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8 October 2021

Department of Water and Environmental Regulation
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To Whom it May Concern,

RE – Jindong - Treeton Road Gravel and Sand Extraction - Clearing Permit Application

Please find herein information pertaining to a clearing permit (area) application on behalf of Leeuwin Civil Pty Ltd (the applicant).

Background

The applicant is currently extracting gravel from within Lot 4201 Jindong – Treeton Road, Kaloorup in accordance with a Development Approval (DA16/0376), issued by the City of Busselton on the 17th November 2016. This approval will expire in November 2021 and not all gravel has been extracted from the approved area. Accordingly, a new Development Approval and Extractive Industry Licence application to complete the current gravel extraction and for a new area of sand and gravel extraction in the north-west of the property has been submitted to the City of Busselton on 28th September 2021 (refer to **Appendix A**). The total extraction footprint is 20.9 hectares (ha).

Lot 4201 is located within the municipality of the City of Busselton, approximately mid-way between Cowaramup and Busselton, being approximately 14 km from each and approximately 200 km south of Perth (refer to **Figure 1**). The subject site is currently grazed by livestock.

The proposed extraction activities will require the removal of seven mature marri (*Corymbia calophylla*) trees and a 4,150 m^2 area comprised of Wild Plum (*Podocarpus drouynianus*) (herein referred to as the subject site), which are contained within proposed Cells 4, 5, 8 and 9 (refer to **Plates 1** to **8** for pictures and **Figure 2** for clearing locations).

During a site visit on the 5th August 2021 no visible hollows were observed from a ground level inspection of the marri trees to be cleared. No native understory was observed within the proposed clearing area as the subject site has largely been cleared of remnant native vegetation and is currently comprised of a variety of pasture grasses with isolated paddock (marri) trees and shrubs.

The available volume of gravel (*insitu* volume of approximately 325,000 m^3) is to be extracted in seven cells ranging from 2.0 to 3.2 ha, each separated into stages of less than 2 ha in size to ensure that no more than 2 ha is disturbed at any time. Currently, works are progressing in an easterly direction, which will continue into Cells 1-3. Upon completion of Cells 1-3, extraction works will then commence in Cells 4-7.

The available volume of sand in Cells 8-9 is approximately 50,000 m^3 and will be extracted in two cells (8 and 9) in response to market demand. The post extraction landform will be designed with maximum batters of 1:5. Upon completion of the extraction activities, the area will be returned to pasture.

Plate 7: Marri tree to be cleared.

Plate 8: Wild Plum to be cleared.

Minimisation and Mitigation Measures

The applicant undertook an assessment of the area prior to determining the suitability of sand and gravel extraction from the subject site. This included a visual assessment of vegetation within the proposed location. Upon completion of this assessment, it was determined that the trees within the clearing area are unlikely to constitute significant habitat for fauna species of conservation significance. It is considered that no other reasonable or practicable avoidance measures can be implemented within the clearing footprint.

To avoid any direct or indirect impacts to vegetation within adjoining properties or the remainder of Lot 4201, the applicant has committed to the following mitigation and management measures:

- Access within the site will be restricted to authorised personnel remaining on established tracks;
- Dieback management measures will be implemented as per the EIL Accendo 2021 (refer **Appendix A**).
- Weed management measures will be implemented as per the EIL Accendo 2021 (refer **Appendix A**).
- As cleared vegetation will not be utilised within revegetation it will be disposed of offsite or burnt, further reducing potential spread of pests or disease.

Impact Assessment

Any clearing of native vegetation requires a permit in accordance with Part V of the *Environmental Protection Act 1986* (EP Act), except where an exemption applies under Schedule 6 of the Act or is prescribed by regulation in the *Environmental Protection (Clearing Native Vegetation) Regulations 2004*.

The clearing of native vegetation for the purpose of the proposed extraction activities will require an approved clearing permit. Clearing applications are assessed against the Ten Clearing Principles outlined in Schedule 5 of the EP Act. These principles aim to ensure that all potential impacts resulting from the removal of native vegetation can be assessed in an integrated manner.

An examination of the Ten Clearing Principles applied against a desktop investigation and site-specific investigations is provided below.

Table 1: Assessment against the Ten Clearing Principles.

