WATER MANAGEMENT PLAN

LOT 103 BOYANUP ROAD WEST, STRATHAM

October 2023

Telephone +61 418 950 852

info@accendoaustralia.com.au
PO Box 5178 West Busselton WA 6280
ABN 11 160 028 642

www.accendoaustralia.com.au

Document Control

Version	Date	Author	Reviewer
V1	20/9/2023	PN	KMT/Shire of Capel
V2	19/10/2023	PN	KMT
Filename	2311_Lot 103 Boyanup Rd W WMP_V2		

Limitations

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

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

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

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

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

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

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

1.1 Background

Leeuwin Civil Pty Ltd (the applicant) is proposing to extract sand from a 7.4 ha area within Lot 103 Boyanup Road West, Stratham (herein referred to as the subject site) (refer to **Figure 1** and **Figure 2**).

The available volume of sand, *insitu* volume of approximately 400,000 m^3, is to be extracted. The subject site will be excavated to an approximate maximum depth of 12.6 metres Australian Height Datum (m AHD). The post extraction landform will be similar visually (minus the excavated material) and in form with the pre-excavation landform with batter slopes of 1:4 vertical to horizontal.

1.2 Purpose and Scope

The purpose of this Water Management Plan (WMP) is to review the risks and control measures to appropriately manage minimise the environmental impacts of the extractive industry on both groundwater and surface water in proximity to the subject site.

The scope of the WMP is to cover the following:

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

2 EXISTING ENVIRONMENT

2.1 Location

The subject site is located within Lot 103 Boyanup Road West, Stratham. The subject site is located within the municipality of the Shire of Capel, approximately 10 km north of the Capel town centre and approximately 170 km south of Perth (refer to **Figure 1** and **Figure 2**).

2.2 Land Use

The subject site is zoned "Rural" under the Shire of Capel's *Local Planning Scheme No. 8*. The subject site is located within the "Special Control Area – Basic raw materials" under the *Local Planning Scheme No. 8.* The proposed extractive industry is a permitted land use within this zone subject to development approval from the Shire of Capel.

Land use abutting the boundaries of the subject site is Rural based to the north, east and south. Properties to the west of the subject site on the other side of Bussell Highway are zoned 'Special Rural'.

The subject site is currently used for the grazing of cattle.

2.3 Topography and Soils

The current topography of the subject site can be described as sloping with the elevation ranging from 13 m Australian Height Datum (AHD) in the west to 30 m AHD in the south eastern corner of the subject site (refer to **Appendix A**).

The subject site is located on the Perth Coastal Zone consisting of coastal sand dunes and calcarenite within the Spearwood system. The Spearwood systems consists of "*Sand dunes and plains with yellow deep sands, pale deep sands and yellow/brown shallow sands"* (Tille 2006).

The subject site is located within the Spearwood S1b phase consisting of 'dune ridges with deep siliceous yellow brown sands or pale sands with yellow-brown subsoil and slopes up to 15%' (Natural Resource Information (NRInfo) (DPIRD 2023).

2.4 Climate

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

The closest weather recording station is Bunbury (Station 9965). Temperatures are highest on average in February, at approximately 30°C. July has the lowest average temperature of the year of 7.3°C.

Rainfall for the area is approximately 730 mm per annum with approximately 90% of the rain falling during the winter months, April to October inclusive.

During the summer months the dominant wind in the mornings is from the south-east at 10-14 knots, swinging to the south-west at 20-25 knots in the afternoon. During winter, the winds are most commonly 10-14 knots with no dominant prevailing direction. During storms winds from the west and north-west can reach 40 knots (BoM 2020).

Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system which yields the two hour 1 in 10 (10%) annual exceedance probability storm event for the subject site as 40.2 mm/hr.

2.5 Hydrology

2.5.1 Groundwater

The subject site is located within the Bunbury West subarea of the proclaimed Bunbury Groundwater Area.

Groundwater data from monitoring bores located within the extraction area and approximately 140 m to the north of the extraction area (refer to **Figure 3**) have been monitored monthly for groundwater levels from January 2021 to December 2022 (refer to **Appendix B**). Data from this monitoring indicates a maximum groundwater elevation of 10.4 m AHD in the northern bores and 11.0 m AHD in the bore within the extraction area in September 2022. Given a distance of approximately 300 m between these bores, and their location at approximately the same topographical elevation (14 m AHD), it can be assumed that the maximum groundwater at the south western corner of the excavation area will be approximately 11.6 m AHD. To ensure a separation to groundwater of at least 1 m, maximum excavation levels of 12.6 m AHD will be maintained across the subject site.

2.5.2 Surface water

The subject site is located in the Wonnerup subarea of the unproclaimed Capel surface water area, approximately 400 m to the north of the Rights in Water and Irrigation (RiWI) Act 1914 proclaimed Capel River System surface water area. The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

A dam is located to the north of the subject site. A buffer of at least 100 to this dam will be maintained at all times. Whilst not defined as a watercourse, a drainage depression is located to the west of the subject site. It is proposed to provide a buffer of at least 30 m to this depression at all times.

2.5.3 Wetlands

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

Table 1. Wetland classifications (Semeniuk 1995).

