and mulched later depending on the time of year the clearing occurs • In order to make up the expected shortfall across site, importation of mulch as required ensuring originated from dieback free area of similar vegetation type and/or composted for period between 3-6 months so pathogens and weed seeds are neutralised.	A	2	L

6.6	Introduction of dieback infestations during rehabilitation activities	B	3	M	• Existing Dieback Management Plan to be followed by all personnel, machinery and vehicles entering the site which requires machinery, vehicles, and equipment to be washed down prior to being onsite to remove any foreign soil and seeds. • All materials (mulch) brought to site are certified as weed and dieback free.	A	3	L
Implementation and installation phase								
5.1.2, 7.4	Herbivores (in particular kangaroos) impact the success of rehabilitation through grazing pressure	D	3	H	• A "rural style" kangaroo fence shall be installed along the property boundary along the existing firebreaks to minimise clearing. • The fence shall be 1500mm high and shall be composed of ringlock and steel posts. Box strainers shall be used at all changes in direction. • A rabbit-proof skirt shall be attached to the ringlock fence. This involves a 1200 mm wide chicken wire skirt being connected to the base of the fence, with the bottom 300 mm bent at right angles, and placed on a level surface (where possible) and/or covered with soil. • Herbivore impacts shall be assessed through regular monitoring.	B	2	L
5, 5.2, 5.4, 7.2.1, 7.2.4, 7.2.5, 7.3	Landform does not blend with surrounding landscape and is unstable	D	3	H	• Proposed landform and stabilisation treatments for each zone as specified (Sections 5.2 to 5.4). • Batters re-contoured to a 1:4 slope that shall create a stable landform profile that blends in with the surrounding environment and topography. • Batters shall either have site topsoil or a constructed topsoil utilising subsurface soils and site and/or imported mulch, spread across the face of the batters (50mm depth). • Large woody debris may be placed over the upper face of the batters to provide additional stabilisation as well as habitat. Mulch shall be installed and then tracked in utilising tracked earthmoving equipment (i.e. dozer or posi-trac) to assist in soil stabilisation and create holding points for native seed so it doesn't all end up at the toe of the batter (25mm depth). • Batters shall be ripped along the contour to assist in breaking compaction and water infiltration. The topsoil / mulch shall then be driven over with tracked earthmoving machinery up and down the face of the batter to create imprints in the soil. This shall assist in soil stability and seed retention. • No bulk earthworks proposed in pit floor as soil stability not expected to be an issue.	B	2	L
5 and 7.1	Poor weed management leading to poor establishment of native vegetation	E	3	H	• Existing topsoil stockpiles dominated by weeds to be buried within embankments to a minimum depth of 100 mm. • Ongoing weed management shall occur during the extraction works to ensure adequate control of weeds onsite. • Once a rehabilitation area has been formed (i.e., batter) and topsoil and mulch have been installed, two weed control events shall occur on rehabilitation areas prior to commencement of seeding and tubestock works. • An initial weed control event shall be undertaken to target any weed germination that has occurred due to the initial disturbance, and an additional follow-up control shall occur once the ripping has been completed to target any secondary germination.	B	2	L

					• Herbicides shall be selected for the target species, taking into account the surrounding environment and the constraints this may present.			
7.11	Work phases undertaken out of season of without adequate lead times delaying and leading to poor rehabilitation outcomes.	C	2	M	• Revegetation activities planned and executed in line with works schedule (Section 7.11) to avoid unnecessary delays and maximise rehabilitation outcomes.	B	2	L
7.2.4, 7.9 and 7.10	Poor germination/plant survival and soil hydraulic properties.	C	2	M	• Following bulk earthworks, where it is specifically mentioned, the management zones shall be ripped to aerate and decompact the soil from the civil works to improve vegetation establishment. • Rip lines are to be installed across the contour of the slope at an optimal depth of 300-500mm using a dozer with a single tine. • Rip lines shall be spaced at one metre intervals where possible across the management zones. • Where specified, scarification shall occur immediately prior to the broadcast of seed (in first 50 mm of soil) to create micro-niches for seed germination. • Direct seeding is to be undertaken at the recommended rate of 4 kg per hectare for the batters and 2.5 kg per hectare for the pit base, using a native seed mix suitable for site conditions. The seed shall be pre-treated and then pre-coated with mycorrhizal fungi mix prior to being hand broadcast. Hand broadcasting is the preferred method as it ensures even and adequate coverage. • Native everlastings shall also be hand broadcast at a rate of 5 kg/ha as a cover crop to provide soil stability as well as protection for native germinants. • Planting of tubestock shall be undertaken along the rip lines at the required density and species distribution - 1 plant / 20m^2 (500 stems / ha). • A single 10 g fertiliser tablet shall be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants.	B	2	L
Post installation phase								
5.1.1	Intended and unintended damage to rehabilitation from community, personnel or contractors.	C	2	M	• Signage advising the public, contractors, and employees that rehabilitation works are being progressively undertaken shall be placed on the entry gate into the active site. In addition, rehabilitation areas where there is a direct interface with access tracks and turnarounds shall be clearly delineated with a visible barrier and signage installed stating 'rehabilitation works in progress'. • Regular monitoring to inspect site for damage and any required repairs.	C	2	M

8.1, 8.2	Poor rehabilitation progress towards completion criteria.	C	3	H	• Monitoring shall identify issues early before they have major impacts on rehabilitation and shall be undertaken over several years or potentially longer depending on the demand for sand resource (monitoring regime specified in Section 8.1). • Monitoring results shall trigger maintenance activities specified in Section 8.2 and may include: o On-going weed management; o Re-planting in areas of poor response; o Erosion repair; o Fence repair; and o Disease and pest control.	B	3	M
3.7, 8.2	Adverse whether including climate change on rehabilitation.	C	3	H	• Planting and seeding activities to be undertaken during winter season to take advantage of winter rain and maximise chance of successful germination and establishment. • Species selected shall be sourced locally and shall already be adapted to the local environmental conditions. • Species selected have geographic ranges which span across large portions of southern Western Australia and across multiple IBRA regions which may provide greater ability to adjust to predicted climate change in the region over the long term (DEC 2013).	B	3	M
8.2, 8.3	Soil moisture due to lack of rainfall / hot dry summers	C	3	H	• Monitor seedling survival over the summer period. • Have allowances in place for additional planting should there be high death rates recorded. • Adjust infill planting methodology to include TerraCottem should significant deaths continue over multiple years.	B	3	M

Appendix 7 Management Zones



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Project: Lot 74 Calinup Rd Sand Pit RIP
Project Number: P979A
Client: McDougall Quarries

Drawing: Overview of Rehab Mgmt Zones
Drawing Number: P979A-02
Revision: 2

Date: 12/4/23
Drawn By: MSB

N

Appendix 8 Indicative Works Schedule

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Lot 74 Calinup Rd Rehabilitation Implementation
Indicative Works Schedule - 2022/23
REVA

Current Period: 3/10/22 | **Week Starting 3/10/22**

Anticipated Timing | Actual | % Complete | Actual (beyond plan) | % Complete (beyond plan)

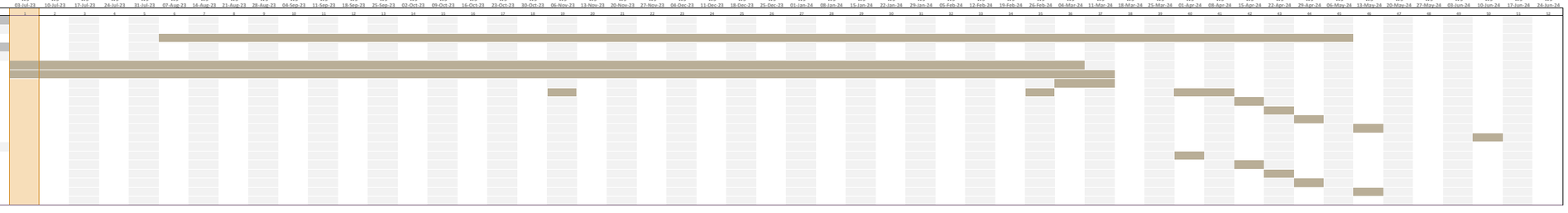
ACTIVITY	PLAN START	PLAN DURATION	WS 03-Oct-22	WS 10-Oct-22	WS 17-Oct-22	WS 24-Oct-22	WS 31-Oct-22	WS 07-Nov-22	WS 14-Nov-22	WS 21-Nov-22	WS 28-Nov-22	WS 05-Dec-22	WS 12-Dec-22	WS 19-Dec-22	WS 26-Dec-22	WS 02-Jan-23	WS 09-Jan-23	WS 16-Jan-23	WS 23-Jan-23	WS 30-Jan-23	WS 06-Feb-23	WS 13-Feb-23	WS 20-Feb-23	WS 27-Feb-23	WS 06-Mar-23	WS 13-Mar-23	WS 20-Mar-23	WS 27-Mar-23	WS 03-Apr-23	WS 10-Apr-23	WS 17-Apr-23	WS 24-Apr-23	WS 01-May-23	WS 08-May-23	WS 15-May-23	WS 22-May-23	WS 29-May-23	WS 05-Jun-23	WS 12-Jun-23	WS 19-Jun-23	WS 26-Jun-23
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PRELIMINARIES AND MOBILISATION																																									
Preliminaries																																									
Project Setup and Administration	03-Oct-22	5 days																																							
Safety Management Plan	03-Oct-22	2 days																																							
Kangaroo fence boundary perimeter	10-Oct-22	10 days																																							
Seed and cutting collection 2022/23 program	10-Oct-22	165 days																																							

Lot 74 Calinup Rd Rehabilitation Implementation
Indicative Works Schedule - 2023/24
REVA

Current Period: 3/7/23 **Week Starting 3/7/23** 1

Anticipated Timing | Actual | % Complete | Actual (beyond plan) | % Complete (beyond plan)

ACTIVITY	PLAN START	PLAN START	PLAN DURATION	IDEAL PERIOD	ACTUAL START	ACTUAL START	ACTUAL DURATION	ACTUAL DURATION	PERCENT COMPLETE
PRELIMINARIES AND MOBILISATION									
Preliminaries									
Seed and cutting collection 2023/24 program	6	07-Aug-23	200 days	40					
SITEWORKS & INSTALLATION (Mobilisation 1 - Cells 18 to 10)									
Rehabilitation Management Zones 1 & 2									
Landform re-creation (by others)	1	04-Mar-24	10 days	36					
Topsoil installation	1	18-Mar-24		37					
Topsoil construction (by others)	36	04-Mar-24		2					
Weed control (initial application)	40	26-Feb-24	10 days	2					
Contour ripping	42	15-Apr-24	5 days	1					
Vertical imprinting	43	22-Apr-24	5 days	1					
Weed control (follow-up application)	44	29-Apr-24	5 days	1					
Seed broadcasting	46	13-May-24	5 days	1					
Tubestock installation	50	10-Jun-24	5 days	1					
Rehabilitation Management Zones 3									
Weed control (intial application)	40	01-Apr-24	2 days	1					
Ripping	42	15-Apr-24	5 days	1					
Scarification	43	22-Apr-24	5 days	1					
Weed control (follow-up application)	44	29-Apr-24	3 days	1					
Seed broadcasting	46	13-May-24	1 days	1					
Tubestock installation	55	10-Jun-24	2 days	1					



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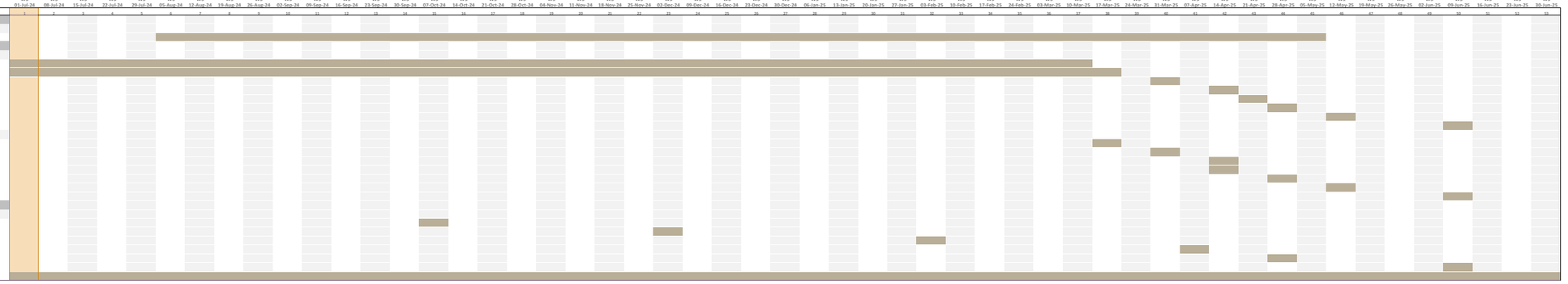
Lot 74 Calinup Rd Rehabilitation Implementation

Lot 74 Calinup Rd Rehabilitation Implementation
Indicative Works Schedule - 2024/25
REVA

Current Period: 1/7/24 | Week Starting 1/7/24 | 1

Anticipated Timing | Actual | % Complete | Actual (beyond plan) | % Complete (beyond plan)

ACTIVITY	PLAN START	PLAN START	PLAN DURATION	IDEAL PERIOD	ACTUAL START	ACTUAL START	ACTUAL DURATION	ACTUAL DURATION	PERCENT COMPLETE
PRELIMINARIES AND MOBILISATION									
Preliminaries									
Seed and cutting collection 2024/25 program	6	05-Aug-24	200 days	40					
SITEWORKS & INSTALLATION (Mobilisation 2 - Cells 9 to 1)									
Rehabilitation Management Zones 1 & 2									
Landform re-creation (by others)	1	01-Jul-24	10 days	37					
Topsoil installation	1	17-Mar-25	10 days	38					
Weed control (initial application)	40	31-Mar-25	2 days	1					
Contour ripping	42	14-Apr-25	5 days	1					
Vertical imprinting	43	21-Apr-25	5 days	1					
Weed control (follow-up application)	44	28-Apr-25	5 days	1					
Seed broadcasting	46	12-May-25	5 days	1					
Tubestock installation	50	09-Jun-25	5 days	1					
Rehabilitation Management Zones 3									
Removal of access track and turnaround	38	17-Mar-25	5 days	1					
Weed control (initial application)	40	31-Mar-25	2 days	1					
Ripping	42	14-Apr-25	3 days	1					
Scarification	42	14-Apr-25	2 days	1					
Weed control (follow-up application)	44	28-Apr-25	3 days	1					
Seed broadcasting	46	12-May-25	3 days	1					
Tubestock installation	50	09-Jun-25	2 days	1					
MONITORING AND MAINTENANCE									
Cells 18 to 10									
Post-planting weed control - spring	15	07-Oct-24	5 days	1					
Rehabilitation monitoring - spring	23	02-Dec-24	5 days	1					
Post-planting weed control - summer	32	03-Feb-25	5 days	1					
Post-planting weed control - autumn	41	07-Apr-25	5 days	1					
Rehabilitation monitoring - autumn	44	28-Apr-25	5 days	1					
Infill planting (if required) - winter	50	09-Jun-25	5 days	1					
Fence maintenance (if required)	1	01-Jul-24	365 days	53					



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Lot 74 Calinup Rd Rehabilitation Implementation

Lot 74 Calinup Rd Rehabilitation Implementation
Indicative Works Schedule - 2023/24
REVA

Current Period: 7/7/25 | **Week Starting 7/7/25**

Anticipated Timing | Actual | % Complete | Actual (beyond plan) | % Complete (beyond plan)

ACTIVITY	PLAN START	PLAN DURATION	WS 07-Jul-25	WS 14-Jul-25	WS 21-Jul-25	WS 28-Jul-25	WS 04-Aug-25	WS 11-Aug-25	WS 18-Aug-25	WS 25-Aug-25	WS 01-Sep-25	WS 08-Sep-25	WS 15-Sep-25	WS 22-Sep-25	WS 29-Sep-25	WS 06-Oct-25	WS 13-Oct-25	WS 20-Oct-25	WS 27-Oct-25	WS 03-Nov-25	WS 10-Nov-25	WS 17-Nov-25	WS 24-Nov-25	WS 01-Dec-25	WS 08-Dec-25	WS 15-Dec-25	WS 22-Dec-25	WS 29-Dec-25	WS 05-Jan-26	WS 12-Jan-26	WS 19-Jan-26	WS 26-Jan-26	WS 02-Feb-26	WS 09-Feb-26	WS 16-Feb-26	WS 23-Feb-26	WS 02-Mar-26	WS 09-Mar-26	WS 16-Mar-26	WS 23-Mar-26	WS 30-Mar-26	WS 06-Apr-26	WS 13-Apr-26	WS 20-Apr-26	WS 27-Apr-26	WS 04-May-26	WS 11-May-26	WS 18-May-26	WS 25-May-26	WS 01-Jun-26	WS 08-Jun-26	WS 15-Jun-26	WS 22-Jun-26	WS 29-Jun-26
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
MONITORING AND MAINTENANCE																																																								
Cells 18 to 1																																																								
Post-planting weed control - spring	13-Oct-25	10 days																																																					
Rehabilitation monitoring - spring	08-Dec-25	10 days																																																				
Post-planting weed control - summer	09-Feb-26	10 days																																																				
Post-planting weed control - autumn	13-Apr-26	10 days																																																				
Rehabilitation monitoring - autumn	04-Apr-26	10 days																																																				
Infill planting (if required) - winter	15-Jun-26	10 days																																																				
Fence maintenance (if required)	07-Jul-25	365 days																																																			

Appendix 9 Record Keeping Templates

Weed Control and Herbicide Daily Usage Form

Project No / Name		Temp - min / max, °C	
Project Manager		Wind - min / max, km/h	
Area treated, ha		Dew - None / Light / Heavy	
Supervisor		Operator 2	
Operator 1		Operator 3	
Date		Start / Finish Times	

Treatment types: Spray / Basal Bark / Drill & Fill / Cut & Paint / Manual removal (cross out not applicable)

Herbicides etc sprayed	Dilution rate with water *	**Herbicides for BB, D&F, C&P**	Dilution rate
Glyphosate 360 or 540	100 or 70 mL / 10 L	Glyphosate 360 or 540	45/55 or 40/60 with water
Metsulfuron methyl		Total glyphosate used, mL	
Garlon		Garlon	18 m L/ L diesel
Other (specify)		Total Garlon used, mL	
Agral wetting agent	1.3 mL / 10 L	Total diesel used, L	
Envirodye Red or Blue	10 mL / 10 L	**Triple rinsing of sprayers**	
Total herbicide used, mL		**Comments**	
Total water used, L			
Main weeds targetted			

* Manufacturer's general recommendation only - check for particular species and write in actual used

LOT 74 CALINUP RD REHAB
PROVENANCE SEED DETAILS

Batch ID	Date	Species	Location	No of Specimens Collected From	Original Quantity (g)	Withdrawal (g)	Quantity Remaining (g)	Age

LOT 74 CALINUP RD REHAB
CELL REHABILITATION DETAILS

Rehab Cell No:	
Activity Date:	
Conducted By:	

Action Undertaken		
Date	**Activity**	**Description**
	(e.g. Seeding, planting, weed control, seed pre-treatment, seed collection, topsoil construction, rabbit control, etc.)	(e.g. Seed broadcasting rate and qty, seedling rate and qty, provenance seed qty and age, topsoil installation and age, etc.)