Principle	Assessment	Conclusion
a.) Native vegetation should not be cleared if it comprises a high level of biological diversity	The subject site has been mostly cleared of remnant native vegetation with the exception of sparse Wild Plum (*Podocarpus drouynianus*) shrubs and seven Marri trees (*Corymbia calophylla*). The remainder of the subject site is comprised of pasture grasses. Mapping (Mattiske and Havel 1998) indicates original vegetation complexes within the subject site would have included vegetation of the Whicher Scarp Uplands and Valley systems which are comprised of open forest or woodland of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*). The subject site is in a Completely Degraded (Casson *et al.* 2009) condition as it is devoid of any native understory vegetation and is comprised of pasture grasses. A search of the Protected Matters Database indicated two Threatened Ecological Communities (TEC) are likely to occur within 1 km of the subject site[1]. This includes the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region ecological community and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community, which are listed as Endangered and Critically Endangered respectively (refer to Principle (d)). Given the condition of the subject site and history of agricultural use, visual inspection of the subject site has indicated neither TEC is present. The subject site's historical and current land use (livestock grazing) in combination with vegetation condition denotes that it is unlikely to contain flora species of conservation significance. As discussed under Principle (b), the subject site is not likely to comprise significant habitat for any conservation significant fauna species due to the absence of suitable habitat. The clearing will result in the removal of seven mature Marri (*Corymbia calophylla*) trees in varying condition and a 4,150 m^2 area comprising of Wild Plum (*Podocarpus*	Based on the extent of historical clearing within the subject site, the condition of the trees to be removed and the limited clearing footprint, the subject site is not likely to comprise high biodiversity. The proposed clearing is not likely to be at variance with this Principle.

[1] A third TEC was identified within the EIL (Accendo 2021) on the eastern boundary of Lot 4201 (refer to **Appendix A**). As this is outside of the proposed clearing area, this TEC has not been included within this clearing permit.

Principle	Assessment	Conclusion
	drouynianus). The removal of this vegetation is not considered likely to significantly impact on the biological diversity of the area.	
b.) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	A search of the Department of Biodiversity, Conservation and Attraction's (DBCA's) threatened fauna database and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protected matters database indicates the following fauna is likely to be present within a 1 km radius of the subject site: • *Botaurus poiciloptilus* (Australasian Bittern); • *Calidris ferruginea* (Curlew Sandpiper); • *Calyptorhynchus baudinii* (Baudin's Cockatoo); • *Calyptorhynchus latirostris* (Carnaby's Cockatoo); • *Calyptorhynchus banksia naso* (Forest Red-tailed Black Cockatoo); • *Falco hypoleucos* (Grey Falcon); • *Numenius madagascariensis* (Eastern Curlew); • *Dasyurus geoffroii (*Chuditch, Western Quoll*);* and • *Pseudocheirus occidentalis* (Western Ringtail Possum (WRP). Due to the high mobility of the majority of the species occurring within the local area, the small size of the subject site and the vegetation being Completely Degraded in condition, it is not likely that these species are dependent on the subject site. Therefore, the proposed clearing is not likely to significantly impact their habitat. In the *EPBC Act referral guidelines for three threatened black cockatoo species* (2012), the Commonwealth Department of Agriculture, Water and the Environment (DAWE) has identified a range of tree species as potential breeding and foraging habitat for the three threatened species of black cockatoo. Marri trees are identified within this document as providing breeding or foraging habitat for black cockatoo species. The subject site contains a total of seven Marri trees of variable form, some with disease expression. During the site visit, from opportunistic observations, no obvious tree hollows (suitable for breeding) were identified.	Removal of vegetation within the subject site is not considered to be at variance with this Principle as the limited clearing of low quality habitat will not impact the success of any fauna indigenous to Western Australia.