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

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

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

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

There is one Multiple Use (MU) wetland (UFI 13329) mapped to the west of the extraction site (refer to **Figure 3**).

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas within the property. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing through the drainage lines into the wider drainage system. The development is not proposing to alter this process, with all water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality is maintained.

3 EXTRACTION ACTIVITIES

The sand quarry will cover an area of approximately 7.4 ha, with a current maximum elevation ranging from 13 m AHD to 30 m AHD. It will be excavated to a maximum depth of approximately 12.6 m AHD commencing in the north east and moving initially in a southerly direction in stages less than 2 ha in size (refer to **Figure 2**). The proposal does not include any crushing or screening of material.

It is estimated that the total maximum volume of sand to be removed will be approximately 400,000 m^3 with a maximum of approximately 200,000 m^3 excavated each year, depending on supply and demand.

The planned end use of the quarry is to restore a natural soil profile and return the area to pasture, ensuring that there is no net loss of agricultural land.

3.1 Operational Works

Using a loader, the topsoil (where available) will be stripped and placed in stockpiles. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

Typical operating hours for quarries will be adopted for the subject site which involves 7am to 6pm each Monday to Friday and 7am to 1pm Saturdays for rehabilitation works only; and at no time on Sundays or public holidays. The site will be worked by 2 - 3 persons, depending on market demand.

3.1.1 Sand Extraction

The sand will be excavated by a bulldozer to a stockpile or loaded directly to waiting trucks for transport. A summary of the proposed sand extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 m contour plan developed.
- The topsoil and overburden (if present) will be stripped and stockpiled using a loader.
- An excavator or front-end loader will be used to dig the sand and transport it to a stockpile.
- The sand will then be picked up by a loader and loaded to trucks for transport.
- All static and other equipment, will be located on the floor of the quarry to provide visual and acoustic screening.
- Excavation will commence in the north of the quarry and then move in a southerly direction. The face and walls of the pit will act as noise barriers.
- Upon completion of each section of quarry, the section will be reformed and back filled, where subgrade material is available, to achieve the proposed final contours.
- At the end of excavation, the floor of the quarry will be deep ripped, covered by overburden and topsoil, and rehabilitated to a constructed soil.

3.1.2 Final Contours

The slope of the final contours of the quarry will be an undulating surface at approximately 12.6 m AHD which is consistent with the adjoining land.

Slopes of the batters at the end of excavation will be retained at 1:4 vertical to horizontal.

3.1.3 Equipment

All operational equipment will work on the quarry floor to provide maximum sound and visual screening. All equipment and infrastructure will be fully portable to facilitate movement throughout the site required

for staged quarrying operations. The site will be secured by locked gates when it is not being actively worked. The boundary fencing will be maintained to prevent inadvertent and unauthorised entry.

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

Table 3. Equipment.

Equipment	Description
Site office and/or containers	May be required for the management and security of small items.
Toilet	A portable toilet may be required on site.
Water tanker	Used for dust suppression on the access roads and working floors when required.
Loader	Loaders will be used for the movement of sand and loading road trucks.
Excavator	An excavator may be used for the removal of sand material.
Anaconda Radial Stockpiler	Used for stockpiling of sand.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.
Tip truck	Removal of sand from site.

3.1.4 Water Usage

Water is only required for dust suppression within the quarry and the access road. Water will be sourced from an offsite source and tankered to the site for dust suppression purposes, as required.

4 POTENTIAL IMPACTS AND MANAGEMENT

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

4.1 Surface Water

The current water cycle within the subject site consists of inputs from rainwater flowing downhill in a westerly direction into the wider drainage system. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through the base of the pit to ensure water quality to the drains is maintained.

An MU wetland is located to the west of the subject site (refer to **Figure 3**). A buffer of at least 30 m from the excavation area to the mapped boundary of all wetlands will be maintained.

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas adjacent to the subject site. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The proposed activities are not proposing to alter the natural surface flow process, with all water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality is maintained.

The mobilisation and positioning of equipment is not associated with any impacts to surface water, including stormwater runoff.

4.2 Drainage

Potential impacts associated with sedimentation and erosion from stormwater runoff during the operation of the quarry will be minimised by the construction of diversion drains around the excavation and hardstand areas to divert clean water away from the pit and contain any potentially sediment laden surface water within the pit.

The DWER recommendation is that surface water runoff produced within the excavation area from the two hour, 1 in 10 (10%) annual exceedance probability event should be contained within the pit (DoW 2019). Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system (BoM 2021), which yields the two hour 1 in 10% (10%) annual exceedance probability event for the site at 42 mm. For every 1 ha area open for excavation at any time a holding volume of 420 m^3 is required.

For l works in Stages 1 and 2, the required holding volume can be readily achieved within the excavated pit given the very high topographical relief.

For works in Stages 3 and 4, for a maximum area of 2 ha, a holding volume of 840 m^3 is required. The dimensions of these Stages are as follows:

- Stage 3: length is 220 m and minimum width is 60 m;
- Stage 4: length is 140 m and minimum width is 125 m.

A total holding area of at least 132,000 m^3 for Stage 3 and 17,500 m^3 for Stage 4 is achieved when these stages are excavated to a depth of 1 m. Excavation depths within Stages 3 ad 4 will range between approximately 1 – 5.5 m BGL, ensuring the required holding volume can be readily achieved within the excavated pit.