Additional Comments
(Additional information about site conditions, rainfall totals prior and after, and other general comments)

Prior Works History		
Date	**Activity**	**Description**
	(Works completed previously)	(Works completed previously)

** Attach species list, maps, photos, etc. as req'd

LOT 74 CALINUP RD REHAB
TOPSOIL RECORDS

Date	Rehab Cell	Source (onsite or constructed)	Qty (m3)	Age of Topsoil Post-Stripping	Depth Spread	Method of Installation	Constructed Topsoil Information
	(e.g. cell 3)				(e.g. 50mm)	(e.g. posi-track)	(i.e. compost make-up, moisture content, oxygen content, length stockpiled for, additives, treatments, etc.)

LOT 74 CALINUP RD REHAB
IMPORTED MATERIAL REGISTER

Date	Rehab Cell	Imported Material (mulch, etc.)	Qty (m3)	Age of Material	Original Location	Disease / Weed Controls Prior to Entering Onsite	Additional Information
	(e.g. cell 3)	(e.g. mulch)			(e.g. BORR South)	(e.g. pasturized for 6 months, dieback free assessed area, etc.)	

LOT 74 CALINUP RD REHAB
QUADRAT MONITORING SHEETS

Quadrat Information	
Site / Quadrat Name:	
Quadrat GPS Location:	1) 2) 3) 4)
Current Site Conditions:	

	Nov-23	Apr-24	Nov-24	Apr-25	
Native Species					**Comments:**
Trees					
Shrubs					
Groundcovers					
TOTAL					

Weed Species					**Comments:**
TOTAL					

	Nov-23	Apr-24	Nov-24	Apr-25	
Density					**Comments:**
Total Native Stems Rec.					
Native Stem Density (stems / m2)					
Total Weed Stems Rec.					
Weed Stem Density (stems / m2)					

Diversity					**Comments:**
Total Native Species Rec.					
Total Weed Species Rec.					

Cover					**Comments:**
% Native Cover					
% Weed Cover					
% Soil Cover					

Structure					**Comments:**
% Understorey					
% Middlestorey					
% Overstorey					

Other					**Comments:**
Presence of Fauna					
Presence of Disease / Pests					

Additional Comments:

Appendix I – Groundwater Monitoring Report

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To :	McDougall Quarries Pty Ltd (c/o – Element)	Date :	29 Nov 22
Attention :	Daniel Lewis (Element)	Our Ref :	J6978b
Email :	*daniel.lewis@elementwa.com.au*	Pages :	30

LOT 2 CALINUP ROAD, GELORUP
GROUNDWATER LEVEL MONITORING – JUNE 2021 TO NOVEMBER 2022

Dear Daniel,

Please find below summary of JDA groundwater level monitoring performed at Lot 2 Calinup Rd, Gelorup between June 2021 to November 2022. This report is presented in the following sections:

1. *Introduction*
2. *Study Area Characteristics*
3. *Climate*
4. *Monitoring Layout*
5. *Monitoring Results and Analysis*
6. *Maximum Groundwater Level*
7. *Conclusions*

1. INTRODUCTION

JDA was appointed by McDougall Quarries Pty Ltd to conduct groundwater level monitoring at Lot 2 Calinup Road, Gelorup (Figure 1) (herein referenced as the Study Area) between June 2021 and November 2022. Previous water monitoring between June 2021 to October 2021 was reported in JDA (2021).

The Study Area is currently used for sand extraction under Ministerial Statement 767 (2008). Section 11 of Ministerial Statement 767 states the excavation depth should not be less than 2 m above the historical maximum water level for the location, or less than 20 mAHD, whichever is greater (EPA, 2008). JDA understands this elevation (20 mAHD) was based on data collected in 1999 and prior to extraction of sand within the pit, with the landform significantly modified since the previous monitoring. The recent Ministerial Statement 1186 (EPA 2022) related to amendments of the proposal boundary and development envelope of the Study Area and Section 11 of Ministerial Statement 767 (2008) was not altered (EPA, 2021).

Presented below is a summary of JDA's groundwater level monitoring and analysis for the Study Area across the monitoring period.

2. STUDY AREA CHARACTERISTICS

The topography of the Study Area is generally characterised by a sand ridge extending north-south along the western Study Area boundary; denoted as 'Gelorup ridge' in EPA (2005); and forms part of a larger dune systems across the Greater Bunbury area (Baddock et al., 2014; DWER, 2019). Elevations rise to about 36 to 38 mAHD across the ridge (Figure 2) with individual smaller sand mounds rising to 46 mAHD in the north and south and to 59 mAHD in the central sand mound. Depressions either side of the ridge are approximately 16 mAHD.

The surface geology of the Study Area is generally mapped as sands associated with Tamala Limestone (Qts) in GSWA (1982) with Bassendean Sand (Qpb) along the eastern extent, Figure 2.

The Tamala Limestone within the area is often denoted as the "Spearwood Dune System" and generally comprises creamy white to creamy yellow sands, predominantly medium-grained, moderately sorted and sub-angular to rounded (Baddock et al., 2014; DWER, 2019). The Bassendean Sand is located east of the Tamala Limestone and has an interfingering relationship with the Guildford Formation (Qpa) which underlies small dunes derived from Bassendean Sand although this varies across the coastal plain (Baddock et al., 2014).

The swamp deposits and peaty sands (Qhw) situated just east of the Study Area are the most recent deposits in the area and are typically associated with the surrounding lakes and wetlands (DWER, 2019). These deposits are typically 1 to 3 m deep and overly Tamala Limestone or Bassendean Sand.

Regional groundwater flow direction is generally east to west (Commander, 1984; DWER, 2019). The water table along the western areas of the Swan Coastal Plain typically rise only 0.5 to 1 m during winter (DWER, 2019). Recharge is predominantly via infiltration of precipitation although in the swamp deposits/peaty sands, recharge is likely to cause localised perching.

3. CLIMATE

The Gelorup area is characterised by a Mediterranean climate with warm dry summers and cool wet winters.

Rainfall data is provided by three Bureau of Meteorology (BoM) rainfall gauging stations, namely *Bunbury Post Office* (009514, 1877-1985); *Bunbury Power Station* (009885, 1985-1995); and *Bunbury* (009965, 1996-2022), Figure 3. The Bunbury rain gauges are located 10 to 14 km north to north-east of the Study Area. The Thirlmere rain gauge (Site ID. 009648), Figure 3, is located closest to the Study Area, 7 km south-east, but is not regularly monitored with few complete rainfall years since 1997. In general, the Thirlmere annual rainfall totals are higher than recorded at Bunbury.

The average annual rainfall, 1877 to 2020, for Bunbury was 829 mm, with 30-year and 10-year averages of 704 mm and 685 mm, respectively. This represents a 15% (30-year average) and 17% (10-year average) decrease from the long-term average annual rainfall and is consistent with decreasing rainfall across south west Western Australia (DoW, 2015). The seasonal rainfall distribution has also altered since 1990, with a reduction of average monthly totals in the winter months, but no reduction in summer months.

Rainfall recorded in 2021 was 963.8 mm at Bunbury (Site ID. 009965), over 130 mm higher than the long-term average (1877-2020) of 829 mm. Rainfall in 2022 to end-October was 741.2 mm, marginally above the 30-year average (1991-2020) of 704 mm but 90 mm below the long-term average.

Pan evaporation is provided by the Department of Primary Industries and Regional Development (DPIRD) Dardanup (Waterloo) weather station where annual pan evaporation has ranged from 1,400 to 2,000 mm for the 2010 to 2020 period with an average around 1,720 mm. This is higher than the estimated pan evaporation in Luke (1987) of 1,550 mm but within the range of recently recorded pan evaporation (2010 to 2020). Pan evaporation in 2021 at Dardanup (Waterloo) was 1,732 mm; similar to the 2010 to 2020 average.

4. MONITORING LAYOUT

4.1 Study Area Groundwater Monitoring Bores

Seven groundwater monitoring bores, GL01 to GL07 on Figure 4, were installed by Edrill Environmental on 02 June 2021 and supervised by JDA. The bores were constructed with 50 mm Class 18 threaded PVC, screened in the lowest 3 m and finished with a gravel pack and bentonite seal. Drilling continued until an impermeable layer was reached or groundwater was encountered. The monitoring bores were pumped for 20 minutes post-drilling to develop out fines and drilling water. In south-eastern bores, (GL02, GL03, GL04 and GL05), an impermeable layer was encountered around 9.5 to 11.5 mAHD. In the remaining bores (GL01, GL06 and GL07) bores were terminated once groundwater was encountered, around 4 to 7 mAHD.

Bore details are provided in Table 1 and locations shown on Figure 4.

Odyssey capacitance water level loggers were installed in all bores on 04 June 2021. Static groundwater levels were recorded at 1 hour (winter/spring) and 3 hour intervals (summer/autumn) by the water level loggers and verified on-site via manual still water level measurements using an electrical depth probe. Loggers were downloaded on 04 July and 26 October 2021 and 04 June and 01 November 2022.

The HYDSTRA data management system was used to store, process and analyse water level data recorded by the Odyssey capacitance loggers.

4.2 DWER Long-Term Monitoring Bores

DWER monitoring bores BY10B and BY21C were drilled as part of the Bunbury Shallow-Drilling Groundwater Investigation (1975-1980) (Commander, 1984).

BY10B is located 1.7 km west of the Study Area, Figure 5. The bore was drilled in sands associated with Tamala Limestone to 12 m depth, gravel packed and screened in the lowest 6 m (6 to 12 m) with the base of the superficial aquifer likely around 20 m below surface (Commander, 1993). The seasonal variation of BY10B is around 0.5 m.

BY21C is located 4.3 km south-west of the Study Area, Figure 5. The bore was drilled using a mud rotary method to 24 m depth and screened in the lowest 6 m (18 to 24 m) The lithological logs indicates coarse sand to 4.3 m depth then yellow sand with bands of clay to the termination depth (Commander, 1993). There is conflicting information as to whether BY21C is screened within the superficial (DWER, 2019 & 2021) or Yarragadee aquifer (Commander, 1983 & 1984). The seasonal variation of BY21C (1979 to 1999) was around 0.5 to 1 m. However as groundwater levels have fallen, the seasonal variation (2009 to *present*) is 1.3 to 2 m.

JDA requested and was granted permission to access DWER bores BY10B and BY21C with manual still water level measurements taken during site visits. In addition, manual water level measurements were extracted from DWER's *Water Information Reporting* platform. Details of the bores are shown in Table 1.

TABLE 1: GROUNDWATER MONITORING BORE DETAILS

Bore ID	GDA 1994 Coordinates		Natural Surface (mAHD)	Top of Casing (mAHD)	Stick-up (m)	Depth (m)	Date Constructed
	Easting	Northing					
GL01	372217	6298310	29.4	30.12	0.72	22.85	02 June 2021
GL02	372437	6297811	28.49	29.14	0.65	18	02 June 2021
GL03	372581	6297954	19.52	20.22	0.70	9	02 June 2021
GL04	372489	6298364	20.27	21.04	0.77	10.3	02 June 2021
GL05	372570	6298633	16.19	16.79	0.60	7.25	02 June 2021
GL06	372371	6298920	27.77	28.52	0.75	23.23	02 June 2021
GL07	372495	6299240	20.29	21.02	0.73	16.86	02 June 2021
BY10B	370623	6299032	10.16	11.11[1]	-	12	17 December 1975
BY21C	368889	6295768	12.73	13.53	0.80	24	14 May 1979

Note: 1. Measurement Point

5. MONITORING RESULTS AND ANALYSIS

Recorded fluctuations in logged groundwater levels are presented on Figures 6 and 7. Manually recorded groundwater levels by JDA are presented in Table 2, with peak recorded groundwater levels in 2021 and 2022 summarised in Table 3.

TABLE 2: MANUALLY RECORDED GROUNDWATER LEVELS - 2021 AND 2022

Bore ID	Groundwater Level (mAHD)				
	04-Jun 21	01-Jul 21	26-Oct 21	01-Jun 22	01-Nov 22
GL01	8.22	8.22	8.52	8.28	8.42
GL02	13.67	13.69	14.22	13.76	14.05
GL03	13.86	13.91	14.64	13.87	14.43
GL04	13.53	13.62	14.23	13.64	14.06
GL05	12.68	12.86	13.77	12.66	13.56
GL06	6.61	6.64	7.12	6.69	6.94
GL07	5.88	5.92	6.37	5.91	6.21

TABLE 3: PEAK WINTER GROUNDWATER LEVELS – 2021 AND 2022

Bore ID	2021 (June to December)			2022 (January to November)		
	Date Recorded	Water Level (mAHD)	Separation to Natural Surface (m)	Date Recorded	Water Level (mAHD)	Separation to Natural Surface (m)
GL01	26 October[1]	8.52[1]	20.88	01 November	8.42	20.98
GL02	21 November	14.25	14.23	01 November[2]	14.05[2]	14.44
GL03	27 October	14.64	4.88	30 October	14.43	5.09
GL04	01 November	14.24	6.03	28 October	14.065	6.205
GL05	19 October	13.81	2.38	19 September	13.64	2.55
GL06	13 November	7.15	20.62	01 November	6.94	20.83
GL07	25 November	6.41	13.88	28 October	6.21	14.08

Note: 1. GL01: No logger data after 26 October in 2021. Peak groundwater level in 2021 likely 0.03-0.05 m higher.
2. Logged failure at GL02 from June to November 2022. Peak groundwater level shown for 2022 is the manual recorded water level (Table 2).

Local groundwater flow direction is generally east to west/north-west and is relatively consistent with the regional groundwater flow in Commander (1984). An abrupt shift in groundwater levels was recorded between north-west to western bores (GL01, GL06 & GL07) and south-east to eastern bores (GL02 to GL05) and likely represents groundwater flow from a lower conductivity to higher conductivity soil, Bassendean Sand to Tamala Limestone. Baddock et al. (2014) and DWER (2019) suggest ranges of horizontal saturated hydraulic conductivities in the Bassendean Sand of 5 to 20 m/day and in the Tamala Limestone of 10 to 1,000 m/day, i.e. up to a 50 fold increase, and hydraulic gradients at the interface of the two formations are likely to be steep as a result. There is also potentially a discontinuity across the Tamala Limestone and Bassendean Sand boundary (Baddock et al., 2014).

In both 2021 and 2022, groundwater levels rose steadily and generally peaked in late-October/early-November, Table 3 and Figures 6 and 7. Manual groundwater level readings by JDA on 26 October 2021 and 01 November 2022, Table 2, were near the respective annual peaks.

Peak groundwater levels at GL01, GL06 and GL07 ranged from 6.41 to 8.52 mAHD in 2021 and 6.21 to 8.42 mAHD in 2022. Peak groundwater levels at GL02 to GL05 ranged from 13.81 to 14.64 mAHD in 2021 and 13.64 to 14.43 mAHD in 2022. Groundwater levels in 2022 generally peaked 0.1 to 0.2 m lower than in 2021, Table 2 and Figures 6 and 7, commensurate with the 220 mm of reduced annual rainfall.

Groundwater levels in GL05 exhibited a steeper increase in winter, with an earlier and prolonged period of peak (~2.5 months) compared to the other monitoring bores during both years. Groundwater level rose from June to end-August 2021 1.1 m to a peak of 13.81 mAHD with groundwater generally levels remaining within a ± 0.05 m range mid-November 2021, Figure 7. A similar trend was observed in 2022 with groundwater levels peaking at 13.64 m, 0.17 m lower than the 2021 peak. This bore is located closest to mapped swamp deposits and multiple use wetlands, Figure 2. These deposits are typically shallow in depth (1 to 3 m) and surround excavated dams (Figure 5). The elevation of these dams (from LiDAR) is around 13.5 to 14 mAHD and groundwater within a small area west of these dams (including at GL05) may flow west to east during winter, reverse of the wider local/regional groundwater flow direction, with dams acting as a local 'control' of groundwater levels in the area.

Separation to natural surface from groundwater levels was higher in bores located on the sand ridge compared to lower-lying areas to the east of the ridge. The seasonal variation generally increased from west to east with a seasonal variation across June to November 2022 of 0.19 m at GL01; then 0.26 and 0.29 m at GL06 and GL02; then 0.3 to 0.56 m at GL07, GL04 and GL03 with the highest of 0.90 m at GL05.

Chart 1 below shows a cross-section visualisation of estimated groundwater levels between bores GL01 and GL04 on 26 October 2021. There is likely to be a steeper hydraulic gradient at the boundary of the Tamala Limestone sands and Bassendean Sands with the location of this inferred from GSWA (1982).