Principle	Assessment	Conclusion
	Furthermore, available mapping data indicates that there is approximately 810 ha of remnant native vegetation within 5 km radius of the clearing area, the majority of which is described as 'Woodland to open forest of Jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*), western woody pear (*Xylomelum occidentale*) and peppermint (*Agonis flexuosa*) on raised river terrace in the perhumid zone'. On this basis, the removal of seven trees will have negligible impact on the availability of breeding and foraging habitat for black cockatoos on a local and regional scale. Mapping prepared by Shedley *et.a*l. 2014 identified no suitable WRP habitat within the subject site. Additionally, the area is devoid of any peppermint trees (*Agonis flexuosa*) which is the preferred habitat for WRP as outlined within the *WRP Recovery Plan* (DPaW 2014). Accordingly, the vegetation subject to clearing does not currently provide habitat for WRPs. Accordingly, the clearing will not result in the loss of significant habitat for WRPs. Furthermore, there is a small area of 'Medium' habitat located approximately 150m to the southeast of the subject site and approximately 46 ha of 'High' quality habitat approximately 630 m to the north of the subject site. The DBCA *Chuditch Dasyurus Geoffroii Fauna Profile* (2017) identifies Chuditch habitat as Jarrah (*Eucalyptus marginata*) forests and woodlands, mallee shrublands and heathlands. As this habitat is not present within the subject site, the clearing will not result in the loss of significant habitat for Chuditch. In consideration of the above the subject site is not considered to provide significant habitat for conservation significant fauna recorded within the local area.	
c.) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	A DBCA's threatened (Declared Rare and Priority) flora databases and the EPBC Act protected matters database indicates the following conservation significant flora is likely to be present within a 1km radius of the subject site: • *Banksia nivea subsp. Uliginosa* • *Banksia squarrosa subsp. argillacea* • *Brachyscias verecundus* • *Caladenia busselliana*	Removal of the vegetation within the subject site is not considered to be at variance with this Principle as native vegetation has previously been impacted by agricultural clearing and activities.

Principle	Assessment	Conclusion
	• *Caladenia hoffmanii* • *Caladenia huegelii (*Grand Spider Orchid) • *Chamelaucium sp. S coastal plain* • *Daviesia elongate subsp. 8longate* • *Diuris micrantha;* • *Drakaea elastica* • *Drakaea micrantha* • *Gastrolobium papilio* • *Grevillea brachystylis subsp. grandis* • *Lambertia echinata subsp. Occidentalis;* • *Petrophile latericola* • *Verticordia plumosa var. anaeotes* • *Verticordia plumosa var. vassensis* According to available databases, none of the abovementioned species occur within the subject site, however *Grevillea brachystylis subsp. Grandis* has been identified 20 m to the east of the property. The likelihood of this species occurring within the subject site is very low given the extent of historical anthropogenic activities and absence of suitable soil types. Furthermore, the additional species listed are not considered likely to occur within the subject site as it does not appear to contain the vegetation structure or diversity consistent with recordings of these conservation significant species. Given the Completely Degraded condition of the subject site and historic agricultural impacts, it is highly unlikely that any flora of conservation significance exists within the subject site. On this basis, the proposed clearing is not at variance to this Principle.	
d.) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance	The DBCA defines an ecological community as "a naturally occurring assemblage that occurs in a particular type of habitat" (PWS 2015). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon	Clearing within the subject site is not considered to be at variance to this Principle as vegetation consistent with the mapped TECs is not present.

Principle	Assessment	Conclusion
of a threatened ecological community.	ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC). As well as protection under State legislation, selected ecological communities are also afforded statutory protection at a Federal level pursuant to the *EPBC Act (*1999). The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182. A search of the DBCA's and EPBC databases found two TECs endorsed under State and Commonwealth legislation which may occur within proximity to the subject site. This included the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region ecological community and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community. The clearing area does not contain the floristic composition or structure consistent with the identified TECs, as the vegetation is in a Completely Degraded condition. On this basis, the subject site is not likely to comprise or be necessary for the maintenance of a TEC and therefore the proposed clearing is not at variance to this Principle.	
e.) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The subject site lies within the Swan Coastal Plain Biogeographic Region of the south-west Botanical Province (Thackway and Cresswell 1995), an area that extends from Jurien Bay to the north to Dunsborough to the south, and west of the Darling Scarp. Historically this biogeographic region has been extensively cleared for both urban and agricultural purposes. While the majority of the subject site has previously been completely cleared of remnant vegetation, broadscale pre-European vegetation mapping of the area undertaken by Mattiske and Havel (1998) identified the following two vegetation associations in proximity: • Vegetation Association 310 – Whicher Scarp Yelverton Uplands • Vegetation Association 324 – Whicher Scarp Yelverton Valleys	Clearing within the subject site is not considered to be at variance to this Principle as the vegetation is not considered significant as a remnant of native vegetation.

<table>
<tr><th>Principle</th><th>Assessment</th><th>Conclusion</th></tr>
<tr><td></td><td>
The mapped vegetation associations can be used to determine vegetation extent and status on the Swan Coastal Plain (refer to Table 2). The EPA recognises vegetation associations that are not well represented in reserves as being ‘significant’.