However, given the lower topographical elevation on the western boundary a small bund will be required to contain surface water within the pit when excavation is occurring adjacent to the western boundary.

During excavation activities, the surface will be internally drained, with the gradients in the cells being constructed to ensure that no surface water runoff occurs.

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

Table 4. Risk assessment associated with surface water and stormwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Erosion and sedimentation	Uncontrolled and contaminated stormwater runoff	Erosion and sedimentation resulting in poor surface water quality in surrounding waterways.	Construction of diversion drains around the excavation and hardstand areas to divert clean water away from the pit and contain any potentially sediment laden surface water within the pit. Excavation undertaken with a gradient to ensure that stormwater is contained within the excavation footprint.	1	2	Low

4.3 Groundwater

Groundwater will not be extracted or dewatered during the operation of the quarry and therefore, no impacts to groundwater levels are proposed.

Maximum excavation levels have been determined to ensure at least 1 m separation from the maximum groundwater level will be maintained at all times. The final contours of the quarry will provide an undulating surface at approximately 12.6 m AHD which is consistent with the adjoining land. This will provide a separation of at least 1.0 m between the final contours and the maximum groundwater elevation. This separation to groundwater is consistent with advice provided by the DWER and subsequently many previously approved extractive industry operations in the southwest. The specific 2 m separation distance was originally recommended for operations in highly sensitive environments such as Public Drinking Water Areas (PDWA) (refer to *Water Quality Protection Note 15*). Furthermore, it is noted that the *Government Sewage Policy 2019* recommends a 0.6 m to 1.5 m separation distance from the discharge point of an onsite sewage system to groundwater. As opposed to sewage systems, extractive industries are not associated with any environmental discharges (excluding accidental spills which can occur in any land use). The extraction and processing of sand is a chemically free operation with the liquids used being lubricants for

machinery and fuel. There will be no storage of chemicals or fuel on the subject site. In addition, the subject site is not adjacent to any environmental sensitive areas (i.e. conservation category or Ramsar wetlands). Therefore, a 1 m separation to groundwater is deemed to be suitable in consideration of the low risk nature of the operation.

Table 5. Risk assessment associated with groundwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Contamination of groundwater	Machinery	Contamination of groundwater	Maintenance of at least 1.0 m separation from groundwater at all times.	1	2	Low

4.4 Hydrocarbons and Dangerous Goods Management

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

Servicing of machinery and equipment will not occur onsite further reducing the possibility of contamination.

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

Table 6. Hydrocarbon and dangerous goods management measures.

Timing	Management Measure
During quarry operations	Mobile refuelling of equipment and vehicles will be undertaken on site by a mobile fueling truck on a hard stand area outside of the pit area.
	Spill kits containing appropriate equipment for control, containment and cleanup of hydrocarbon and chemical spills will be available in appropriate locations onsite and maintained.
	No vehicles or machinery are to be serviced or cleaned within the subject site.

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

Table 7. Risk assessment associated with the uncontrolled discharge of contaminants.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Uncontrolled discharge of contaminants to land	Machinery	Contamination of soils and/or water	Refer to Management Measures provided in **Table 6**.	1	2	Low

REFERENCES

Beard J. S. (1990). *Plant life of Western Australia*, Kangaroo Press, Perth.

Barnesby, B.A. and Proulx-Nixon, M.E. (2000). *Land resources from Harvey to Capel on the Swan Coastal Plain, Western Australia - Sheets 1 and 2.* Land Resources Maps No. 23/1 and 23/2. Agriculture Western Australia.

Churchward, H.M. and McArthur, W.M. (1978). Landforms and soils of the Darling System, Western Australia. In *'Atlas of Natural Resources, Darling System, Western Australia'*. Department of Conservation and Environment, Western Australia.

Davidson, W. A. (1995). *Hydrogeology and groundwater resources of the Perth Region, WA*. Geological Survey of Western Australia. Bulletin 142. 257 pp.

Deeney, A. (1989) *Geology and Groundwater Resources of the superficial formations between Pinjarra and Bunbury, Perth Basin.*

Department of Parks and Wildlife (DBCA) (2004). *Geomorphic Wetlands of the Swan Coastal Plain dataset*.

Department of Water (DoW) (2014). *South West Region Guideline, Water resource considerations for extractive industries.* DoW, Perth WA.

Environmental Protection Authority (EPA) (2006). *Guidance Statement No.10 for the Assessment of Environmental Factors (in accordance with the EP Act 1986: Levels of Assessment for Proposals Affecting Natural Areas Within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region.*

Environmental Protection Authority (EPA) (2009). *South West Regional Ecological Linkages.* Bulletin No 8. Retrieved from: http://epa.wa.gov.au/EPADocLib/3040_SWREL_EPB821009.pdf

Geological Survey of Western Australia (1978). *Geology and mineral resources of Western Australia, memoir 3*. Geological Survey of Western Australia, Perth, WA.

Heddle, E.M., Loneragan, O.W. and Havel, J.J. (1980). *Darling Systems – Vegetation Complexes, In: Atlas of Natural Resources Darling System*, Western Australia, Department of Conservation and Environment, Perth.