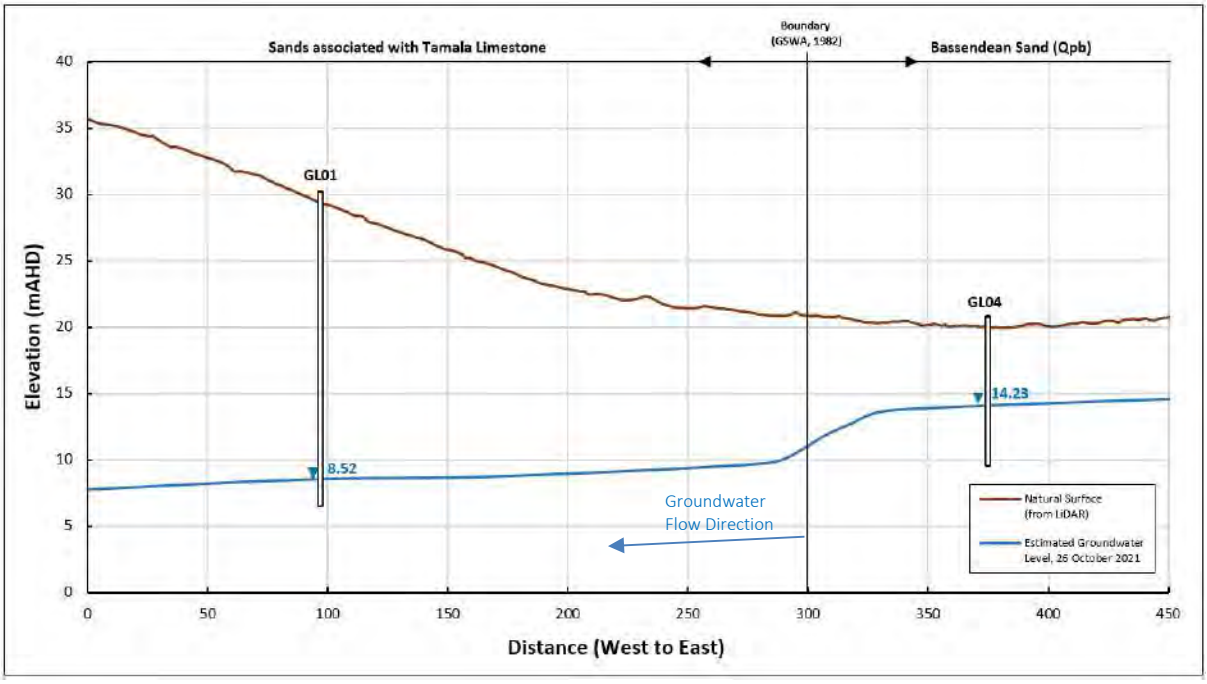

CHART 1: CROSS-SECTION, GL01-GL04

6. MAXIMUM GROUNDWATER LEVEL (MGL)

DWER Monitoring Bore BY10B

The water level time series for DWER bore BY10B, Figure 8, shows a lowering between 1999 and 2007 with annual peak groundwater levels falling by 0.50 m. Annual peak groundwater levels between 1977 and 1999 are around 6.1 to 7.2 mAHD with levels between 2007 and 2021 around 5.5 to 6.25 mAHD. The seasonal variation is generally 0.3 to 0.6 m, consistent with observations in Commander (1984) of coastal bores within the Bunbury region. There were noticeable shifts in the data between 1977 and 2021. The maximum recorded groundwater level for the period, 7.26 mAHD, occurred on 23 November 1988. The Thirlmere rain gauge does suggest significant rainfall between May and September 1988 of 833 mm which could have given rise to the high groundwater level, however, the significant drop between November 1988 and February 1989 of 1.4 m likely represents erroneous data within the period. There is likely to be further erroneous levels within the period 1988 to 1999 as in some cases, significant falls or rises are recorded between monitoring events a month or two apart.

Due to significant uncertainty with pre-2006 data, an Average Annual Maximum Groundwater Level (AAMGL) and Maximum Groundwater Level (MGL) for BY10B has been calculated for the period 2007 to 2020. The AAMGL is 6.00 mAHD with the MGL at 6.25 mAHD.

DWER Monitoring Bore 21C

Figure 9 shows the water level time series for BY21C. The seasonal variation has changed significantly over the recorded period 1979 to 2020 with an average seasonal variation of 0.5 m in 1979 to 1987 rising to 0.6 to 0.9 m between 1987 to 2000 and 1.5 to 2 m between 2008 and 2020. This increase of seasonal variation is predominantly shown as a fall in the minimum groundwater level and may be influenced by increased groundwater abstraction within the rural-residential Stratham area (Figure 5). The AAMGL (1979 to 2020) for BY21C is 4.74 mAHD with the MGL of 5.49 mAHD recorded on 16 October 2013. 2013 and preceding years all show annual rainfall totals just below the long-term average and the reason for the maximum occurring at this time is therefore unclear.

The groundwater levels measured by JDA on 26 October 2021 and 01 November 2022 at BY21C were 0.75 m and 0.9 m, respectively, lower than the prior 2 'dry' years and suggests the bore is significantly influenced by unknown external factors, Figure 9. With uncertainty also in the screening aquifer of the bore, BY21C was deemed by JDA as not appropriate for comparison to the Study Area groundwater levels.

Study Area Monitoring Bores

DWER Bore BY10B has been used by JDA to adjust groundwater levels across the Study Area to an MGL. The 26 October 2021 measurement by JDA of 6.01 mAHD was approximately at the bore AAMGL (2007-2020) of 6.00 mAHD. JDA therefore consider peak water levels recorded in 2021 near the end of October 2021, Tables 2 and 3, represent the Study Area AAMGL.

To estimate MGL in 2021, a correction of +0.24 m was applied to Study Area groundwater levels measured on 26 October 2021, representing the difference between JDA's 26 October 2021 measurement at BY10B of 6.01 mAHD and the MGL (2007-2020) of 6.25 mAHD. For 2022, a correction of +0.34 was applied to groundwater levels measured on 1 November 2022.

Table 4 shows MGL values calculated from both 2021 and 2022 groundwater levels. Whilst the MGL for both years are similar, MGL values calculated from 01 November 2022 groundwater levels are at or slightly lower than 2021. JDA therefore consider the 2021 estimates of MGL to be a more accurate representation of a long-term MGL for the Study Area.

Figure 10 presents the MGL contours for the Study Area based on the 2021 peak groundwater levels. These contours are estimates only, and are based on the mapped interface of the Tamala Limestone associated sands with the Bassendean Sands mapped in GSWA (1982) (see Figure 2). This interface was adjusted around GL02 as groundwater levels at GL02 were more in-line with Bassendean Sand groundwater bores (GL03 to GL05) than the Tamala Limestone bores (GL01, GL06 & GL07).

TABLE 4: CALCULATION OF MGL FROM 2021 AND 2022 GROUNDWATER LEVELS

Bore ID	2021 MGL (JDA, 2021)			2022 MGL		
	Groundwater Level 26 October 2021	Correction	MGL (mAHD)	Groundwater Level 01 November 2022	Correction	MGL (mAHD)
GL01	8.52	+0.24	8.76	8.42	+0.34	8.76
GL02	14.22	+0.24	14.46	14.05	+0.34	14.39
GL03	14.64	+0.24	14.88	14.43	+0.34	14.77
GL04	14.23	+0.24	14.47	14.06	+0.34	14.40
GL05	13.77	+0.24	14.01	13.56	+0.34	13.90
GL06	7.12	+0.24	7.36	6.94	+0.34	7.28
GL07	6.37	+0.24	6.61	6.21	+0.34	6.55

7. CONCLUSIONS

JDA concludes that:

- Rainfall in 2021 at BoM's Bunbury rain gauge of 963.8 mm was over 130 mm higher than the long-term annual average (1877-2020) of 829 mm. Rainfall in 2022 to end of October was 741.2 mm and 90 mm below the long-term annual average, but marginally above the 30-year annual average (1991-2020) of 704 mm.
- Regional groundwater flow is generally east to west with seasonal variations around 0.5 to 1 m close to the coast. The local groundwater flow direction was east to west/north-west.
- Groundwater levels generally peaked in late-October/early-November in both 2021 and 2022.
- Bores within sands associated with Tamala Limestone (GL01, GL06 and GL07) had 2021 peak groundwater levels ranging from 6.41 mAHD (GL07) to 8.52 mAHD (GL01), and in 2022 from 6.21 mAHD to 8.42 mAHD.
- Bores within Bassendean Sand (GL02 to GL05) had 2021 peak groundwater levels ranging from 13.81 mAHD (GL05) to 14.64 mAHD (GL03), and in 2022 from 13.64 mAHD to 13.43 mAHD.
- Groundwater levels in bore GL05 are likely influenced by swamp deposits and excavated dams located east (up-gradient) of the bore.
- Change in groundwater levels between bores likely reflects groundwater flow from low to high hydraulic conductivity soils, i.e. Bassendean Sands to sands associated with Tamala Limestone.
- Peak groundwater levels in 2022 were generally 0.1 to 0.2 m lower than 2021, commensurate with reduced rainfall received.
- Groundwater level measured at DWER long-term monitoring bore BY10B on 26 October 2021 of 6.01 mAHD was similar to its' AAMGL of 6.00 mAHD. JDA therefore consider groundwater levels recorded near the end of October 2021 represent the Study Area AAMGL. Peak groundwater level measured by JDA on 01 November 2022 was about 0.1 m below the bore AAMGL (2007-2020).
- Maximum Groundwater Level (MGL) estimated for both 2021 and 2022 were similar. The 2021 MGL is considered to be a more accurate representation of a long-term MGL for the Study Area with MGL contour mapping based on the boundary of the Tamala Limestone sands and Bassendean Sands mapped in GSWA (1982).

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Luke, G.L, Burke, K.L. & O'Brien, T.M. (1987) *Evaporation data for Western Australia – Resource Management Technical Report No. 65*. Perth: W.A. Department of Agriculture, division of Resource Management. October 1987.

Attachments:

Figure 1: Location Plan

Figure 2: Existing Study Area Characteristics

Figure 3: Rainfall and Evaporation

Figure 4: Study Area Bore Locations

Figure 5: DWER Long-Term Monitoring Bores

Figure 6: Logged Groundwater Levels – GL01, GL06 and GL07

Figure 7: Logged Groundwater Levels – GL02, GL03, GL04 and GL05

Figure 8: DWER Bore BY10B Groundwater Level Time-Series, AAMGL and MGL

Figure 9: DWER Bore BY21C Groundwater Level Time-Series, AAMGL and MGL

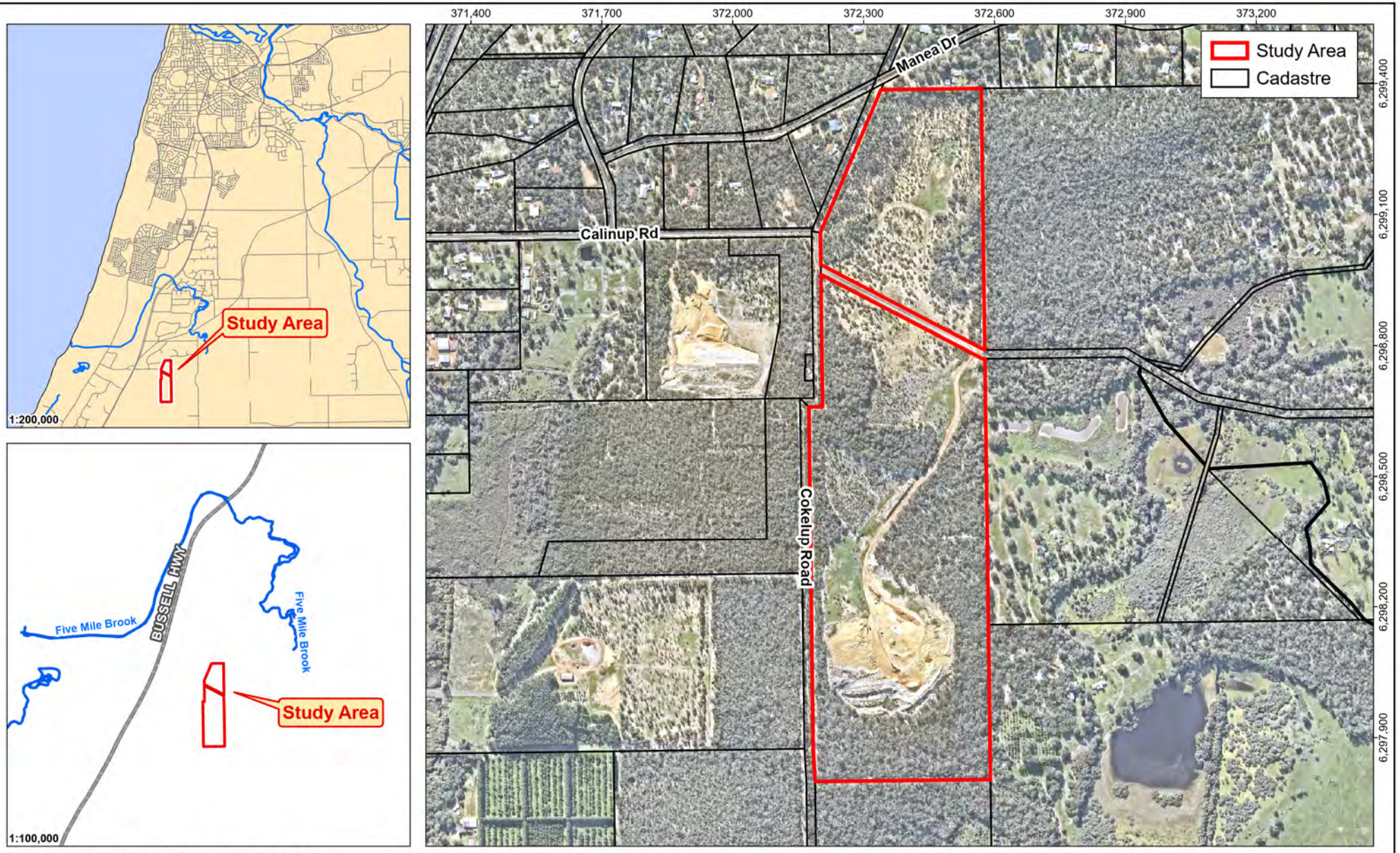
Figure 10: Estimated Maximum Groundwater Level (MGL) Contours

Appendix A: Bore Lithological Logs

If you have any queries on this report, please contact Matthew Yan or Michael Ioannidis.

Regards,

JDA CONSULTANT HYDROLOGISTS



Data Source: Nearmaps (2022), 04 July 2022.

Coordinate System: GDA 1994, Zone 50

JDA Consultant Hydrologists

Job No. J6978

Scale: 1:12,000 @A4

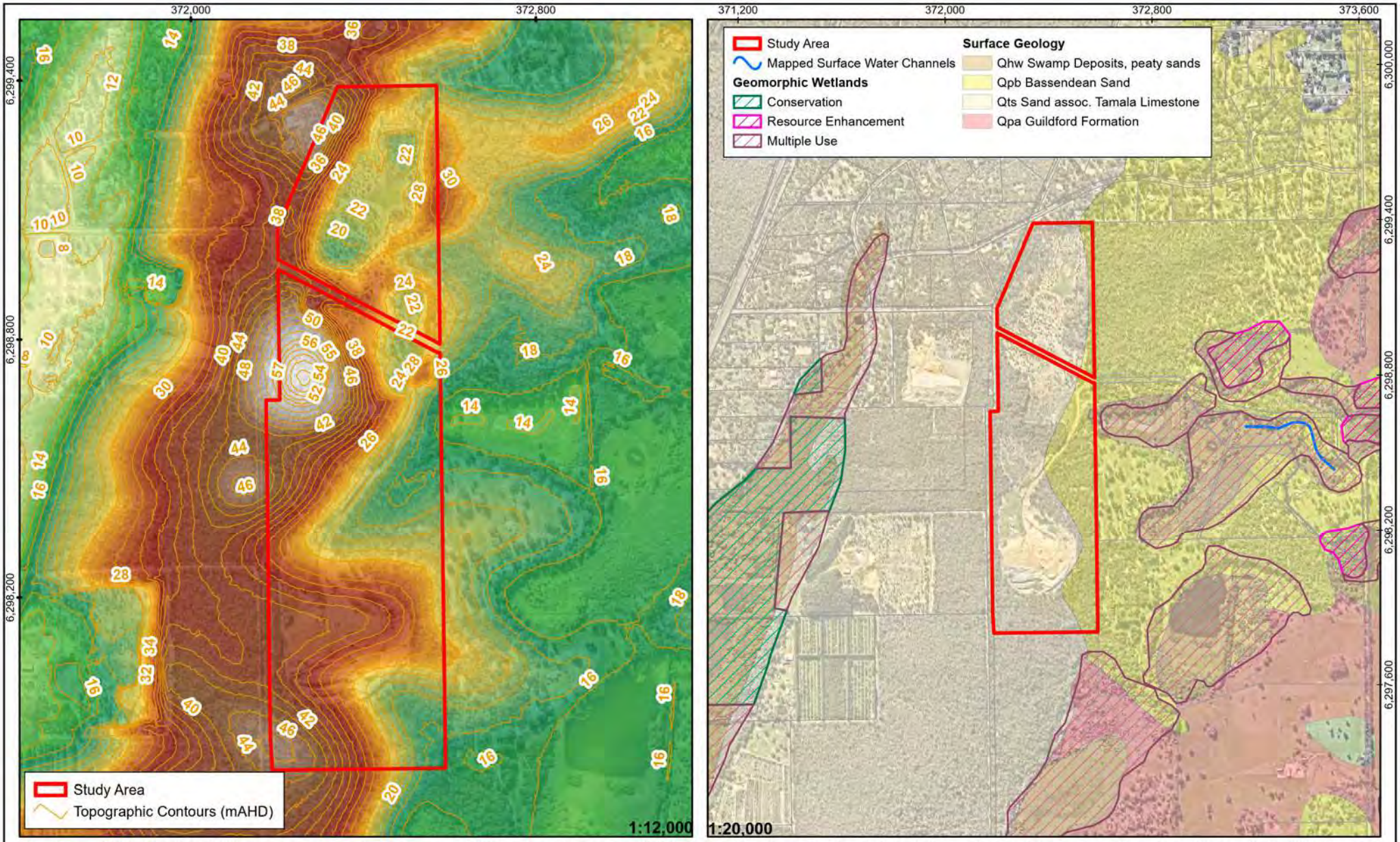
0 100 200 300 400 Metres

N

McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 1: Location Plan



Data Source: GSWA (1982) *1: 50 000 urban geology map - Bunbury - Burekup (2031 III - 2031 II)*. Landgate (2019) *Medium Scale Topo Water Line (LGATE-018)*; NearMaps (2022)