Table 2. Extent of pre-European vegetation remaining the Swan Coastal Plain IBRA region.
<table>
<tr><th>System</th><th>Pre-European (ha)</th><th>Current Extent (ha)</th><th>Remaining Extent (%)</th><th>Extent in Managed Lands (%)</th></tr>
<tr><td>IBRA Bioregion[1]
Swan Coastal Plan</td><td>1,501,221</td><td>579,813</td><td>39</td><td>38</td></tr>
<tr><td>Local Government[1]
City of Busselton</td><td>3,499</td><td>982</td><td>28</td><td>97</td></tr>
<tr><td>Beard Vegetation Association
310
324</td><td>
2,439
3,589</td><td>
1,358
1,065</td><td>
56
30</td><td>
15
12</td></tr>
</table>
The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30% of their pre-European extent remaining. In consideration of Table 2, vegetation associations 310 and 324 has greater than 30% of their pre-European extent remaining denoting that it is well represented.

The presence of Wild Plum and Marri is not indicative of the either complex and the clearing area does not contain the floristic composition or structure consistent with this vegetation system. Accordingly, the clearing will not impact the extent of either the Whicher Scarp Yelverton Uplands or Valley complexes.

Furthermore, as the subject site does not comprise high biological diversity, is not likely to impact upon significant habitat for fauna indigenous to Western Australia, priority or threatened flora and is not likely to comprise a PEC or TEC. On this basis the subject site is
</td><td></td></tr>
</table>

Principle	Assessment	Conclusion
	not considered to be a significant remnant within an extensively cleared landscape. The proposed clearing is not at with this variance to this Principle.	
f.) Native vegetation should not be cleared if it is growing in, or in association with an environment associated with a watercourse or wetland.	According to the DBCA's *Geographic Wetlands of the South West* database there is a Multiple Use (MU) wetland (UFI 15) directly adjacent to the eastern border of the subject site. An additional MU wetland (UFI 14) is located 85 m to the southwest of the subject site. There are no other watercourses or Ramsar wetlands located within or in proximity to the subject site. The project will not involve clearing of any riparian native vegetation or clearing of vegetation in proximity to a watercourse. The proposed clearing is unlikely to be at variance to this Principle.	Clearing within the subject site is not considered to be at variance with this Principle as no riparian vegetation or clearing in proximity to a watercourse will be undertaken.
g.) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The subject site is located within the Whicher Scarp System within the Donnybrook Sunkland Zone consisting of pale deep sands, loamy gravel and non-saline wet soils. The proposed clearing area of cells 8 – 9 to the west of the subject site consists of the Yelverton deep sandy flats Phase, which is a level to gently undulating raised shelf lying 10-40 m above the Swan Coastal Plain. This phase has been mapped as having 86% of the unit with a high to extreme wind erosion risk. The cells 4 – 7 to the east of the subject site are characterized by undulating terrain with sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels of the Yelverton very gentle slopes Phase and duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels of the Yelverton flats Phase (refer to **Figure 3**). This area has been mapped as 66% of the unit with a high to extreme wind erosion risk. Mapping of the subject site identified a very low risk of any water erosion (> 1%). Although a high portion of wind erosion risk has been identified, this will be mitigated by limiting the size of the cells (2 ha) open at any given time and the progressive rehabilitation. Additionally, there will be no increase to these risk levels as there is already limited vegetation within the subject site. To support the Proposal, a Dust and Water Management Plan has been developed (refer to **Appendix A**).	Clearing of the subject site is not considered to be at variance with this Principle given the nature of the site and the proposed works.

Principle	Assessment	Conclusion
	The proposed clearing is not likely to be at variance with this Principle.	
h.) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The subject site is located on privately owned land which has previously been cleared for agricultural activities. Land use abutting the boundaries of the subject site is rural based, including a range of grazing and pastoral land uses. The proposed clearing is unlikely to indirectly impact these properties given the already cleared nature of the surrounding environment. The closest reserve is a recreation reserve (ID 100019899) located approximately 494 m to the north of the subject site. There is also a bushland protection reserve (ID 100019898) located 1.5 km from the subject site and two additional recreation reserves located 875 m (Reserve 25325 Jindong Motocross and Jindong Gravel) and 2.8 km (Reserve 45533) from the subject site, respectively. Given the limited native vegetation present, the subject site does not form an ecological linkage and the clearing will not result in fragmentation between these reserves. In consideration of the above, the clearing is unlikely to be at variance to this Principle.	The proposed clearing is not considered to be at variance with this Principle as there will be no direct or indirect impacts to conservation areas in proximity to the subject site.
i.) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The subject site is located within the proclaimed Busselton-Capel Groundwater Area. Clearing within the subject site will not impact surface water run-off given the small clearing footprint and proximity to watercourses. The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing within the minor and major drains to the wider drainage system. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality to the drains is maintained (refer to Water Management Plan in **Appendix A**). Furthermore, no interactions with groundwater are expected with a minimum of 1 m separation to groundwater to be maintained at all times and no standing water will remain within the site post extraction.	The clearing is not considered to be at variance with this Principle as it is unlikely that the clearing will alter natural surface or groundwater interactions within the subject site.