Molly, S., Wood, J. Hall, S., Wallrodt, S. & Whisson, G. (2009). *South West Regional Ecological Linkages Technical Report*. Available from: http://walga.asn.au/AboutWALGA/Policy/SouthWestBiodiversityProject/SouthWestRegionalEcologicalLinkagesTechnicalReport.aspx

Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

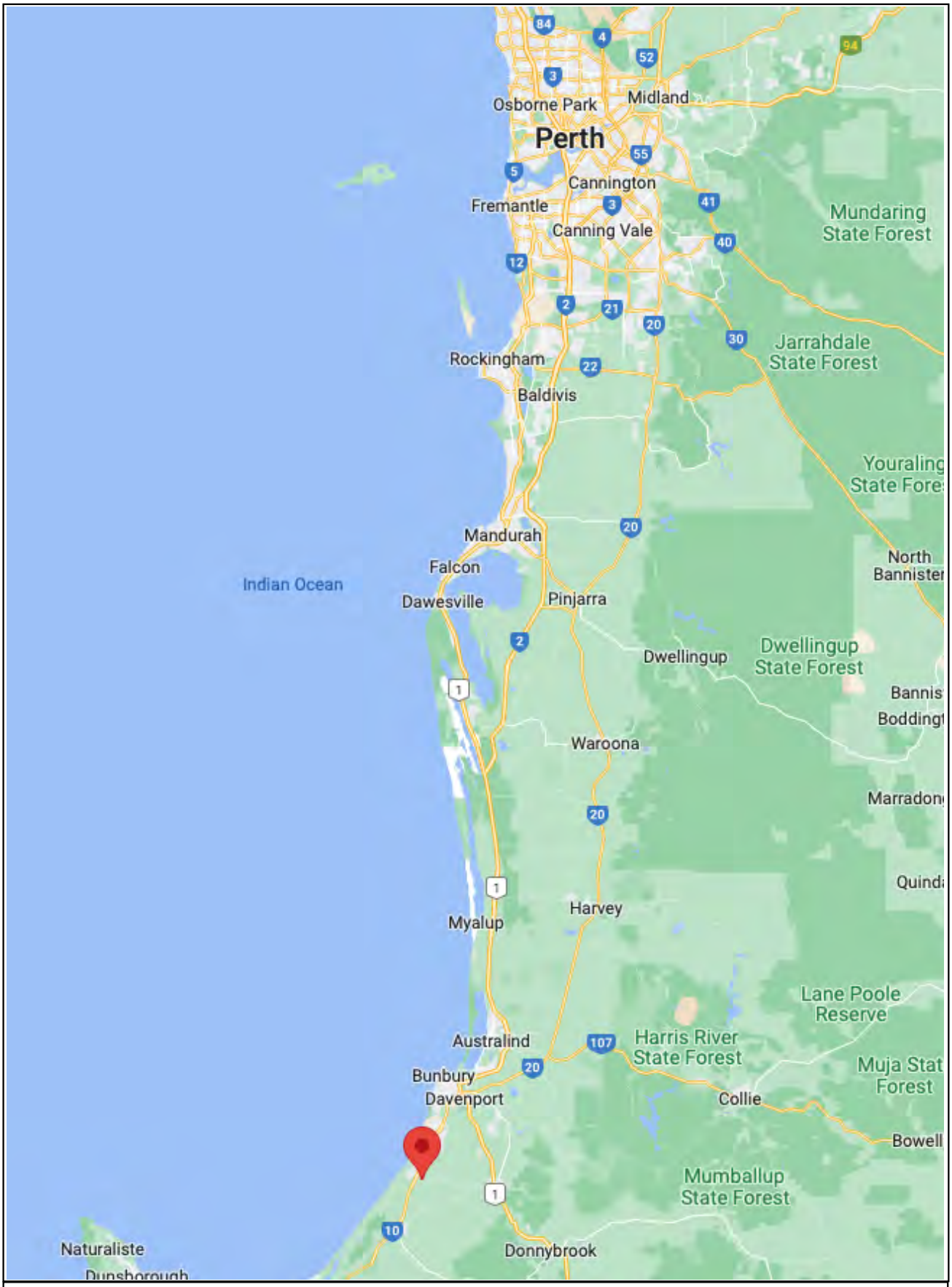
Thackway, R, and Cresswell, ID, (Eds) (1995). *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves*, Version 4.0. Australian Nature Conservation Agency, Canberra.

Tille, P (2006). Soil-Landscape Zones of the WA Rangelands and Interior.

Tille, P J, Mathwin, T W, and George, R J (2001). *South west hydrological information package : understanding and managing hydrological issues on agricultural land in the south west of Western Australia.* Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4488.