Coordinate System: GDA 1994, Zone 50

JDA

Job No. J6978

0 100 200 300 400 Metres

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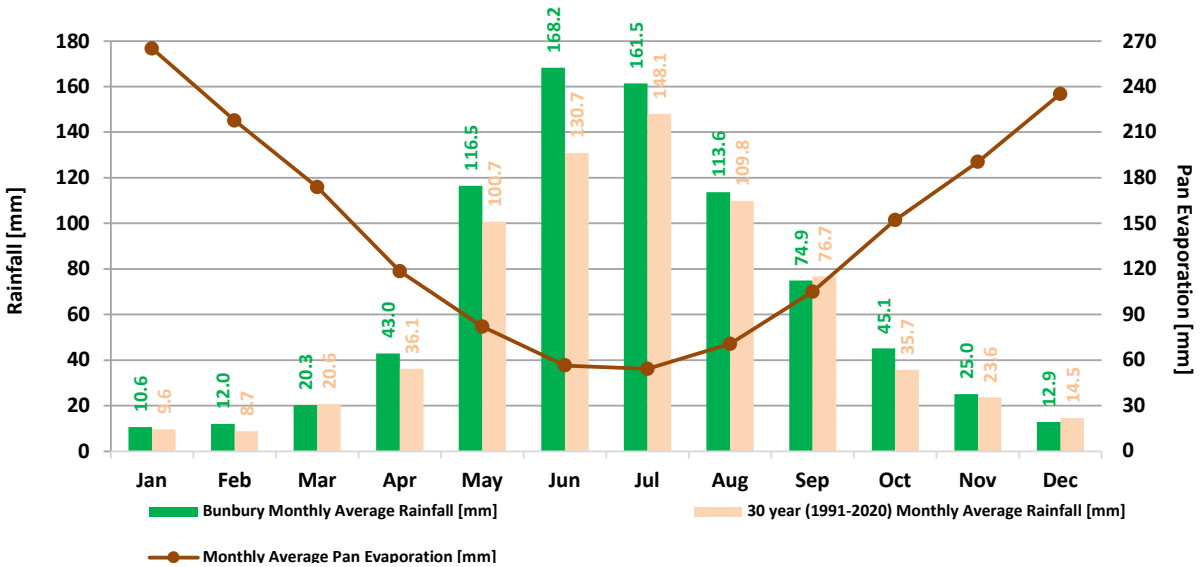
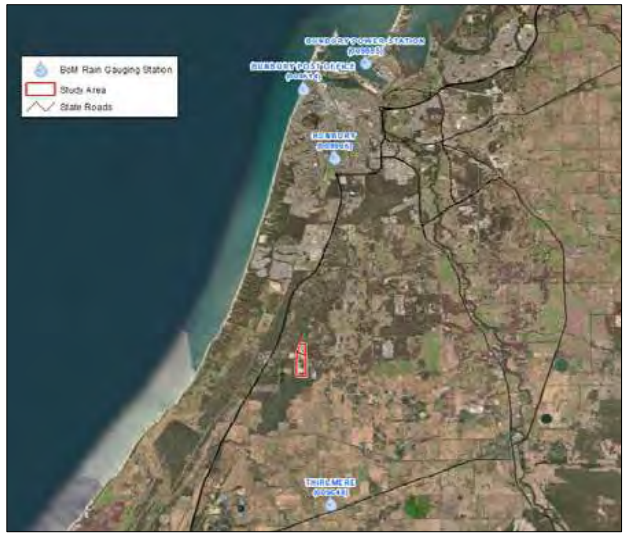
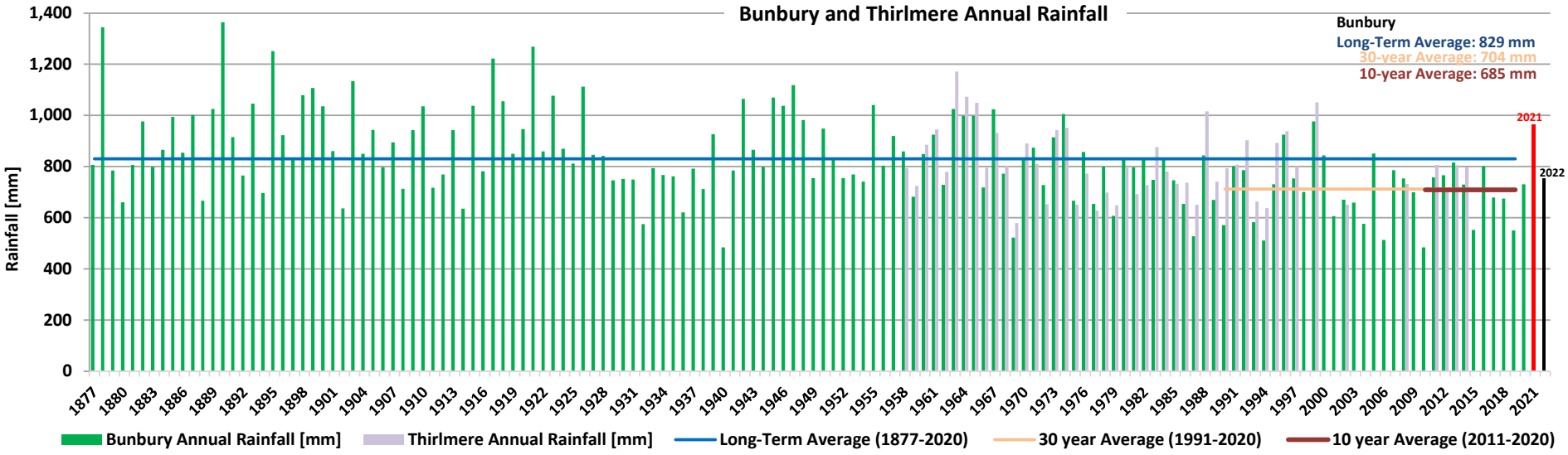
McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 2: Study Area Characteristics







Data Source: BoM (2022) Climate Data Online - Bunbury (009965), Bunbury Post Office (009514) , Bunbury Power Station (009885) & Thirlmere (009648); DPIRD (2022) Dardanup (Waterloo) Pan Evaporation

Job No. J6978

McDougall Quarries Pty Ltd
Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring
Figure 3: Rainfall and Evaporation

JDA

Job No. J6978
Scale 1:7,500 @A4
Coordinate System: GDA 1994, Zone 50

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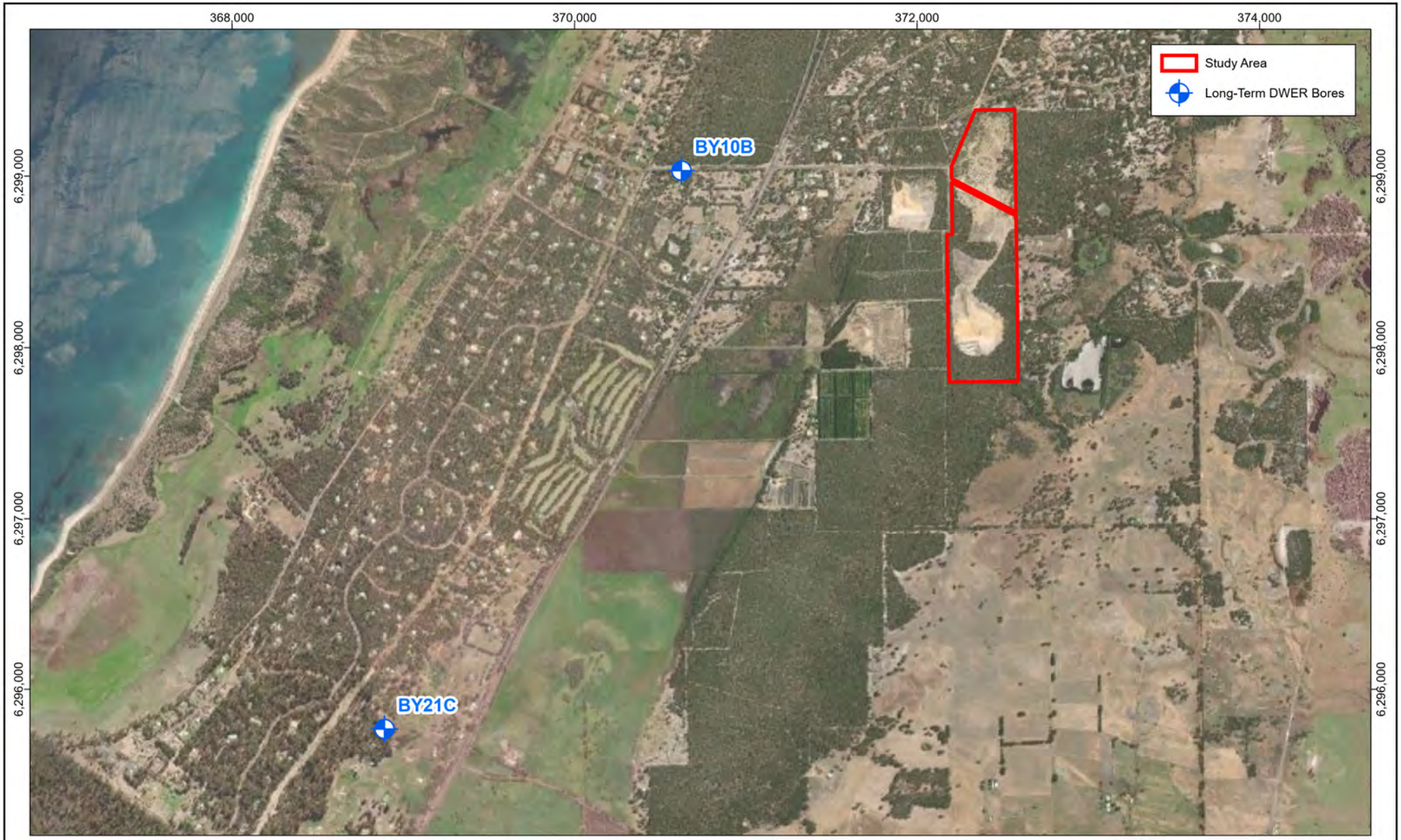
McDougall Quarries Pty Ltd
Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 4: Study Area Monitoring Bore Locations



Data Source:

Coordinate System: GDA 1994, Zone 50

JDA Consultant Hydrologists

Job No. J6978

Scale: 1:30,000 @A4

0 400 800 1,200 1,600 Metres

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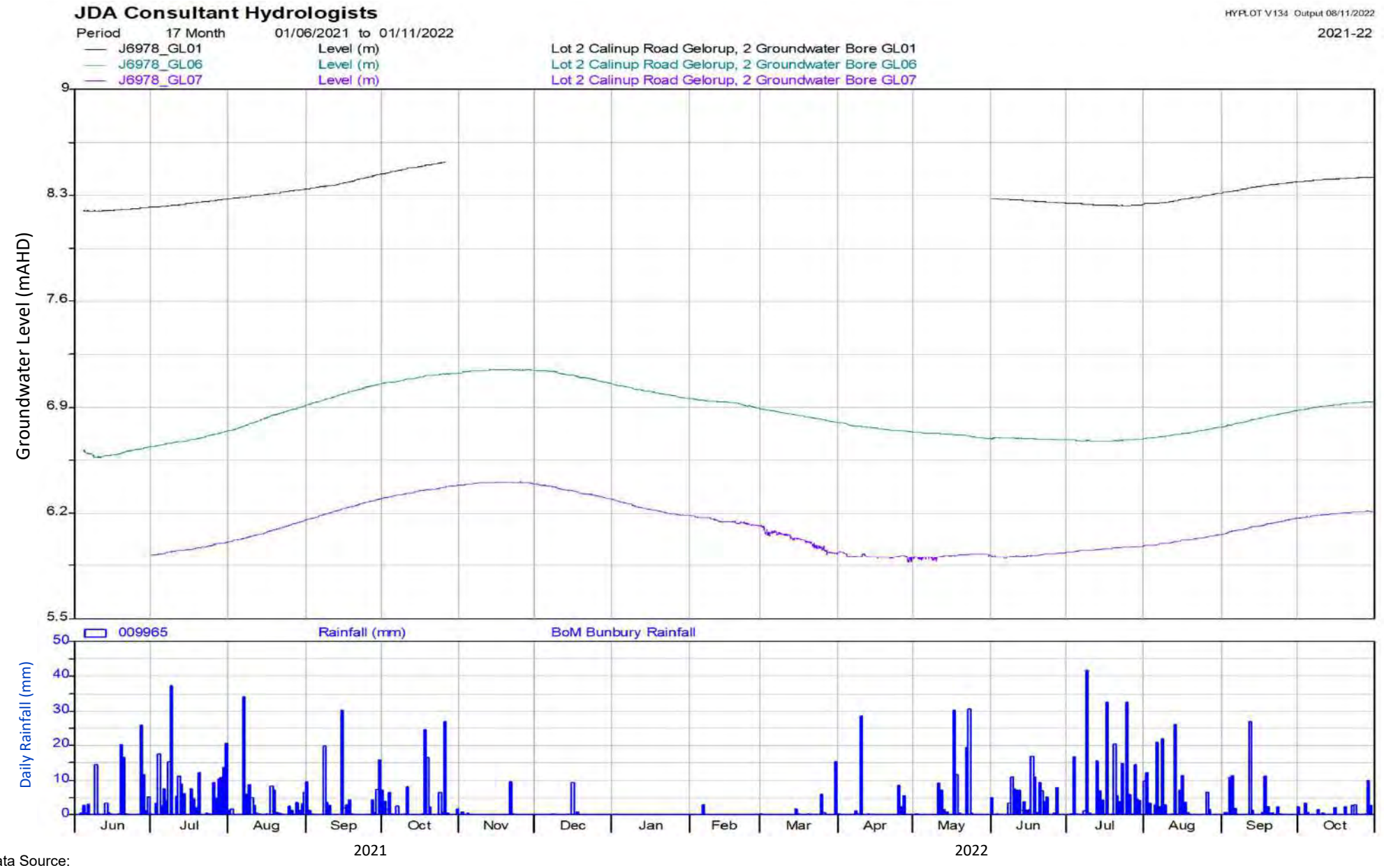
McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 5: DWER Long-Term Monitoring Bores



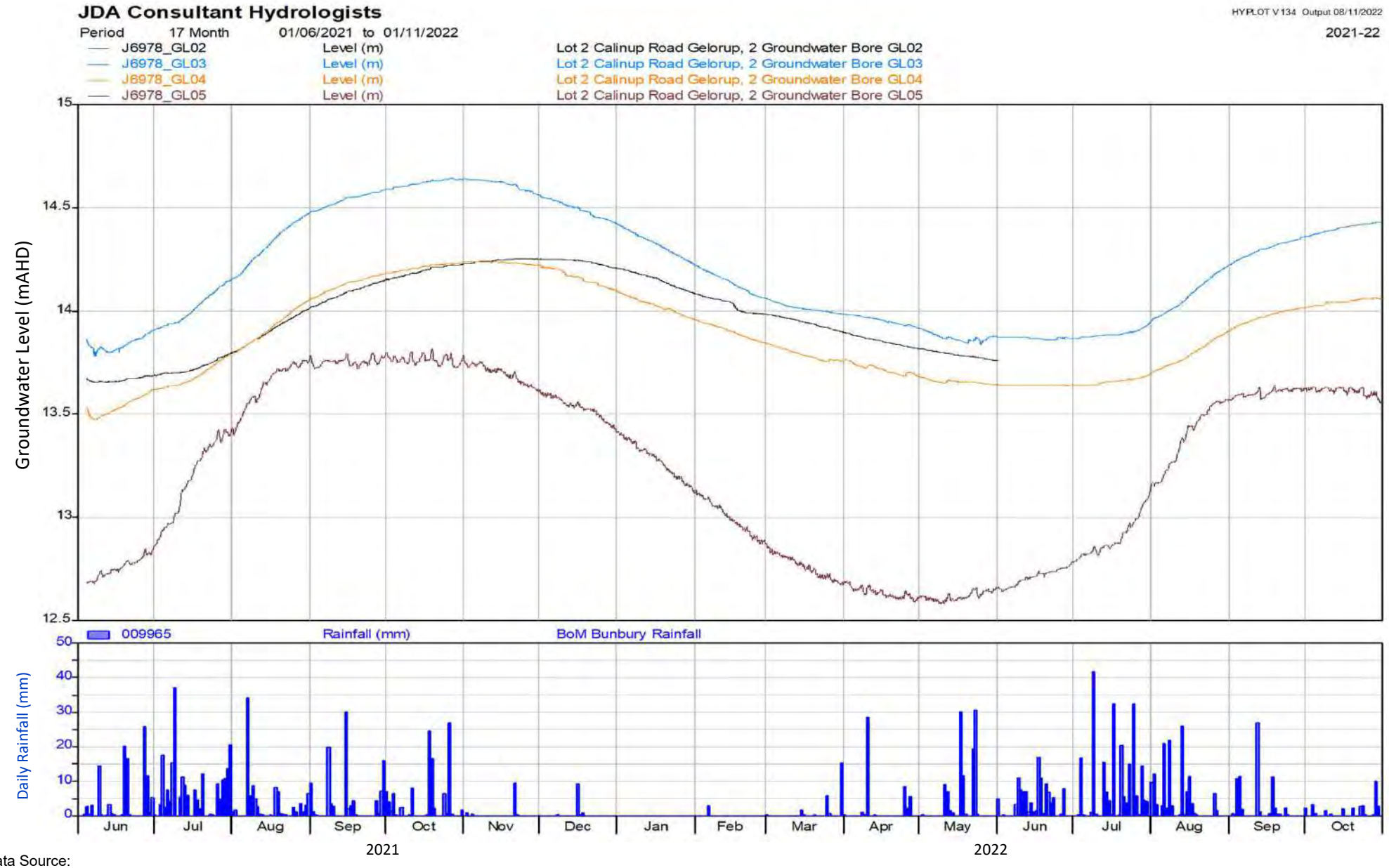
Data Source:

Job No. J6978

McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 6: Logged Groundwater Levels - GL01, GL06 and GL07



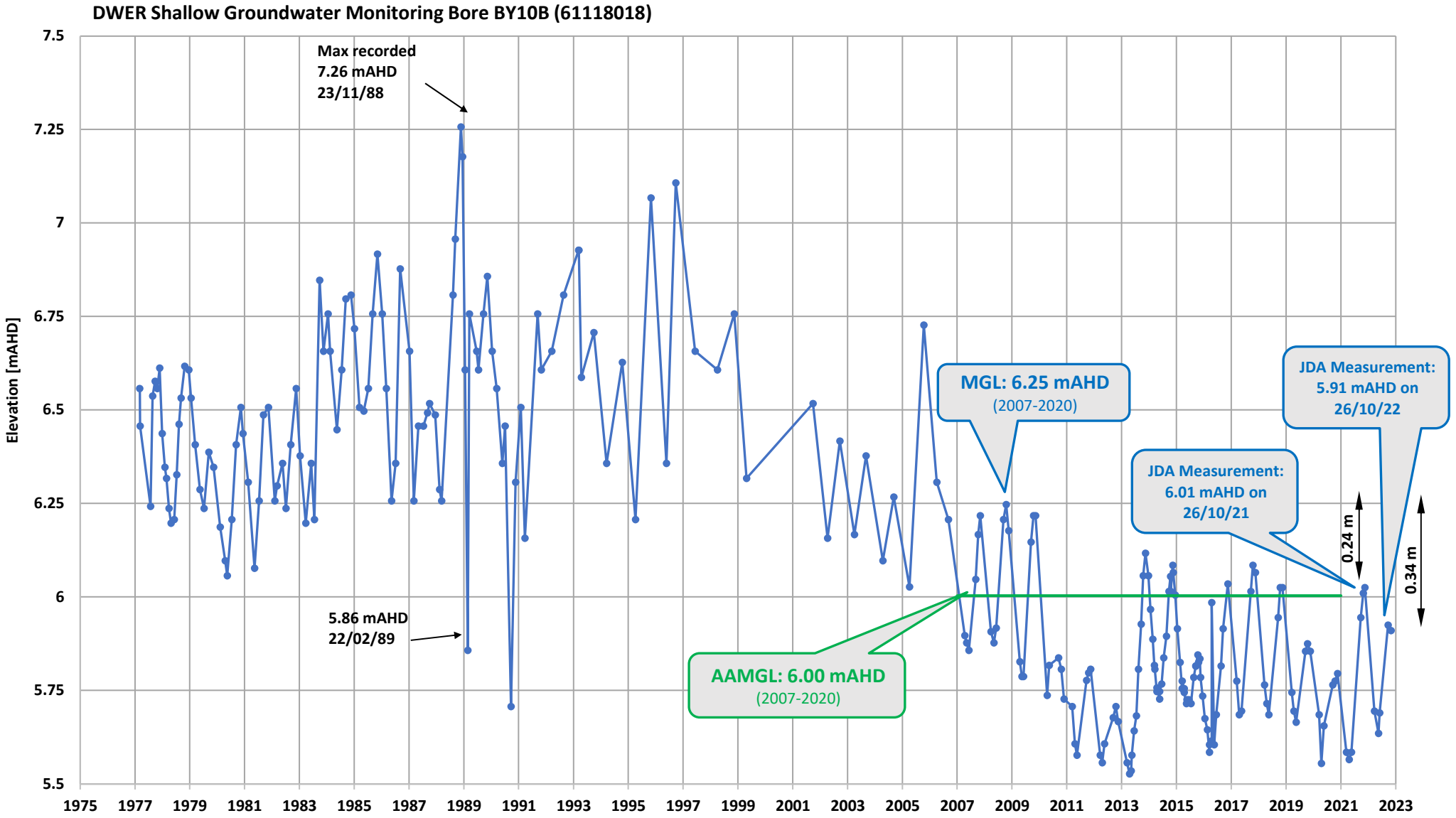
Data Source:

Job No. J6978

McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 7: Logged Groundwater Levels - GL02, GL03, GL04 and GL05



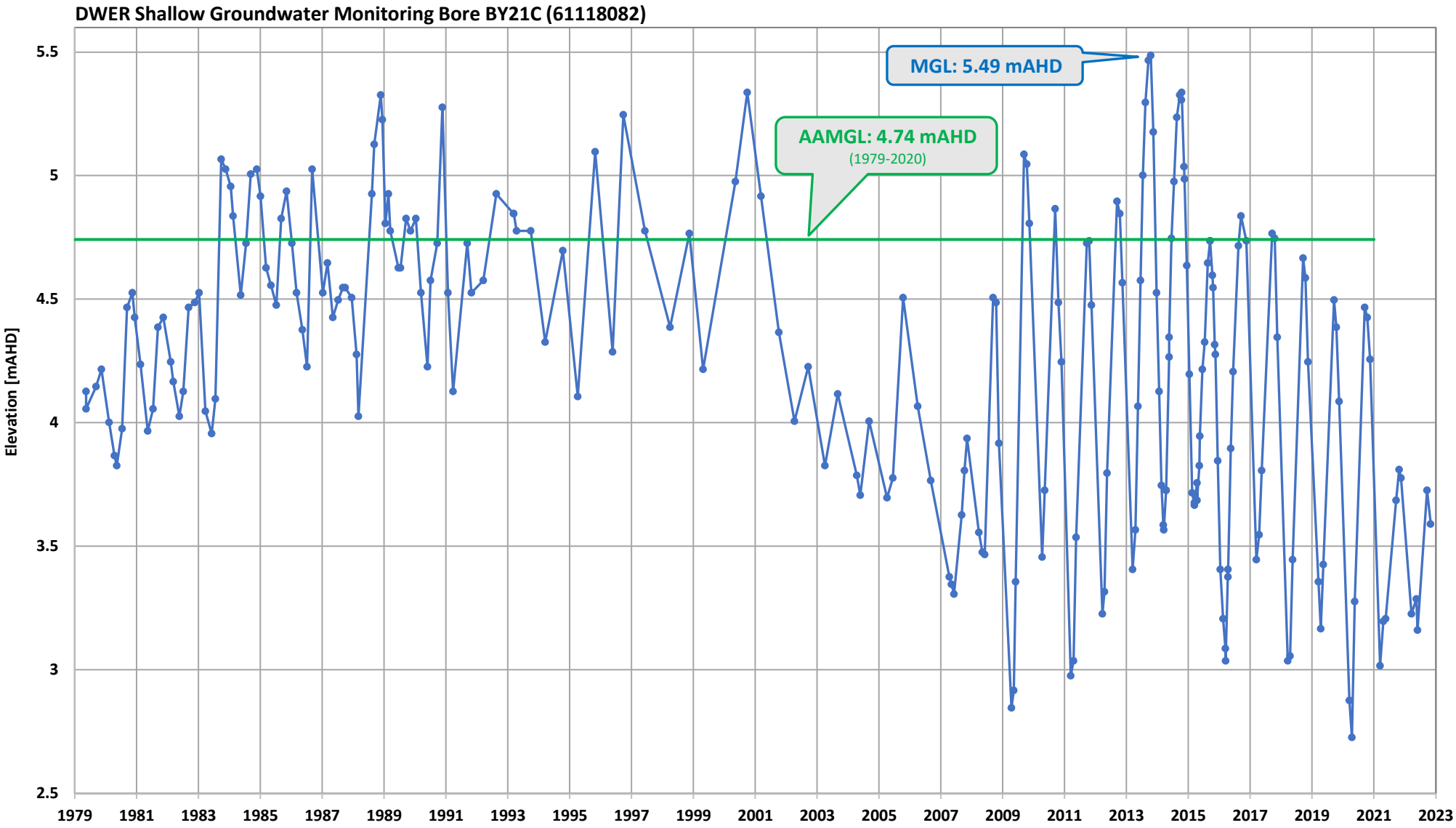
Data Source: Department of Water and Environmental Regulation Online Water Information Reporting (WIR) (DWER, 2022)

Job No. J6978

McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 8: DWER Bore BY10B Groundwater Level Time-Series, AAMGL and MGL



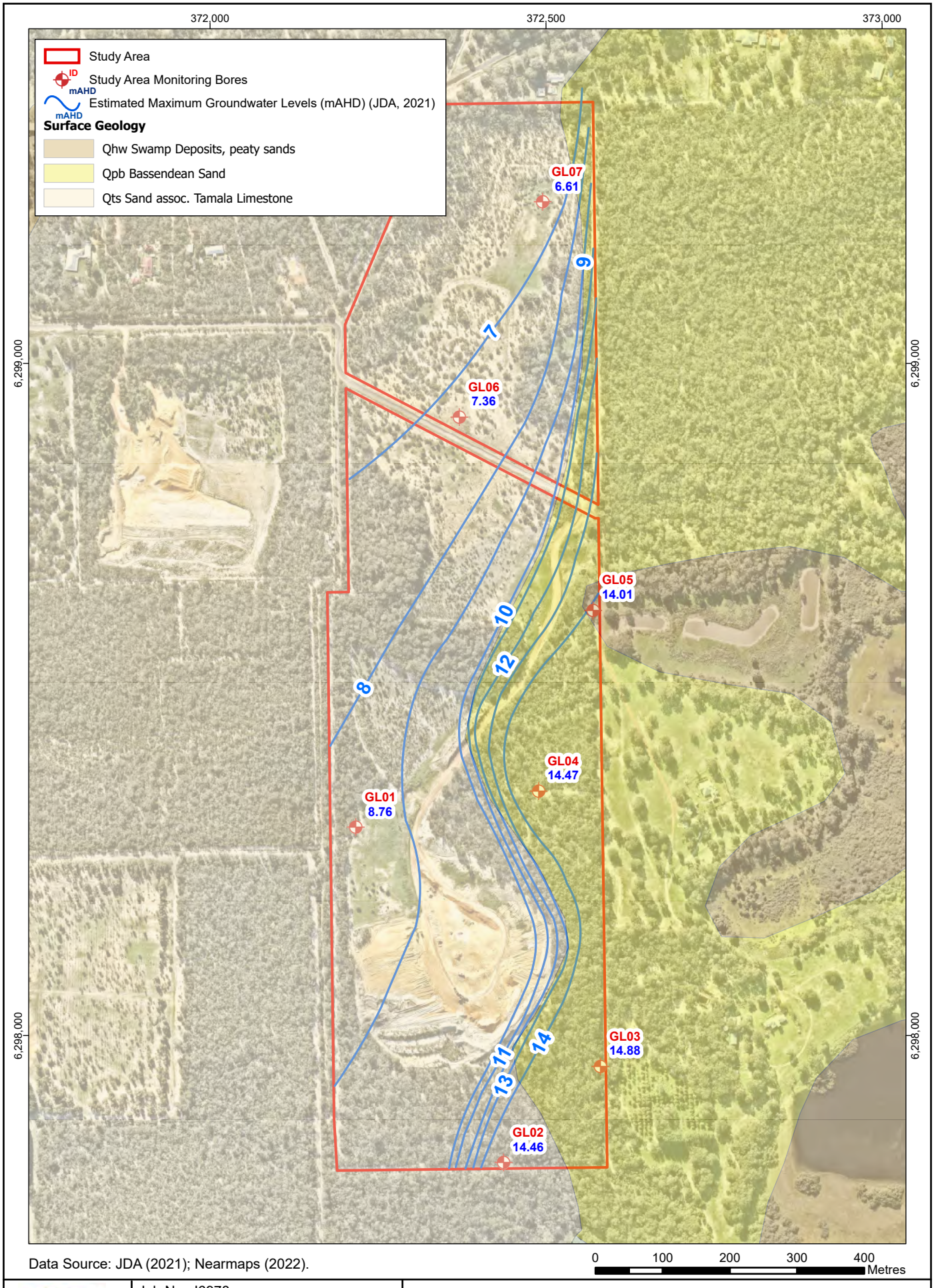
Data Source: Department of Water and Environmental Regulation Online Water Information Reporting (WIR) (DWER, 2022);

Job No. J6978

McDougall Quarries Pty Ltd

Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 9: DWER Bore BY21C Groundwater Level Time-Series, AAMGL and MGL



Data Source: JDA (2021); Nearmaps (2022).

Job No. J6978
Scale 1:7,500 @A4
Coordinate System: GDA 1994, Zone 50

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McDougall Quarries Pty Ltd
Lot 2 Calinup Road, Gelorup: Groundwater Level Monitoring

Figure 10: Estimated Maximum Groundwater Level (MGL) Contours

APPENDIX A

Bore Lithological Logs

JDA Consultant Hydrologists
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL01					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372217	N	6298310	Logged by:	GW
Bore Name:	GL01					Total Depth:	22.00 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	30.12 mAHD
Hole diameter:	0.15 m	Casing Diam:		0.05 m		Natural Surface:	29.4 mAHD

Depth (m)	BORE CONSTRUCTION	GRAPHICAL LOG	LITHOLOGICAL LOG						
			LITHOLOGY	COLOUR	GRAIN SIZE	SORTING	GRAIN SHAPE	MOISTURE	COMMENTS
0.5m			Sand	Dark Grey	Medium	Moderate	Sub R	Dry	Tree roots & leaf litter in soil
				Grey					
1.0m				Light Grey					
2.0m									
4.0m				Light Orange					
6.0m				Orange					
8.0m									
10.0m									
12.0m									
14.0m									
16.0m									
18.0m									
20.0m									

Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.72 m
Total Depth	22.85 mBTOC
Water Level	21.69 mBTOC

JDA Consultant Hydrologists
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client: McDougall Quarries Pty Ltd		Job No:	J6978
Project: Lot 2 Calinup Road, Gelorup		Hole commenced:	02/06/2021
Bore location: GL01		Hole completed:	02/06/2021
Datum: GDA 94 MGA Zone 50 E 372217 N 6298310		Logged by:	GW
Bore Name: GL01		Total Depth:	22.10 m
Driller and drill type: Hollow Stem Auger (Edrill)		R.L. TOC:	30.12 mAHD
Hole diameter: 0.15 m Casing Diam: 0.05 m		Natural Surface:	29.40 mAHD

Depth (m)	BORE CONSTRUCTION	GRAPHICAL LOG	LITHOLOGICAL LOG						
			LITHOLOGY	COLOUR	GRAIN SIZE	SORTING	GRAIN SHAPE	MOISTURE	COMMENTS
21.0m			Sand	Dark Orange	Medium	Moderate	Sub R	Moist	
								Saturated	
22.0m									
EOH 22.1m									

Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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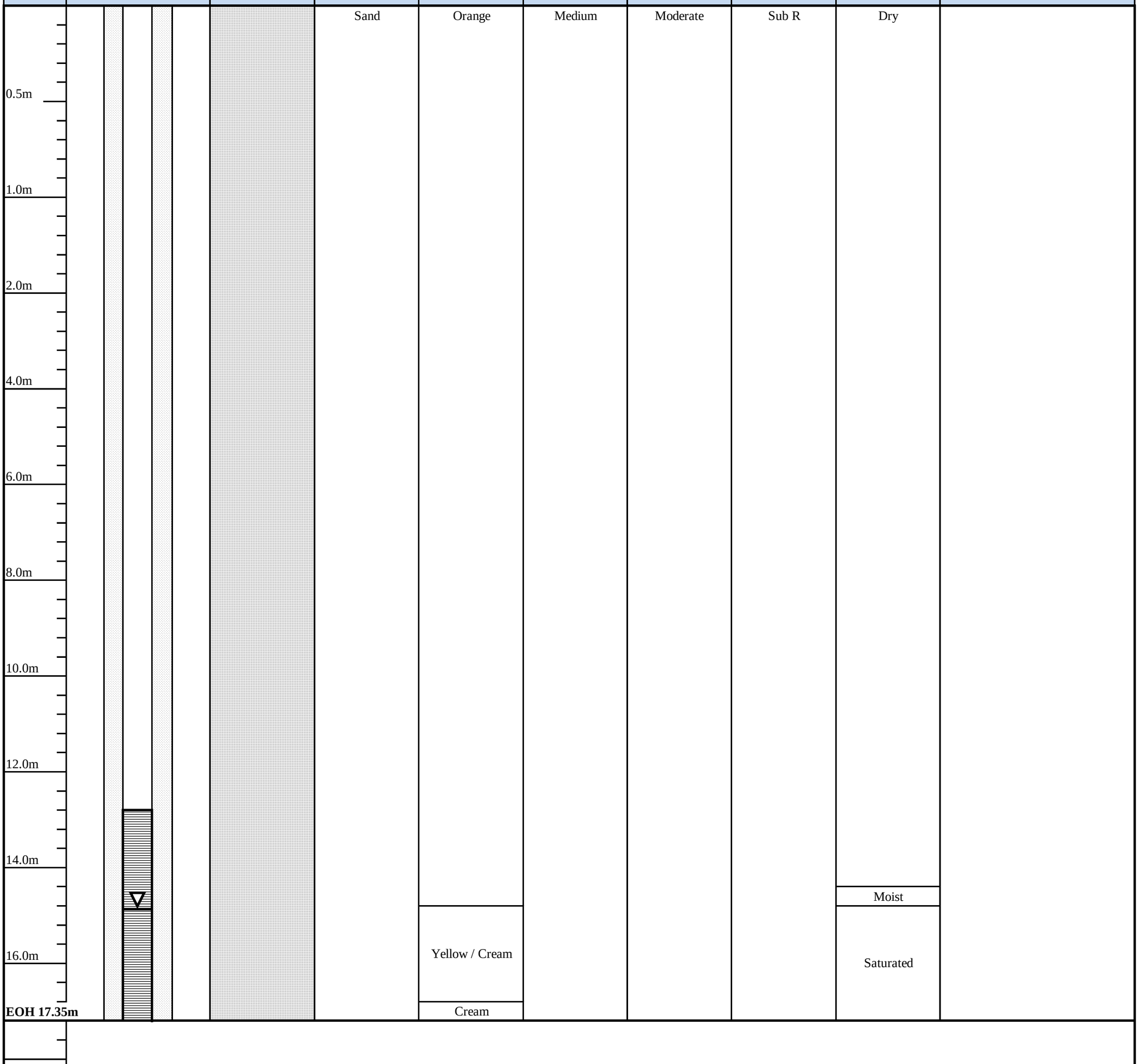
Date	02/06/2021
Stick Up	0.72 m
Total Depth	22.85 mBTOC
Water Level	21.69 mBTOC