Principle	Assessment	Conclusion
	The proposed clearing is not likely to be at variance with this Principle.	
j.) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The subject site does not occur in close proximity to a watercourse. There is a stream running through the eastern portion of Lot 4201 Jindong-Treeton Rd however this is outside the subject site. The limited clearing is highly unlikely to substantially increase runoff and therefore the incidence or intensity of flooding. The proposed clearing is not likely to be at variance with this Principle.	Clearing within the subject site is not considered to be at variance with this Principle as it is unlikely to increase run off and therefore intensity or incidence of flooding.

Summary

The above assessment of the proposed clearing against the Ten Clearing Principles demonstrates that the clearing is not at variance to any of the Principles. Furthermore, given the Completely Degraded condition of the vegetation within the subject site and the history of agricultural activities, it is anticipated that there will be no residual impacts that will require the implementation of any offsets.

Yours sincerely,

Phoebe Norman

Environmental Consultant

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REFERENCES

Department of Agriculture, Water and the Environment (DAWE) (2012). *EPBC Act referral guidelines for three threatened black cockatoo species*

Department of Biodiversity, Conservation and Attraction (DBCA) (2021). *Threatened Ecological Communities (TEC) database*. Accessed September 2021.

Department of Biodiversity, Conservation and Attraction (DBCA) (2017). *Fauna profiles - Chuditch Dasyurus geoffroii*. Retrieved from http://www.dbca.wa.gov.au/

Department of Environment, Water, Heritage and the Arts (2013). *EPBC Act Matters of National Environmental Significance database.* Accessed September 2021.

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

Department of Primary Industries and Regional Development (DPIRD) Geographic Information Services (2020). *Native Vegetation Extent*. Western Australia

Department of Water (DoW) (2009). *Busselton-Capel Groundwater Area Sub-area Reference Sheets.*

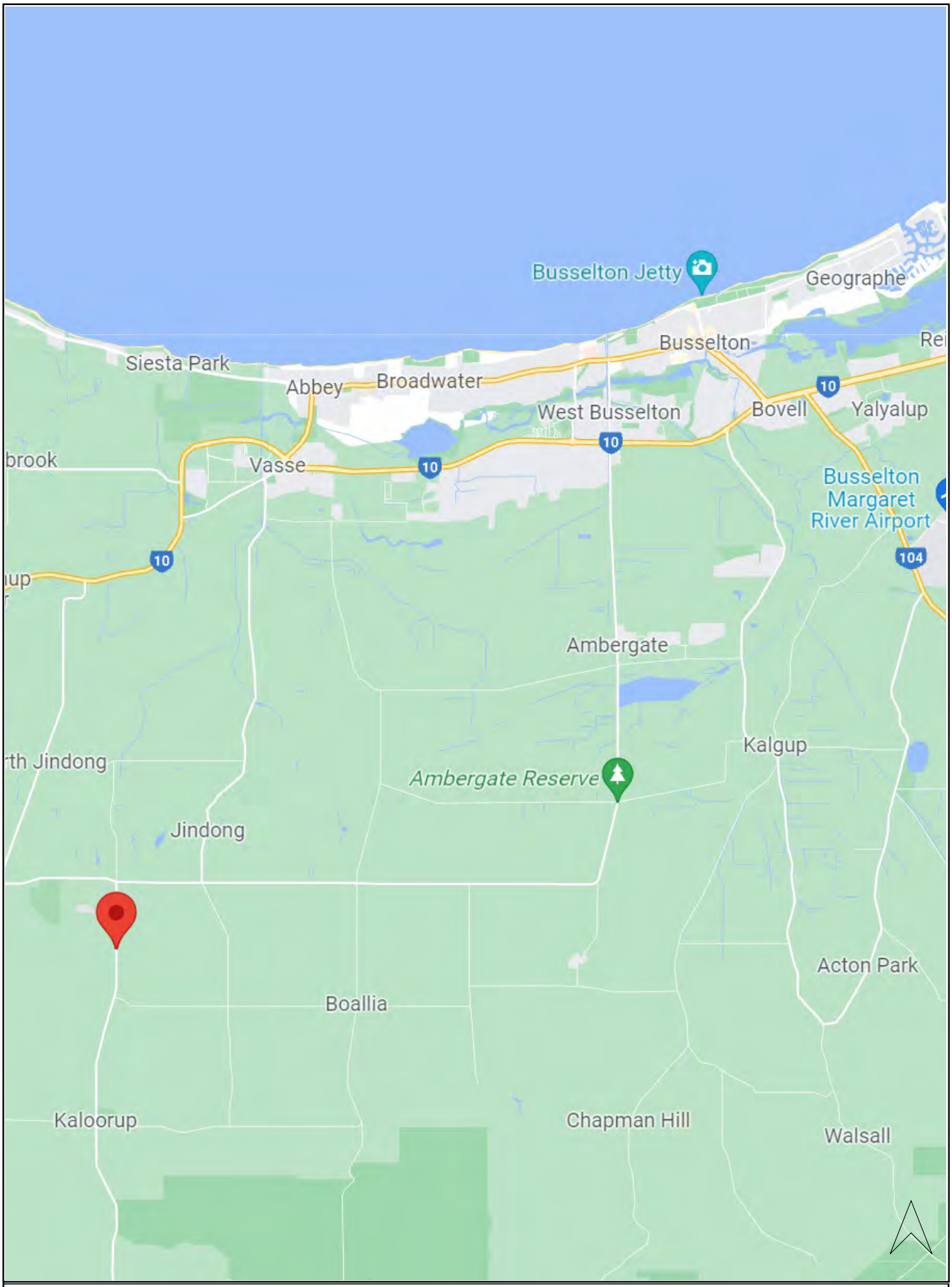
Casson N, Downes S, and Harris A (2009). *Native Vegetation Condition Assessment and Monitoring Manual for Western Australia*. Department of Environment and Conservation, Perth WA