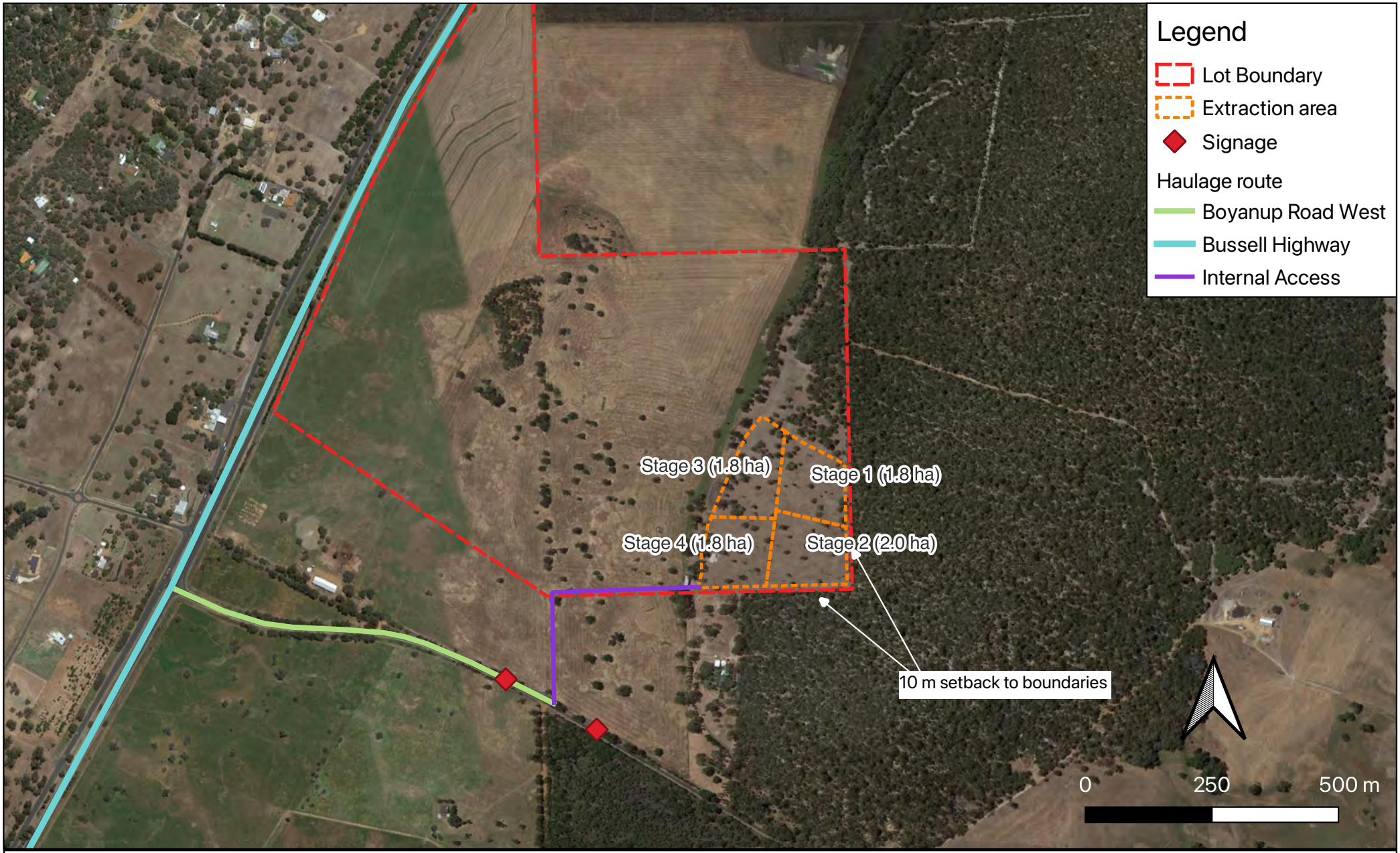
Western Australian Planning Commission (WAPC) (2007). *Planning Bulletin No. 64: Acid Sulfate Soils*, Western Australian Planning Commission, Western Australia.

FIGURES



PROJECT	Lot 103 Boyanup Rd W, Stratham	Project Number	Drawing Number	Revision
		2311	Figure 1	A
DRAWING TITLE	Figure 1 – Site Locality	Designed PN	Checked	
		Drawn PN	Approved	
CLIENT	Leeuwin Civil Pty Ltd	Date	26/09/2023	
		Local Authority	Shire of Capel	
		Sheet 1 of 1		