JDA Consultant Hydrologists
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL02					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372437	N	6297811	Logged by:	GW
Bore Name:	GL02					Total Depth:	17.35 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	29.14 mAHD
Hole diameter:	0.15 m	Casing Diam:		0.05 m		Natural Surface:	28.49 mAHD



Gravel	
Sand	
Clayey Sand	
Sandy Clay	
Clay	
Coffee Rock	
Bentonite	

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.65 m
Total Depth	18 mBTOC
Water Level	15.47 mBTOC

JDA Consultant Hydrologists
Suite 1, 27 York Street
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Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL03					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372581	N	6297954	Logged by:	GW
Bore Name:	GL03					Total Depth:	8.30 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	29.14 mAHD
Hole diameter:	0.15 m	Casing Diam:	0.05 m			Natural Surface:	28.49 mAHD

Depth (m)	BORE CONSTRUCTION	GRAPHICAL LOG	LITHOLOGICAL LOG						
			LITHOLOGY	COLOUR	GRAIN SIZE	SORTING	GRAIN SHAPE	MOISTURE	COMMENTS
0.5m			Sand	Black	Medium	Moderate	Sub R	Dry	Leaf matter, roots
1.0m				Light Brown					
2.0m				Red-Brown					
3.0m									
4.0m				Orange				Moist	
5.0m									
6.0m				Cream				Saturated	
7.0m				Light Cream					
8.0m				White					
EOH 8.30m				Cream / Orange					
6.0m									
7.0m									

Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.7 m
Total Depth	9.00 mBTOC
Water Level	6.36 mBTOC

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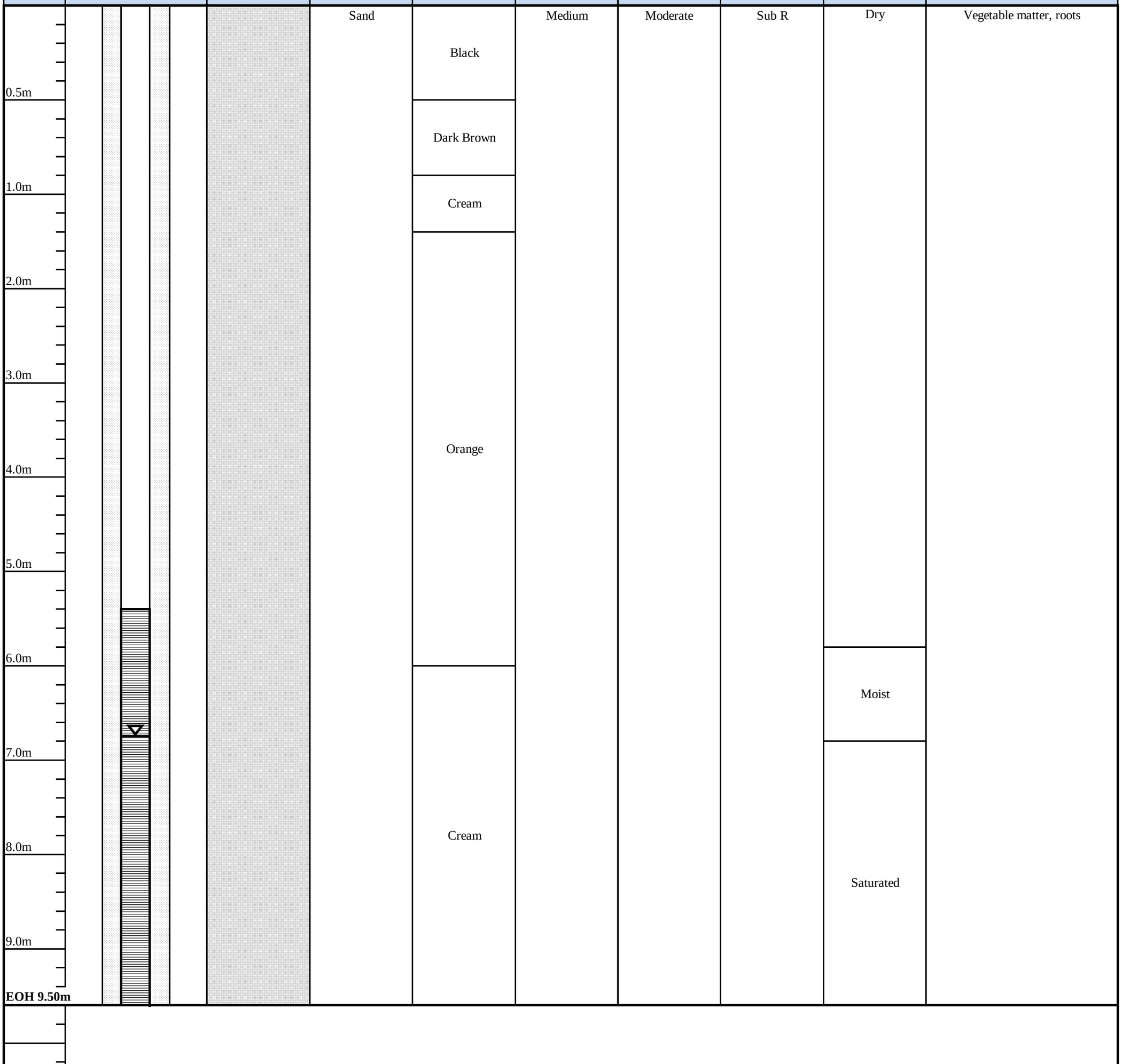
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL04					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372489	N	6298364	Logged by:	GW
Bore Name:	GL04					Total Depth:	9.50 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	21.04 mAHD
Hole diameter:	0.15 m	Casing Diam:	0.05 m			Natural Surface:	20.27 mAHD



Gravel	
Sand	
Clayey Sand	
Sandy Clay	
Clay	
Coffee Rock	
Bentonite	

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.77 m
Total Depth	10.3 mBTOC
Water Level	7.51 mBTOC

JDA Consultant Hydrologists
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL05					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372570	N	6298633	Logged by:	GW
Bore Name:	GL05					Total Depth:	6.65 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	16.79 mAHD
Hole diameter:	0.15 m	Casing Diam:		0.05 m		Natural Surface:	16.19 mAHD

Depth (m)	BORE CONSTRUCTION	GRAPHICAL LOG	LITHOLOGICAL LOG						
			LITHOLOGY	COLOUR	GRAIN SIZE	SORTING	GRAIN SHAPE	MOISTURE	COMMENTS
0.5m			Sand	Black	Medium	Moderate	Sub R	Dry	
1.0m				Dark Grey					
2.0m				Grey					
3.0m				Light Grey					
				Grey					
4.0m				Brown				Moist	
5.0m				Dark Grey				Saturated	Staining
6.0m			Clayey Sand	Grey					Strands of clay
EOH 6.65m									
7.0m									

Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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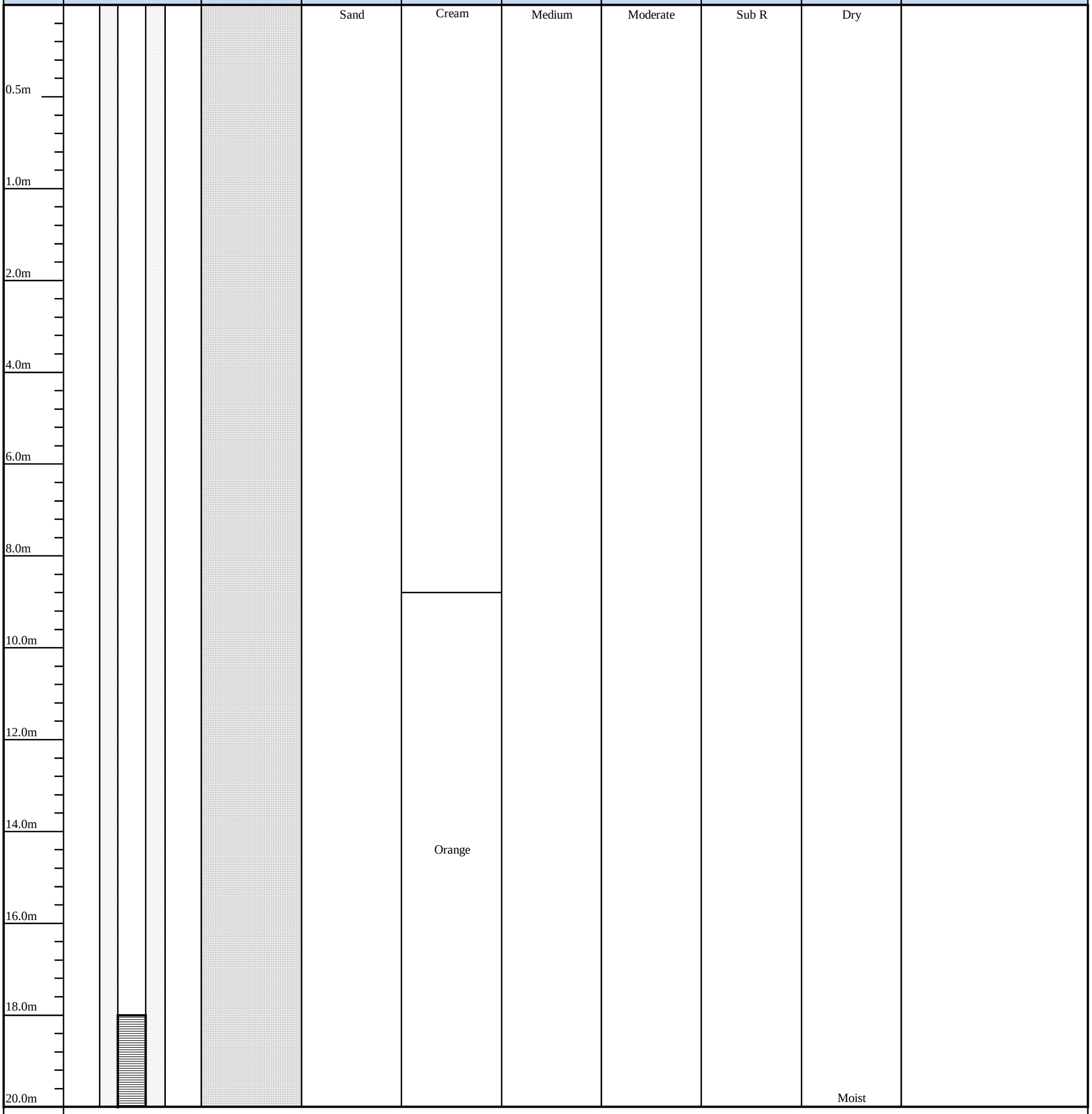
Date	02/06/2021
Stick Up	0.6 m
Total Depth	7.25 mBTOC
Water Level	4.11 mBTOC

JDA Consultant Hydrologists
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL06					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372371	N	6298920	Logged by:	GW
Bore Name:	GL06					Total Depth:	22.5 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	28.52 mAHD
Hole diameter:	0.15 m	Casing Diam:		0.05 m		Natural Surface:	27.77 mAHD



Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.75 m
Total Depth	23.23 mBTOC
Water Level	21.91 mBTOC

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Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client: McDougall Quarries Pty Ltd						Job No:	J6978
Project: Lot 2 Calinup Road, Gelorup						Hole commenced:	02/06/2021
Bore location: GL06						Hole completed:	02/06/2021
Datum: GDA 94 MGA Zone 50	E	372371	N	6298920		Logged by:	GW
Bore Name: GL06						Total Depth:	22.5 m
Driller and drill type:	Hollow Stem Auger (Edrill)					R.L. TOC:	28.52 mAHD
Hole diameter:	0.15 m	Casing Diam:		0.05 m		Natural Surface:	27.77 mAHD

Depth (m)	BORE CONSTRUCTION	GRAPHICAL LOG	LITHOLOGICAL LOG						
			LITHOLOGY	COLOUR	GRAIN SIZE	SORTING	GRAIN SHAPE	MOISTURE	COMMENTS
21.0m			Sand	Orange	Medium	Moderate	Sub R	Moist	
22.0m								Saturated	
EOH 22.5m									

Gravel
Sand
Clayey Sand
Sandy Clay
Clay
Coffee Rock
Bentonite

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.75 m
Total Depth	23.23 mBTOC
Water Level	21.91 mBTOC

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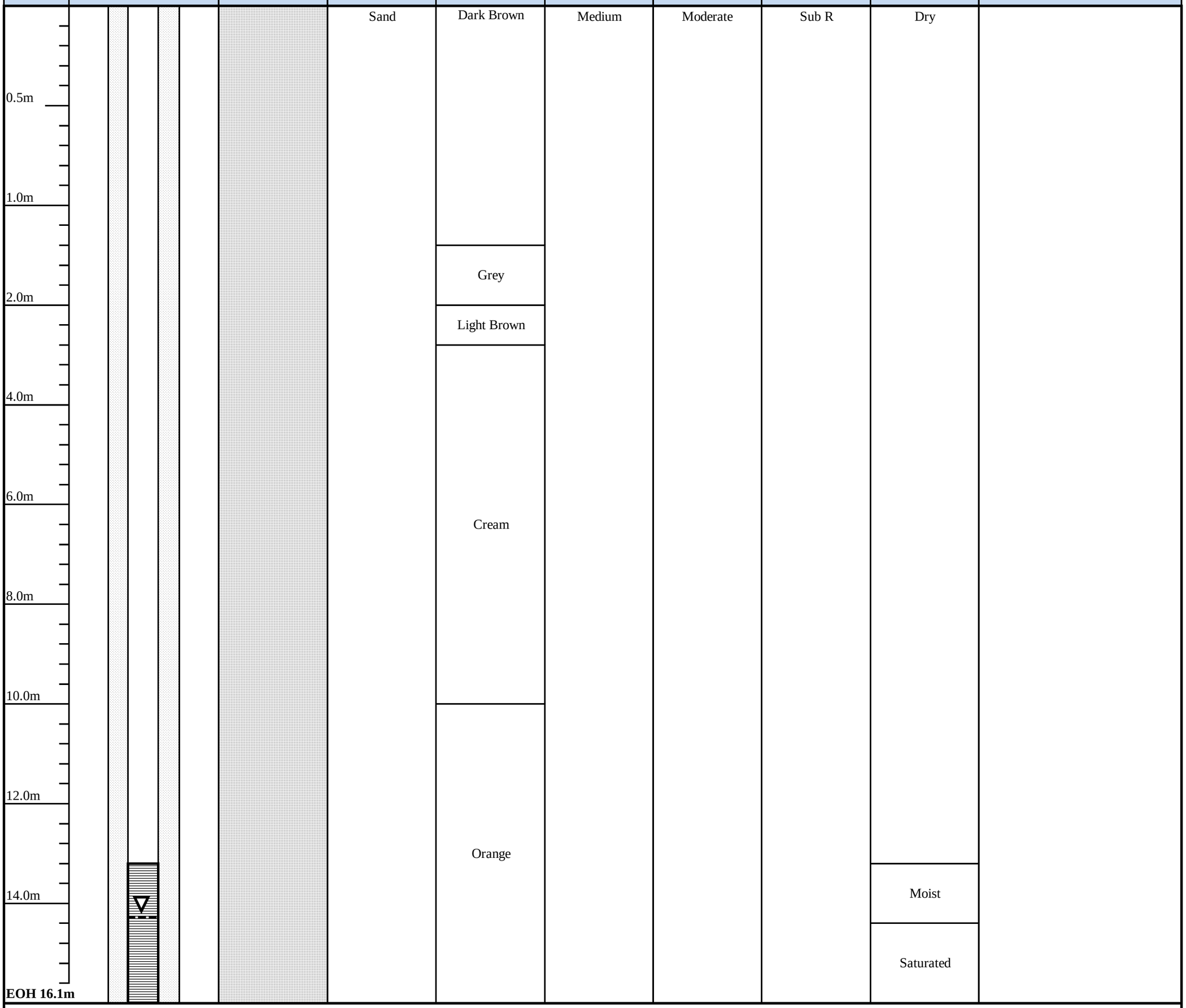
Suite 1, 27 York Street
Subiaco WA 6008
Tel: 9388 2436
Fax: 9381 9279

LITHOLOGICAL LOG

Client:	McDougall Quarries Pty Ltd					Job No:	J6978
Project:	Lot 2 Calinup Road, Gelorup					Hole commenced:	02/06/2021
Bore location:	GL07					Hole completed:	02/06/2021
Datum:	GDA 94 MGA Zone 50	E	372495	N	6299240	Logged by:	GW
Bore Name:	GL07					Total Depth:	16.1 m
Driller and drill type:		Hollow Stem Auger (Edrill)				R.L. TOC:	21.02 mAHD
Hole diameter:		0.15 m	Casing Diam:		0.05 m	Natural Surface:	20.29 mAHD



Gravel	
Sand	
Clayey Sand	
Sandy Clay	
Clay	
Coffee Rock	
Bentonite	

Grain Size	Sorting	Grain Shape	Moisture
Very Fine	Poor	Angular	Dry
Fine	Moderate	Subangular	Moist
Medium	Well	Subrounded	Saturated
Coarse	Very well	Rounded	
Very coarse		Well rounded	
Gravel			

NOTES: _____

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Date	02/06/2021
Stick Up	0.73 m
Total Depth	16.86 mBTOC
Water Level	15.14 mBTOC

Suite 1, 27 York St, Subiaco WA 6008
PO Box 117, Subiaco WA 6904
Ph: +61 8 9388 2436

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info@jdahydro.com.au

Appendix J – Ministerial Statements (767, 969 & 1186)

Published on 15 April 2008 Statement No. 767

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE *ENVIRONMENTAL PROTECTION ACT 1986*)

SOUTHERN EXTENSION OF SAND PIT, LOT 2 CALINUP ROAD GELORUP, SHIRE OF CAPEL

Proposal: The clearing of native vegetation and excavation of sand at the southern portion of Lot 2, Calinup Road, Gelorup (Certificate of Title volume 1356 folio 756). The total area of native vegetation being cleared will not exceed 19 hectares. The area to be cleared will be progressively rehabilitated with native vegetation.