Mattiske, E and Havel J (1998). *Vegetation Mapping in the South West of Western Australia and Regional Forest Agreement vegetation complexes*. Map sheets for Pemberton, Collie, Pinjarra, Busselton- Margaret River, Mt Barker, and Perth, Western Australia. Scale 1:250,000. Department of Conservation and Land Management, Perth.

Shedley E and Williams K (2014). *An assessment of habitat for western ringtail possum (Pseudocheirus occidentalis) on the southern Swan Coastal Plain.* Department of Parks and Wildlife, Perth WA

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.

FIGURES



PROJECT	Lot 4201 Jindong- Treeton Road, Kaloorup		Project Number	Drawing Number	Revision
			2154	Figure 1	A
DRAWING TITLE	Figure 1 - Site Locality		Designed PN	Checked	
			Drawn PN	Approved	
CLIENT	Leeuwin Civil Pty Ltd		Date	6/10/2021	
			Local Authority	City of Busselton	
			Sheet 1 of 1		

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PROJECT Lot 4201 Jindong - Treeton Road, Kaloorup

DRAWING TITLE Figure 2 - Vegetation Mapping

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Project Number	2154	Designed	PN
Drawing Number	Figure 2	Drawn	PN
Revision	A	Checked	
Date	6/10/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

Legend

- Gravel extraction area
- Sand extraction area

Soil Landscape Mapping

- Yelverton deep sandy flats Phase
- Yelverton flats Phase
- Yelverton very gentle slopes Phase
- Yelverton wet valleys Phase

PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 3 - Soil Landscape Mappling
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
Drawing Number	Figure 3	Drawn	PN
Revision	A	Checked	
Date	6/10/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX A – EXTRACTIVE INDUSTRIES LICENCE APPLICATION (ACCENDO 2021)

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EXTRACTIVE INDUSTRIES LICENCE APPLICATION

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Document Control

Version	Date	Author	Reviewer
V1	12/8/2021	PN	KMT
Filename	2145_Lot 4201 Jindong-Treeton Rd EIL _v1		