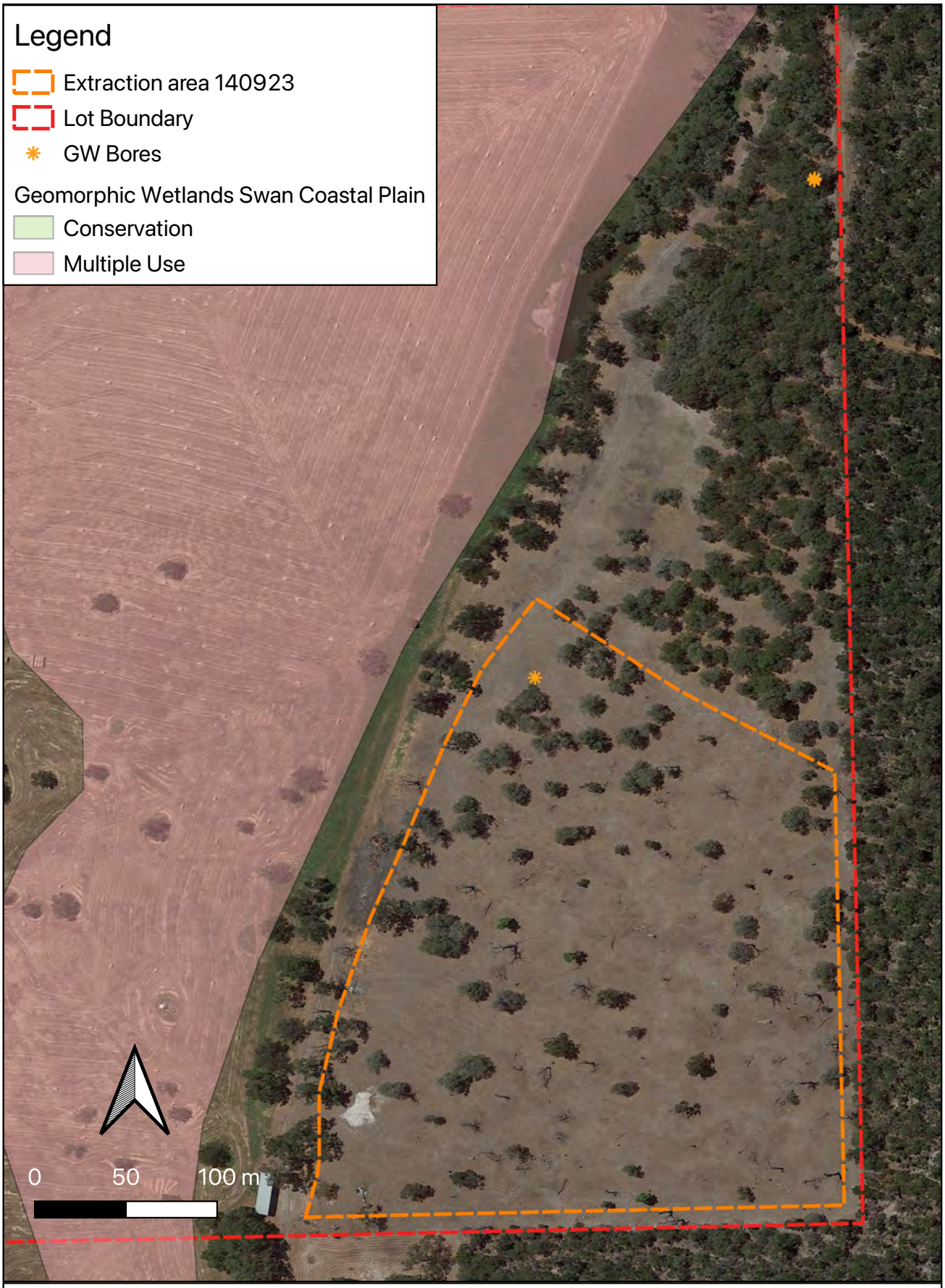
PO Box 5178
West Busselton
Western Australia 6280
Mobile 0418 950 852



PROJECT	103 Boyanup Road West,Stratham
DRAWING TITLE	Figure 2 - Site Extent
CLIENT	Leeuwin Civil Pty Ltd

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

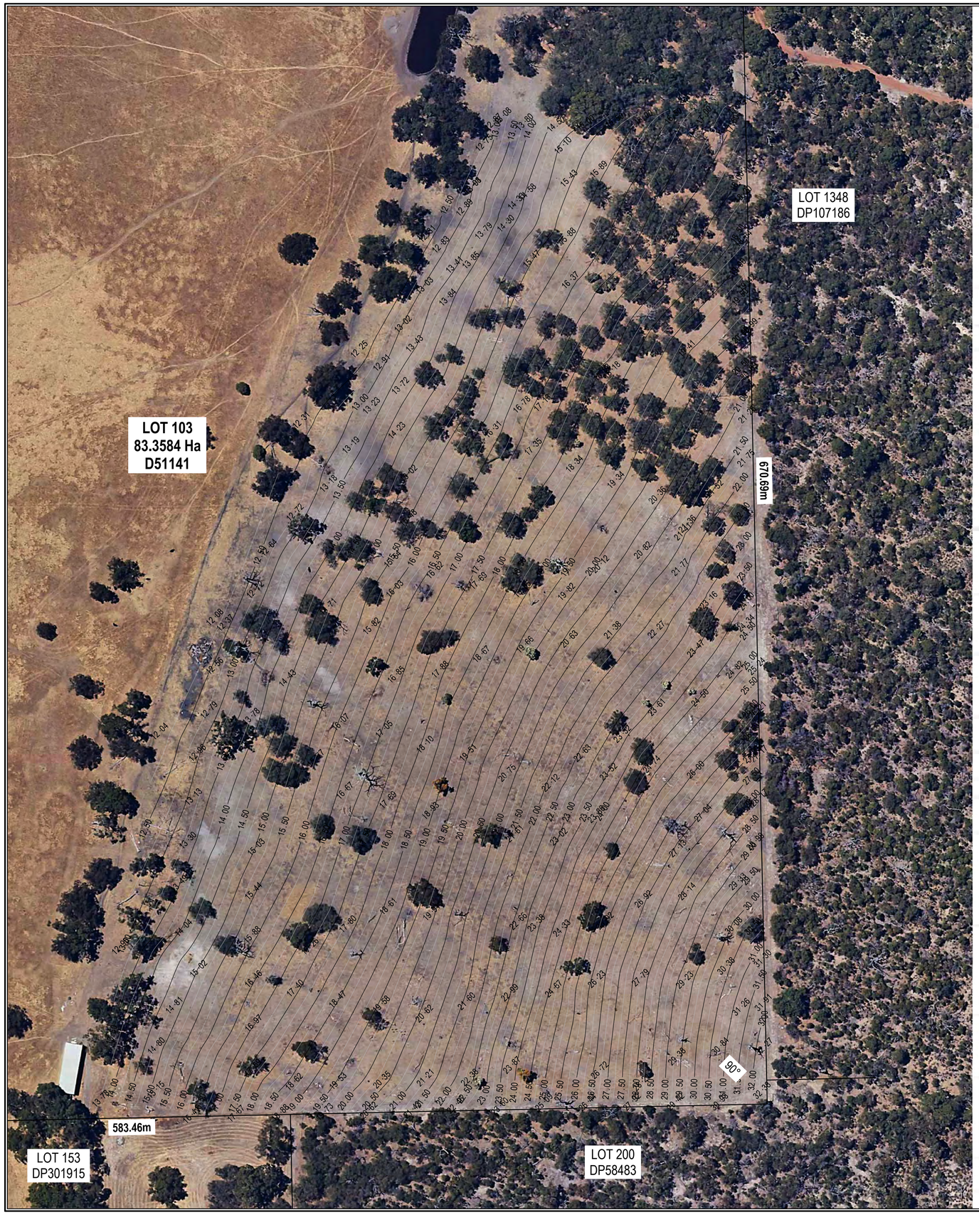
Project Number	2311	Designed	PN
Drawing Number	Figure 2	Drawn	PN
Revision	A	Checked	
Date	20/09/2023	Approved	
Sheet 1 of 1		Local Authority	Shire of Capel