In addition, remedial earthworks and rehabilitation will be carried out on the northern portion of Lot 2, Calinup Road. A total area of approximately 16 hectares at the northern end of Lot 2, Calinup Road will be rehabilitated.

The proposal also includes the placing of perpetual conservation covenants on portions of Lot 2 Calinup Road and Lot 268 Kilpatrick Road Gelorup (Certificate of Title volume 1319 folio 4) as described in Figures 1 and 2.

Proponent: Cotton Holdings Pty Ltd t/as APH Contractors (ACN 009 198 887)

Proponent Address: 26 Spencer Street, BUNBURY WA 6230

Assessment Number: 1301

Report of the Environmental Protection Authority: Bulletin 1194

Ministerial appeal determination: 179 of 2005

The Environmental Protection Authority recommended that the above proposal not be implemented. Following consideration of an appeal, the Minister requested the CEO to draft conditions for consultation with other decision making authorities pursuant to section 45(1) of the Act. The implementation of the proposal is to be subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in Schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister under sections 38(6) or 38(7) of the Act is responsible for the implementation of the proposal.

2-2 The proponent shall notify the CEO of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The proposal must be substantially commenced within five years of the date of publication of this statement.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall submit to the CEO environmental compliance reports annually, reporting on the previous twelve-month period, unless required by the CEO to report more frequently.

4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO and shall be prepared and submitted in a format acceptable to the CEO.

4-3 The environmental compliance reports shall:

1. be endorsed by signature of the proponent's chief executive officer or a person, approved in writing by the CEO, delegated to sign on behalf of the proponent's chief executive officer;

2. state whether the proponent has complied with each condition and procedure contained in this statement;

3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;

4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;

5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;

6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;

7. review the effectiveness of all corrective and preventative actions taken; and

8. describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO.

5 Responsibility for On-site Environmental and Rehabilitation Matters

5-1 At all stages of the proposal, from initial clearing through to closure and decommissioning, the proponent shall nominate a senior employee who shall be the "designated officer" with lead responsibility for on-site environmental and rehabilitation matters.

6 Protection of Vegetation

6-1 The proponent shall not clear or otherwise disturb native vegetation on Lot 2 Calinup Road outside the 19 hectare operational boundary marked as blocks 1 to 18 on Figure 1.

6-2 Prior to the commencement of clearing of vegetation or excavation of sand, whichever is the sooner, and in consultation with the CEO, the proponent shall put in place measures (which may include fencing and signposting) to delineate and protect the locations of plants, vegetation, or other areas of particular conservation significance, including conservation covenant areas, to the requirements of the Minister.

6-3 Throughout the life of the proposal, from initial clearing through to closure and decommissioning, and subject to any specific requirements of conservation covenants applying to the land, the proponent shall maintain, in good condition, the fencing, signposting, or other measures required in condition 6-2, to the requirements of the Minister.

7 Fauna Relocation and Habitat

7-1 Prior to clearing of vegetation or excavation of sand, whichever is the sooner, in consultation with the CEO, the proponent shall prepare a Fauna Relocation and Habitat Plan to the requirements of the Minister.

7-2 This Plan shall detail actions to relocate fauna to a nearby place which reasonably approximates their existing habitat, and shall address relocation of the following fauna species:

- Brush-tailed Phascogale (*Phascogale tapoatafa*);
- Western Brush Wallaby (*Macropus irma*);
- Carpet Python (*Morelia spilota imbricata*);
- Echidna (*Tachyglossus aculeatus*);
- Chuditch (*Dasyurus geoffroii*); and
- Possums of any species,

and shall address the salvage and relocation of tree hollows and habitat logs to provide habitats for fauna, including nesting hollows for birds.

7-3 The proponent shall implement the Fauna Relocation and Habitat Plan required by condition 7-1 to the requirements of the Minister.

7-4 The proponent shall make the Fauna Relocation and Habitat Plan required by condition 7-1 publicly available in a manner approved by the CEO.

8 Management of vegetation

8-1 The proponent shall prevent introduction and spread of weeds and dieback within the proposal area and conservation covenant areas.

8-2 The proponent shall give effect to the requirements of 8-1 by implementing a weed and dieback management plan to the requirements of the CEO that addresses the following:

1. hygiene (including vehicle washdown facilities and procedures),
2. monitoring, and
3. control procedures.

8-3 In the event that weed species or plant dieback are introduced into, or spread from an infected area to an uninfected area within, the proposal area or into conservation covenant areas, the proponent shall undertake appropriate control measures and shall continue those measures for such duration as required by the CEO.

8-4 The proponent shall carry out monitoring, and shall take such remedial or management action as may be required, to ensure that native vegetation adjacent to the proposal area is not adversely affected by dust, water used for dust control or other emissions or factors resulting from implementation of the proposal.

9 Rehabilitation

9-1 Prior to the commencement of clearing of vegetation or excavation of sand, whichever is the sooner, the proponent shall prepare a Rehabilitation Plan to the requirements of the Minister on advice of the CEO.

9-2 The principal objective of this Plan is to ensure there is progressive rehabilitation of:

1. The southern portion of Lot 2 which is to be cleared for excavation; and
2. The previously excavated northern portion of Lot 2 (see Figure 1).

9-3 The rehabilitation Plan shall address short and long term activities, and shall meet the following criteria:

1. In relation to the southern area:
    a. The area of rehabilitation following decommissioning shall be not less than the area cleared for the implementation of the proposal;
    b. The vegetation shall have comparable plant species composition to that which occurred prior to clearing and excavation;

c. The vegetation shall be self-sustaining and composed of plant species native to the local area; and

d. The vegetation shall have comparable densities and abundances of plant species to those which occurred prior to clearing and excavation.

2. In relation to the northern area:

a. The area of rehabilitation in the northern portion of lot 2 shall be commenced within two years of the date of this Statement and cover the whole of the northern portion, with allowance for building envelopes and access roads;

b. The rehabilitation shall include re-earthworking and planting vegetation to achieve a stable land surface;

c. The vegetation shall be self sustaining and composed of plant species native to the local area;

d. In recognition of the degraded state of the northern portion, the objective is not to reinstate native vegetation as it was prior to clearing, but to establish upper storey vegetation and understorey vegetation where possible.

9-4 The Plan shall address the following:

1. Final landforms, slopes, sand/soil profiles, sand/soil depths and other relevant characteristics suitable for the re-establishment of self-sustaining native vegetation;

2. Survey control procedures to ensure that final landforms and slopes are developed as planned;

3. Preparation of an ecological baseline for vegetation coverage in the southern area to be cleared;

4. Collection of baseline information on the pre-clearing/excavation soil/sand profiles, depths and characteristic in the southern area;

5. Collection of baseline information in the southern area on the hydrology of the site;

6. Procedures for re-establishing sand/soil profiles and hydrological conditions comparable to those which existed before clearing and excavation;

7. Procedures for soil handling and treatment to manage and control soil compaction;

8. Procedures for topsoil handling such that stripping and direct return of topsoil is carried out under optimal conditions;

9. Procedures for erosion control;

10. Procedures for preparation, handling and application of mulch to assist in rehabilitation;

11. Progressive rehabilitation of native vegetation using native plant species of local provenance (defined as native plant species from an area within 10 kilometres of the proposal area);

12. Procedures for salvaging and transplanting grass trees (*Xanthorrhoea* species) and cycad palms (*Macrozamia* species) for inclusion in rehabilitation of the site;

13. Specific rehabilitation criteria to achieve the objectives of the plan;

14. Procedures for weed and dieback control;

15. Objectives, requirements and framework for stakeholder consultation and reporting;

16. A strategy which integrates the stages of clearing and excavation with rehabilitation schedules and requirements, including planning for topsoil stripping/replacement, mulching and rehabilitation works in optimum season(s) and conditions;

17. A program to monitor rehabilitation success and to compare with criteria to be achieved;

18. Contingency measures and remedial actions in the event that expected performance is not achieved; and

19. Review, audit and continual improvement.

9-5 Prior to approval of the Rehabilitation Plan by the Minister, the proponent shall commission a review of the Plan by the Botanic Gardens and Parks Authority, or another suitable body or expert(s), to the requirements of the Minister.

9-6 The proponent shall make the Rehabilitation Plan required by condition 9-1 publicly available in a manner approved by the CEO, prior to approval by the Minister.

9-7 Following approval of the Rehabilitation Plan by the Minister, and subject to any other written law, the proponent may proceed with clearing and excavation of blocks 1 to 9 shown in Figure 1.

9-8 The proponent shall not proceed with clearing or excavation on blocks 10 to 18 until the Minister provides written notification that he is satisfied that the Rehabilitation Plan is being implemented.

9-9 The proponent shall provide an annual performance review report on progress in implementing the Rehabilitation Plan required by condition 9-1, including progress in achieving the stated rehabilitation criteria and proposed means of improving performance, to the Minister.

9-10 The proponent shall make the annual performance review report required by condition 9-9 publicly available in a manner approved by the CEO.

9-11 Following consideration of an annual review report, the Minister may by notice in writing require the proponent to immediately cease excavation works on Lot 2 if the Minister concludes that the Rehabilitation Plan is not being satisfactorily implemented.

10 Conservation Covenants

10-1 Prior to clearing of native vegetation, the proponent shall give a conservation covenant(s) for the following areas of land:

1. an area of approximately 19 hectares of native vegetation on Lot 2 Calinup Road, Gelorup as depicted in Figure 1; and

2. an area of approximately 20 hectares of native vegetation and wetland on Lot 268 Kilpatrick Road, Gelorup as depicted in Figure 2.

10-2 The total area covenanted under 10-1 shall not be less than 39 hectares, and the areas covenanted must be native vegetation in good condition or better, or (in the case of the land described in Figure 2) a wetland area of conservation category status.

11 Excavation depth

The depth of sand extraction shall not be less than 2 metres above the historical maximum water table level for the location, or less than 20 metres AHD, which ever is the greater.

12 Definitions

In these conditions (including Schedules and Appendices), unless the contrary intention appears –

"Act" means the *Environmental Protection Act 1986*;

"CEO" means the chief executive officer of the Department of Environment and Conservation;

"conservation covenant" means:

(a) a conservation covenant as defined under section 30B of the *Soil and Land Conservation Act 1945;*

(b) a restrictive covenant entered into with the CEO under section 129BA of the *Transfer of Land Act 1893;* or

(c) any other instrument of a similar type to (a) and (b) and approved by the CEO;

"dieback" means any plant disease of the Phytophthora species;

"Minister" means the Minister responsible for the administration of the Act;

"weeds" means plants species that are not indigenous to the proposal covenant areas and includes all declared plants within the meaning of the *Agriculture and Related Resources Protection Act 1976.*

Procedure

Any dispute as to the terms of the conservation covenants shall be determined by the Minister.

Notes

1. Nothing in this Statement removes the proponent's obligations to comply with other written laws, including any approvals required under laws administered by the Shire of Capel and the requirements of the *Aboriginal Heritage Act 1972.*

Signed 11 April 2008

David Templeman MLA
MINISTER FOR THE ENVIRONMENT; CLIMATE CHANGE; PEEL

Schedule 1

The Proposal (Assessment No. 1301)

The clearing of native vegetation and excavation of sand at the southern portion of Lot 2, Calinup Road, Gelorup (Certificate of Title volume 1356 folio 756). The total area of native vegetation being cleared will not exceed 19 hectares. The area to be cleared will be progressively rehabilitated with local native vegetation.

The location of the native vegetation to be cleared is indicated in figure 1 attached. The area to be quarried will be progressively rehabilitated using local native plant species.

In addition, remedial earthworks and rehabilitation will be carried out on the northern portion of Lot 2, Calinup Road. A total area of approximately 16 hectares will be rehabilitated at the northern end of Lot 2, Calinup Road. The area to be rehabilitated in the northern portion of Lot 2 Calinup Road is indicated in pink in Figure 1.

The proposal also includes the placing of perpetual conservation covenants on the above land and Lot 268 Kilpatrick Road Gelorup (Certificate of Title volume 1319 folio 4) as described in Figures 1 and 2.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1 – Key Proposal Characteristics

Element	Description
Project Life (active sand extraction and quarrying)	Approximately 20 years (Note: rehabilitation works may extend beyond the period of active sand extraction)
Land Tenure	Privately owned land
Maximum area of clearing of native vegetation	19 hectares
Rate of Extraction	200,000 bank cubic metres per year (upper limit)
Infrastructure / ancillary equipment / facilities	• Dry screen and conveyor • Front-end loader(s) for excavation and loading of haulage trucks • Crib room / chemical toilet • Dieback wash-down facilities
Sand-pit depth	not less than 2 metres above the historical maximum water table level or less than 20 metres AHD, which ever is the greater.
Clearing and Excavation staging	Four hectare clearing and excavation blocks (maximum)
Rehabilitation – southern portion	The 19 hectare area to be cleared and quarried will be progressively rehabilitated with local native plant species.

Element	Description
Sandpit access	Via existing Calinup Road
Rehabilitation of northern (previously cleared and quarried) portion of Lot 2 Calinup Road	Remedial earthworks to be carried out and the area to be rehabilitated with local native plant species. The total area to be rehabilitated is approximately 16 hectares.
Conservation covenants	Perpetual conservation covenants will be placed on the following land before clearing or excavation commences on Lot 2: • Lot 2 Calinup Road • Lot 268 Kilpatrick Road

Figures (attached)

Figure 1 – Location of lot 2 Calinup Road showing areas to be rehabilitated (northern and southern portions of lot 2) and the adjacent native bushland which is to be protected in perpetuity by a conservation covenant (exact boundaries of the covenant area to be specified in the Conservation Covenant Agreement).

Figure 2 – Location of additional area of native bushland to be protected in perpetuity through a conservation covenant (exact boundaries of the covenant area to be specified in the Conservation Covenant Agreement).

Figure 1 – Location of lot 2 Calinup Road showing development area, areas to be rehabilitated (northern and southern portions of lot 2) and the adjacent native bushland which is to be protected in perpetuity by a conservation covenant (exact boundaries of the covenant area to be specified in the Conservation Covenant Agreement).