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1 INTRODUCTION

1.1 Background

Leeuwin Civil Pty Ltd (the applicant) is currently extracting gravel from within Lot 4201 Jindong - Treeton Road, Kaloorup in accordance with a Development Approval (DA16/0376), issued by the City of Busselton on the 17th November 2016. This approval was granted for a period of five years and will therefore expire in November 2021. To date, of the 23.4 hectares (ha) approved, 9.2 ha has been mined and rehabilitated, 2 ha is currently being mined and 8.3 ha will be mined in the future. The remaining 3.9 ha is not viable for gravel extraction and has therefore been removed from this application. As not all gravel has been extracted from the approved area, a new approval is required for the applicant to continue extraction of the remaining resource. The scope of this application has also been increased to include an area of sand and gravel located in the north-western portion of the property (refer to **Figure 1**). Accordingly, this application is made for the remaining 10.3 ha associated with the previously approved Development Approval (DA16/0376), and the additional 10.6 ha area located in the north-western portion of the property. The total extraction footprint is 20.9 ha and herein is referred to as the subject site.

The applicant's details are as follows:

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This application is made for a five year period however, the exact life of the project is difficult to estimate as it will be dependent on supply and demand trends.

The available volume of gravel (*insitu* volume of approximately 325,000 m^3) is to be extracted in seven cells ranging from 2.0 to 3.2 ha, each separated into stages of less than 2 ha in size to ensure that no more than 2 ha is disturbed at any time. Currently, works are progressing in an easterly direction, which will continue into Cells 1-3. Upon completion of Cells 1-3, extraction works will then commence in the Cells 4-7.

The available volume of sand in Cells 8-9 is approximately 50,000 m^3 and will be extracted in two cells (8 and 9) in response to market demands. The post extraction landform will be designed with maximum batters of 1:5.

This document has been submitted to fulfil the relevant requirements provided within the City of Busselton's *Local Planning Scheme No. 21* and the City of Busselton's *Local Planning Policy No. 2.3 Extractive Industries*. It is intended to provide the City of Busselton, the public and relevant government agencies with an understanding of the proposal and the environmental strategies and commitments proposed to address various environmental and social issues.

1.2 Location and Layout Plans

The subject site is located within Lot 4201 (HSE No. 216) Jindong-Treeton Road, Kaloorup. The Lot is wholly owned by Allan John Guthrie (refer to **Appendix A** for Certificate of Title). A copy of the front page of the existing lease agreement between Leeuwin Civil and Mr Guthrie, granting Leeuwin Civil permission to

extract gravel from this property, in the areas approved by the City of Busselton, has been provided (refer to **Appendix B**).

The subject site is located within the municipality of the City of Busselton, approximately mid-way between Cowaramup and Busselton, being approximately 14 km from each and approximately 200 km south of Perth (refer to **Figure 1**).

1.3 Planning Policies

1.3.1 Existing and Surrounding Land Uses

Land use abutting the boundaries of the subject site is rural based, including a range of grazing and pastoral land uses.

1.3.2 Policies

The subject site is zoned "Rural" under the City of Busselton *Local Planning Scheme No. 21*. The proposed extractive industry is a permitted land use within this zone subject to development approval from the City of Busselton.

Pursuant to the City of Busselton *Local Planning Policy No 2.3 Extractive Industries* the subject site is located within 'Policy Area 3 – Extractive Industry Less Constrained'. This policy outlines the assessment criteria and policy provisions by which applications for planning consent for an extractive industry will be assessed against including the following:

1) General Policy Provisions
2) Land Use Compatibility
    a) Proximity/distance to sensitive land uses including the nearest residences(s) and other potentially incompatible land uses (i.e. tourist attractions, wineries, chalets, tourist accommodation, horticultural/viticultural enterprises) in respect to the suitability of the type of operation and noise amelioration measures required.
    b) Scale and nature of the operation and likely impact on the land use character of the surrounding area.
    c) Identification of, and proximity to, prime agricultural land.
    d) Suitability of the dust and noise management plans and the likelihood of these measures achieving a successful amelioration of any impacts on the surrounding locality.
    e) Issues raised during the advertising period.
    f) Assessment of Social Impact Statement for the proposal.
    g) EPA Guidance Statement No. 3 (2005) and the need to refer the application to the EPA if minimum separation distances cannot be met.
    h) The policy requirement pertaining to Travel Route Corridors and Landscape Character as outlined in State Planning Policy 6.1.
3) Environmental Impacts
    a) If approvals or advice has been issued by Department of Water and Environmental Regulation (DWER) and if not the extent of remnant vegetation to be cleared, including road verges resulting from road widening and upgrading; and proximity to areas of declared rare or endangered flora and fauna (DRF) or threatened ecological communities (TEC).
    b) Proximity to and significance of watercourses, drains, wetlands, and on-site and adjoining dams and need for surface drainage and groundwater management plans.
    c) Evidence of Dieback disease and the suitability of a Dieback Hygiene Management Plan. (The Dieback Working Group-Best Practice Guidelines should be referenced in the formulation of a

dieback management plan, including the matters that should be addressed in the plan and the responsibilities for the operator to comply with best practice management techniques).