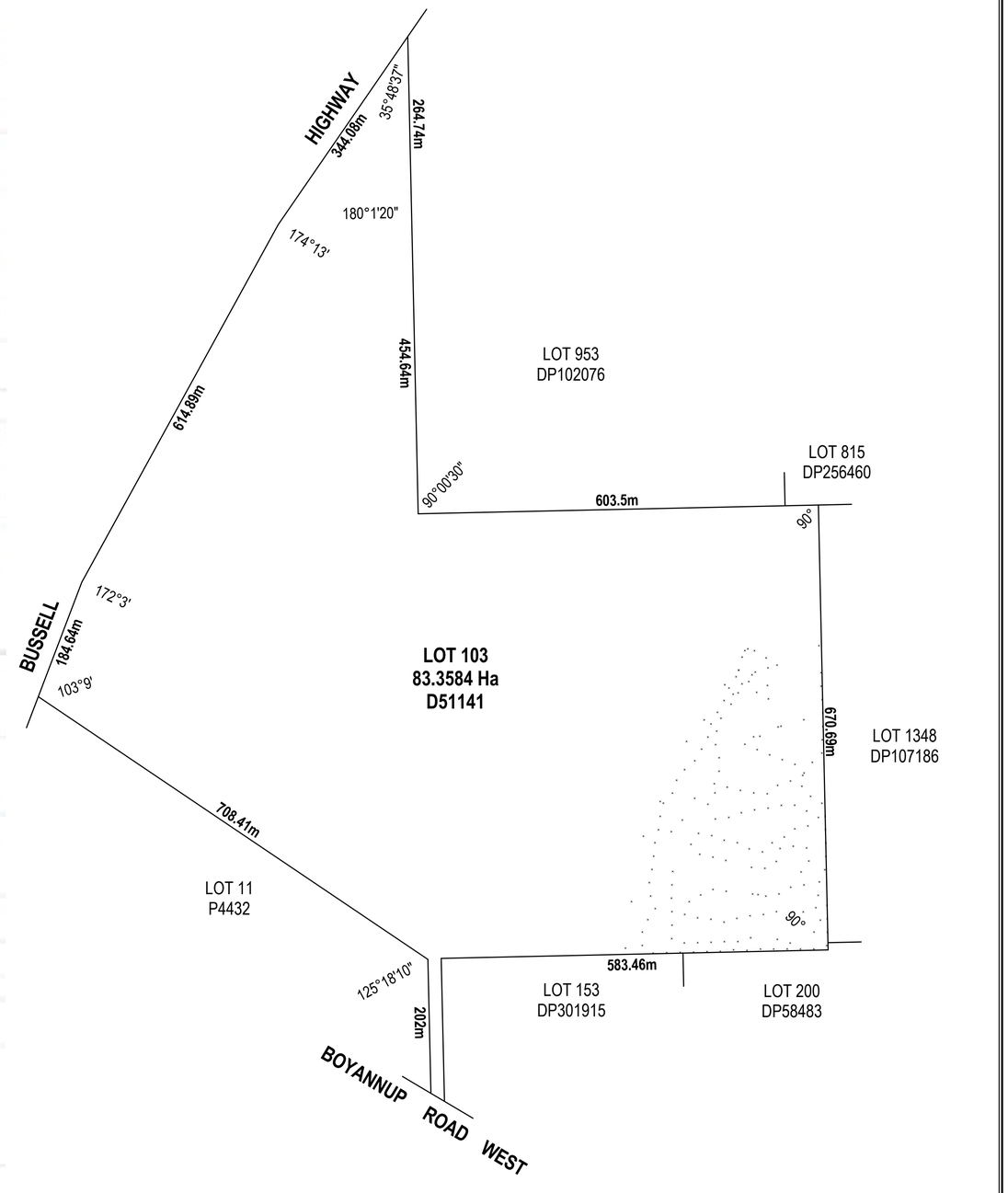


PROJECT	Lot 103 (Harris Pit), Stratham	Project Number	Drawing Number	Revision
		2311	Figure 3	A
DRAWING TITLE	Figure 3 – Water Features	Designed PN	Checked	
		Drawn PN	Approved	
CLIENT	Leeuwin Civil Pty Ltd	Date	21 / 09 / 2023	
		Local Authority	Shire of Capel	
		Sheet 1 of 1		

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

APPENDIX A – SITE CONTOUR SURVEY





LOCALITY DIAGRAM (NOT TO SCALE)

LEGEND

27.13 — EXISTING SURFACE HEIGHT

BOUNDARY

NOTES:
1. Limited boundary marks found. Boundary resurvey recommended if building on or close to boundary.
2. Datum is AHD established from VRS / GPS.
3. Above ground services located by survey. Underground services plotted from plans supplied by the relevant authorities. No liability is accepted for errors in underground service locations. All services to be located on site prior to any work being done.
4. No boundary marks found unless otherwise noted.
5. Contour interval is 0.25m.
6. PDF to be used in conjunction with DWG file supplied. Some point heights may have been omitted for clarity; see DWG file.

Rev.	Description	Drawn	Date	Checked
A	INITIAL ISSUE	TJ	30/8/23	MR

Scale: 1:1000 — A1 (ORIG) — ALL DISTANCES IN METRES — 0 10 20 30 40 50

Surveyor: MR
Survey date: 18/7/2023
Precal/Cad: N/A

The contents of this plan are date stated within the revision panel. All consultants and persons wishing to utilise this data should satisfy themselves of this plan's currency by contacting Survcon.

The boundaries depicted on this plan were not re-established as part of this survey, therefore this plan does not guarantee their accuracy. Re-establishment of the cadastral boundaries is recommended for any proposed works on or near existing boundaries.

N

FEATURE AND CONTOUR SURVEY
LOT 103 ON DIAGRAM 51141,
BOYANUP ROAD, STRATHAM

Client: **LEEUWIN CIVIL**