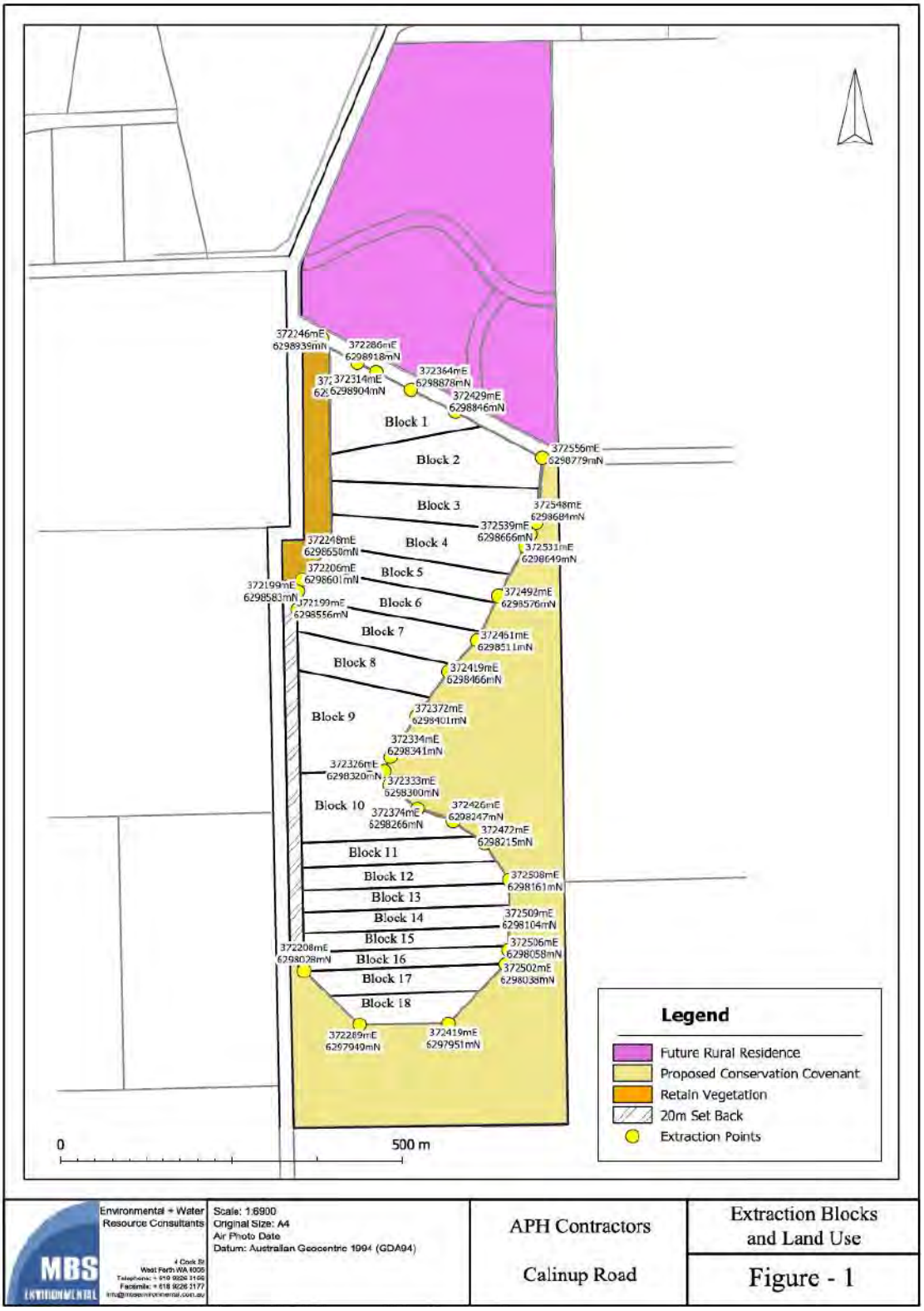
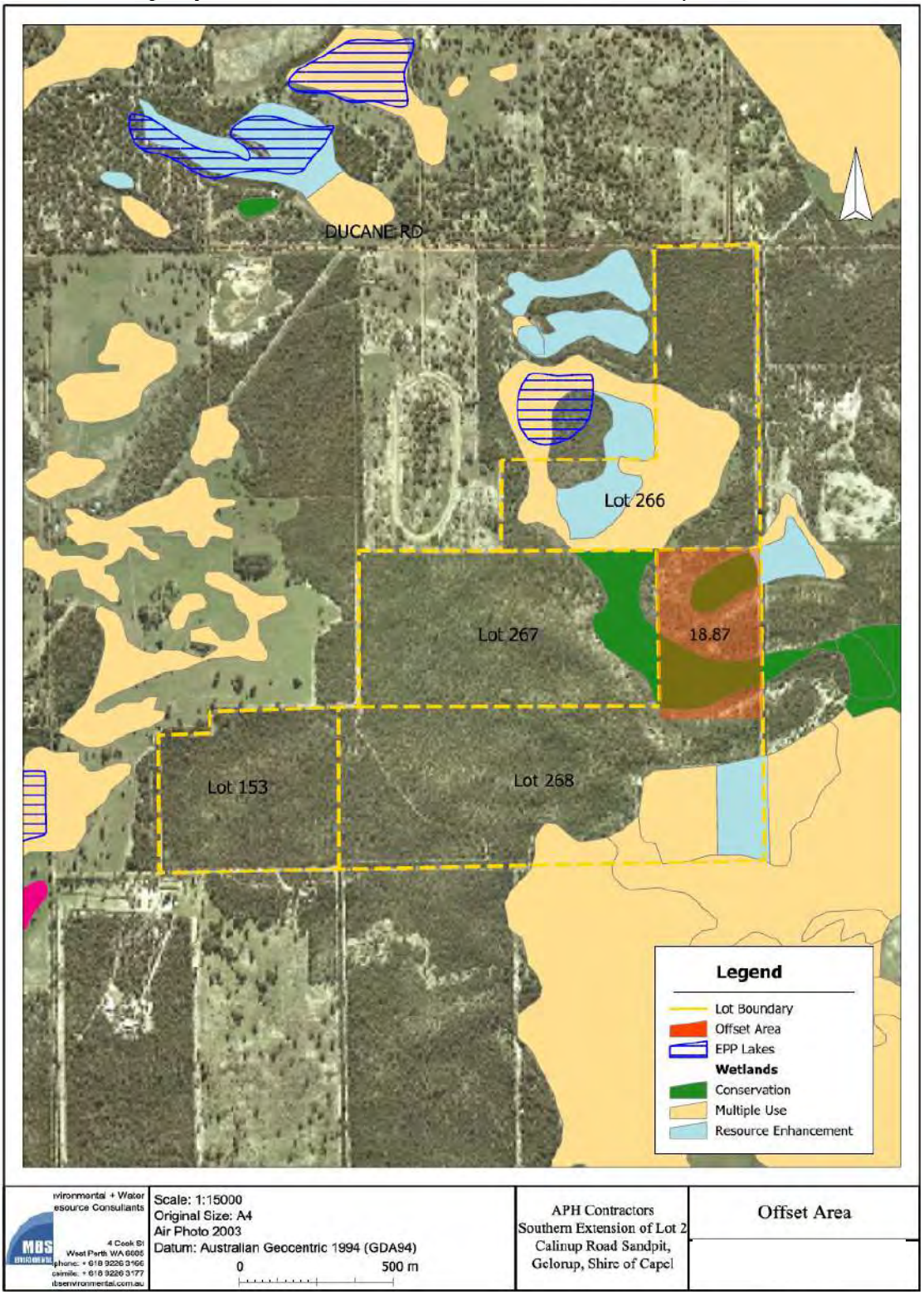


Figure 2 – Location of additional area of native bushland to be protected in perpetuity through a conservation covenant (exact boundaries of the covenant area to be specified in the conservation covenant instrument).



Hon Albert Jacob MLA
Minister for Environment; Heritage Statement No: 969

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE *ENVIRONMENTAL PROTECTION ACT 1986*)

Proposal: Southern Extension of Sandpit, Lot 2 Calinup Road, Gelorup, Shire of Capel

Proponent: Cotton Holdings Pty Ltd

ACN 009 198 887

Proponent Address: 26 Spencer Street, BUNBURY WA 6230

Assessment Number: 1966

Previous Assessment Number: 1301

Report of the Environmental Protection Authority: 1507

Previous Report of the Environmental Protection Authority: 1194

Previous Statement Number: 767

The implementation of the proposal to which the above report of the Environmental Protection Authority relates is subject to the conditions and procedures contained in Ministerial Statement No. 767, as amended by the following:

1. **Conditions 3-1 and 3-2 of Ministerial Statement 767 are deleted and replaced with:**

3 Time Limit of Authorisation

3-1 The proponent shall not commence implementation of the proposal after the 15 April 2016, and any commencement, prior to this date, must be substantial.

3-2 Any commencement of implementation of the proposal, on or before 15 April 2016, must be demonstrated as substantial by providing the Chief Executive Officer* with written evidence, on or before 15 April 2016.

Published on:

12th Floor, Dumas House, 2 Havelock Street, West Perth Western Australia 6005
Phone: +61 8 6552 5800 Facsimile: +61 8 6552 5801
Email: Minister.Jacob@dpc.wa.gov.au

2. **Condition 9-3 (2)(a) of Ministerial Statement 767 is deleted and replaced with:**

9-3 The Rehabilitation Plan shall address short and long term activities, and shall meet the following criteria:

2. In relation to the northern area:

a. The area of rehabilitation in the northern portion of Lot 2 shall be commenced prior to the commencement of clearing of vegetation or excavation of sand (whichever is sooner) in the southern portion of Lot 2, and cover the whole of the northern portion, with allowance for building envelopes and access roads;

* The Chief Executive Officer of the Department of the Public Service which is responsible for the administration of section 48 of the *Environmental Protection Act* 1986, or his delegate.

Albert Jacob MLA
MINISTER FOR ENVIRONMENT; HERITAGE

11 JUN 2014

Hon Reece Whitby MLA
Minister for Environment; Climate Action

Statement No. 1186

STATEMENT TO CHANGE THE IMPLEMENTATION CONDITIONS APPLYING TO A PROPOSAL
(Section 46 of the *Environmental Protection Act 1986*)

SOUTHERN EXTENSION OF SANDPIT, LOT 2 CALINUP ROAD, GELORUP, SHIRE OF CAPEL

Proposal: The clearing of native vegetation and excavation of sand at the southern portion of Lot 2, Calinup Road, Gelorup (Certificate of Title volume 1356 folio 756). The total area of native vegetation being cleared will not exceed 19 hectares. The area to be cleared will be progressively rehabilitated with local native vegetation.

The location of the native vegetation to be cleared is indicated in Figure 1 attached. The area to be quarried will be progressively rehabilitated using local native plant species.

In addition, remedial earthworks and rehabilitation will be carried out on the previously excavated areas as indicated in Figure 1.

The proposal also includes the placing of perpetual conservation covenants on the above land and Lot 268 Kilpatrick Road Gelorup (Certificate of Title volume 1319 folio 4) as described in Figures 1 and 2.

Proponent: McDougall Quarries Pty Ltd
Australian Company Number 635 264 603

Proponent address: 87 Keel Retreat
PORT GEOGRAPHE WA 6280

Report of the Environmental Protection Authority: 1708

Preceding Statements relating to this proposal: 767, 969

Pursuant to section 45 of the *Environmental Protection Act 1986*, as applied by section 46(8), it has been agreed that the implementation conditions set out in Ministerial Statement No. 767 and 969, be changed as specified in this Statement.

Conditions 9-2 and 9-3 of Ministerial Statement 767 are deleted and replaced with:

Published on:

7th Floor, Dumas House; 2 Havelock Street WEST PERTH WA 6005 Telephone +61 8 6552 6300
Email: Minister.Whitby@dpc.wa.gov.au

9 Rehabilitation

9-2 The principal objective of the Rehabilitation Plan is to ensure there is progressive rehabilitation of:

(1) the southern portion of Lot 2 which is to be cleared for excavation; and

(2) the previously excavated portion of Lot 2 (see Attachment 1, Figure 1 of Ministerial Statement 767).

9-3 The Rehabilitation Plan shall address short and long term activities, and shall meet the following criteria:

(1) In relation to the new clearing area:

(a) the area of rehabilitation following decommissioning shall be not less than the area cleared for the implementation of the proposal;

(b) the vegetation shall have comparable plant species composition to that which occurred prior to clearing and excavation;

(c) the vegetation shall be self-sustaining and composed of plant species native to the local area; and

(d) the vegetation shall have comparable densities and abundances of plant species to those which occurred prior to clearing and excavation.

(2) In relation to the previously excavated portion of Lot 2:

(a) the rehabilitation shall include re-earthworking and planting vegetation to achieve a stable land surface;

(b) the vegetation shall be self-sustaining and composed of plant species native to the local area; and

(c) in recognition of the degraded state of the previously excavated areas, the objective is not to reinstate native vegetation as it was prior to clearing, but to establish upper storey vegetation and understorey vegetation where possible.

Condition 9-3(2)(a) of Ministerial Statement 969 is deleted.

Hon Reece Whitby MLA
MINISTER FOR ENVIRONMENT; CLIMATE ACTION

- 2 FEB 2022

Affected decision-making authority consulted under section 46(8A):
Minister for Aboriginal Affairs

Appendix K – Current DA Approval (PA9/2022)

Our Vision

A future focused and resilient community that benefits from good governance, responsive services and appropriate facilities to deliver positive social, environmental and economic outcomes for everyone.

FILE: PA9/2022
ENQ: Scott Price

McDougall Quarries Pty Ltd
87 Keel Retreat
PORT GEOGRAPHE WA 6280

Kyle.jackson@westgen.com.au
Daniel.lewis@elementwa.com.au

Dear Mr McDougall

AMENDMENTS TO AN EXISTING EXTRACTIVE INDUSTRY – LOT 2 CALINUP ROAD, GELORUP

I refer to the Application for Development Approval received 25 February 2021.

Council gave due consideration to the matter at its last meeting held on 21 December 2022, whereby it resolved;

MINUTE OC/2022/255 – COUNCIL DECISION

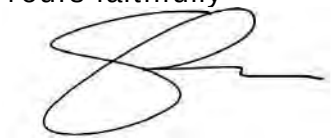
1. Pursuant to s.31 of the State Administrative Tribunal Act 2004in accordance with the provisions of Town Planning Scheme No. 7, Council sets aside the previous decision at the Ordinary Council Meeting dated 26 October 2022 and approves the application for Amendments to an Existing Extractive Industry at Lot 2 Calinup Road, Gelorup.

2. In accordance with the Shire of Capel Extractive Industries Local Law 2016, resolves to grant an Extractive Industry Licence, subject to conditions, in respect of the approved "Industry –Extractive" development on Lot 2 Calinup Road, Gelorup, and that the Director Infrastructure and Development be authorised to sign the Licence on behalf of the Council.

Enclosed is formal notice of Council's Development Approval, which is subject to conditions.

Should you wish to discuss any matter pertaining to the Development Approval, please do not hesitate to contact me.

Yours faithfully



SCOTT PRICE
MANAGER DEVELOPMENT SERVICES

9 January 2023
Enc: Formal Notice of Determination
Approved Development Plan

Planning and Development Act 2005
Notice of Determination on Application for Development Approval

Location:	Calinup Road, Gelorup	Lot:	2
Plan/Diagram:	45139	Vol No:	1356
Application date:	25 February 2021		
Received on:	25 February 2021		

Description of proposed development:

Extractive Industry

The application for development approval is:

☑ granted subject to the following conditions
☐ refused for the following reason(s)

Conditions:

a. The approval being limited to 8 years from the date of issue of the Development Approval dated 29 July 2020 (PA37/2020).

b. Resource extraction is only permitted for a maximum of 5 years after the issue of the Extractive Industry Licence.

c. Rehabilitation of the land may occur at any time within the term of this approval.

d. Unless otherwise approved in writing by the Shire's Director Infrastructure and Development, the development may only proceed generally in accordance with the attached approved plans, as dated, marked and stamped by the Shire, subject to any amendments required as a consequence of the conditions of this approval or any subsequent Extractive Industry Licence issued by the Shire.

e. There shall be no storage of hydrocarbons on-site. On-site refuelling of equipment will be from a mobile service vehicle carrying appropriate spill prevention and clean-up equipment. No major repairs or maintenance will take place on site.

f. Where the satisfaction of any condition of this approval requires the preparation of a legal agreement, all costs incidental to the satisfaction of these conditions, including the Shire's legal costs and registration fees and stamp duty (if any), must be paid by the applicant.

g. The front-end loader must meet the sound power level of 104 dB(A) in accordance with the Noise Management Plan. Noise monitoring at the licensee's expense will be conducted as and when the Shire deem it necessary and suitable controls shall be put in place if deemed necessary.

h. The hours of operation shall be from 7.00am to 6.00pm, Monday to Friday, and 7:00am to 12:00pm Saturday. No operations shall be permitted on Sundays or Public Holidays.

i. None of the operations associated with the Extractive Industry hereby approved shall at any time intercept the water table.

j. Maximum depth of cut shall be no lower than 20AHD. Irrespective of depth of cut, the Applicant shall ensure that a minimum of 2 metres separation to maximum ground water levels shall be maintained at all times.

k. If any interception of groundwater occurs at any time during the extractive industry operation, work shall cease immediately and the Shire notified within 48 hours, followed by agreed remedial action.

l. Access to the site shall be via Calinup Road unless otherwise agreed to in writing by the Shire of Capel.

m. Remnant vegetation within setback areas and surrounding zones shall remain to screen operations from the general public.

n. Setbacks for the extractive industry are as follows:A.40m from the northern boundary;B.20m from the western boundary;C.27m from the eastern boundary; andD.150m from the southern boundary.

o. The Rehabilitation (Revegetation) Implementation Plan prepared by Tranen, dated: 14 September 2022 Rev 4, is hereby approved and is to be implemented to the satisfaction of the Shire of Capel.

p. In accordance with the Rehabilitation (Revegetation) Implementation Plan prepared by Tranen dated: 14 September 2022 Rev 4, a 1.5m high kangaroo fence with rabbit proof skirt is to be constructed around the boundary of Lot 2 (South) within 12 months from the date of this approval.

q. The maximum volume of material to be stockpiled on site at any one time is 5,000m^3.

r. All stockpiles shall be removed prior to the expiry of this approval.

s. Maximum steepness of batter slopes of 1:4 shall be applied to all rehabilitation slopes.

t. The maximum truck movements to and from site per day is limited to 130. Consideration by the Shire will be given for granting additional numbers to the stated maximum figure of 130 trucks per day, with any variation to be approved in writing by the Chief Executive Officer.

u. Prior to commencement of the excavation of each respective stage of the development, security must be provided to the benefit of the Shire to ensure that sufficient funds are available for the Shire to complete rehabilitation of that stage of excavation in circumstances that the outcomes of the Rehabilitation (Revegetation) Implementation Plan have not been satisfactorily completed within the term of this approval.

The relevant security to be provided per stage is set out below, and shall be released subject to the outcomes identified within the Rehabilitation Implementation Plan being met:

Excavation Stage	Total Bond Per Stage
2	$10,421.00
3	$47,739.964
4	$70,919.80
5	$58,101.64
6	$63,206.40
7	$54,948.35
8	$51,078.17
9	$89,383.87
10	$80,416.28
11	$43,099.25
12	$42,014.59
13	$40,167.61
14	$37,364.21
15	$33,720.47
16	$31,992.02
17	$40,983.48
18	$41,887.66

v. Suitable arrangements being made with the Shire of Capel for the payment of a road reinstatement co-contribution for road deterioration purposes associated with Restricted Access Vehicle(s) in accordance with the WALGA co-contribution rates specified within the User guide, estimating the incremental cost impact on sealed roads from additional freight tasks. Road Deterioration Co-contribution is to be made in arrears on the submission of the annual compliance report as required by the Extractive Industry License in accordance with the Shire of Capel Extractive Industry Local Law 2016.

Date of determination: 21 December 2022

Signed: Dated:

9 January 2023

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SCOTT PRICE
MANAGER DEVELOPMENT SERVICES

Lot 74 Calinup Road, Gelorup
Extractive Industry Development Application & Licence
November 2025 | 22-332

element. | PART OF SLR
Level 1, 500 Hay Street. Subiaco WA 6008
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