Survcon SURVEYING SERVICES
PO Box 365
Dunsborough
WA 6281
Australia
Tel: (08) 9754 1188
Fax: (08) 9756 8000
mail@survcon.com.au
www.survcon.com.au

PROJ MNGR.	Michael Riddle	DATUM	MGA50 AHD

JOB NUMBER 9238_SS_A — TYPE — REVISION

APPENDIX B - GROUNDWATER MONITORING DATA

SMB002A_G	13.98	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Date		14/1/2021	12/2/2021	26/3/2021	21/4/2021	13/5/2021	15/6/2021	12/7/2021	6/8/2021	21/9/2021	25/10/2021	15/11/2021	16/12/2021	25/1/2022	17/2/2022	31/3/2022	14/4/2022	24/5/2022	30/6/2022	28/7/2022	31/8/2022	28/9/2022	1/11/2022	23/11/2022	4/1/2023
Casing Height above topo		0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Depth of bor	m	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88	21.88
SWL (m)	m (from top of casing)	4.32	4.34	4.45	4.37	4.34	4.27	4.22	4.13	4.09	4.1	4.1	4.1	4.27	4.34	4.44	4.42	4.46	4.27	4.2	4.15	4.1	4.12	4.24	4.52
m AHD	survey of top steel	10.20	10.18	10.07	10.15	10.18	10.25	10.30	10.39	10.43	10.42	10.42	10.42	10.25	10.18	10.08	10.10	10.06	10.25	10.32	10.37	10.42	10.40	10.28	10.00

SMB008_GL	13.97	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Date		14/01/2021	12/02/2021	26/03/2021	20/04/2021	13/05/2021	15/06/2021	12/07/2021	6/08/2021	21/9/2021	25/10/2021	15/11/2021	16/12/2021	25/1/2022	17/2/2022	22/3/2022	14/4/2022	24/05/2022	30/6/2022	28/7/2022	31/8/2022	28/9/2022	1/11/2022	23/11/2022	4/01/2023
Casing Height above topo		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Depth of bor	m	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56
SWL (m)	m (from top of casing)	3.86	3.89	4.05	3.93	3.95	3.78	3.58	3.46	3.52	3.57	3.61	3.66	3.75	3.82	3.9	3.92	3.96	3.89	3.67	3.56	3.44	3.65	3.82	3.96
m AHD	survey of top steel	10.60	10.57	10.41	10.53	10.51	10.68	10.88	11.00	10.94	10.89	10.85	10.80	10.71	10.64	10.56	10.54	10.50	10.57	10.79	10.90	11.02	10.81	10.64	10.50