d) Comments or recommendations from the Environmental Protection Authority, Department of Agriculture and Food WA, the Department of Water or any other relevant government agency.
e) Proposed end use of site, particularly if intending to revert to agricultural land.
f) The extent of bedrock, underlying clay soil strata and/or ground water levels to a depth of 0.5 m below the base of the excavation area.
g) Any other ecological or environmental issues that may be relevant.
h) Acid Sulphate Soil risks assessment.

4) Visual Amenity
   a) Proximity, elevation and visual exposure to public roads, particularly tourist or scenic routes.
   b) Proximity elevation and visual exposure to tourist and other land uses.
   c) Scope and extent of operation (i.e. particularly stockpiling and pit size).
   d) Topography of the land, which may affect intermediate and back ground views.
   e) Impact on the view shed as identified in the *Caves Road Visual Management Provisions*, if applicable.
5) Route Assessment and Transportation
   a) The outcomes of the Schedule 1 – Traffic Assessment and Road Upgrading Guidelines.
   b) Any comments or recommendations from Main Roads WA.
   c) The impacts of haulage traffic noise, vibration and amenity loss on surrounding areas.

Extractive industries are expected to be approved within Policy Area 3, where such operations can meet the requirements of these provisions and the Scheme, provided they do not impact on known areas of titanium mineralisation, or have an adverse impact on Prime Agricultural land.

The subject site is well removed from areas known to contain titanium mineralisation and the proposal will not have an adverse impact on Prime Agricultural land, as the land will be returned to improved productive agricultural land.

2 EXISTING ENVIRONMENT

2.1 Topography and Soils

The current topography of the subject site can be described as undulating with the elevation ranging from 60 m Australian Heigh Datum (AHD) to 66 m AHD. There is a stream running through the eastern portion of the property associated with Dawson Gully which discharges north into the Buayanyup River. The site drains towards the front of the property in a northern direction into the wider drainage system. The site also drains towards the rear of the property again in a northerly direction (refer to **Figure 2**).

The subject site is located within the Donnybrook Sunkland Zone landform consisting of "*moderately dissected lateritic plateau on Perth Basin sedimentary rocks. Soils are formed in lateritic colluviam, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south*", and the Whicher Scarp System described as "*Low scarp and raised platform on the northern edge of the Donnybrook Sunkland. Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils.*" (Tille 2006).

Within the Whicher Scarp System, the subject site is located within the following sub-systems:

- Yelverton deep sandy flats Phase – Level to gently undulating raised shelf, lying 10 – 40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton very gentle slopes Phase – Undulating terrain. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.
- Yelverton flats Phase – Raised flats. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.

2.1.1 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain when the naturally anaerobic conditions in which they are situated are disturbed and they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS produce sulfuric acid, which can result in a range of impacts to the surrounding environment. ASS that has oxidised and resulted in the creation of acidic conditions are termed "Actual ASS" (AASS), and those that have acid generating potential but remain in their naturally anaerobic conditions are termed "Potential ASS" (PASS).

ASS risk mapping (DWER 2021) indicates that there is a 'moderate to low' risk of ASS occurring within a small portion of the subject site (refer to **Figure 3**). The Department of Water and Environmental Regulation (DWER) guidelines *Identification and investigation of acid sulfate soils and acidic landscapes* (2015) indicate that sites should be investigated for ASS within areas mapped as having a 'moderate to low' risk of ASS when 'soil or sediment disturbance of 100 m^3 or more with excavation from below the natural watertable is proposed'.

This proposal involves the excavation of material largely outside of the areas mapped as having a 'moderate to low' risk of ASS. Furthermore, no excavations below the watertable (a 1 m separation to maximum groundwater levels will be maintained at all times) and no dewatering will be undertaken during excavation works. Accordingly, the potential impacts associated with ASS are expected to be low and therefore no further investigations regarding ASS are considered necessary.

2.2 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 Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Rainfall for the area is approximately 680 mm per annum with approximately 89% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

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 10 year average return interval storm event for the subject site as 42 mm/hr.

2.3 Vegetation and Flora

The vegetation within the subject site is in a 'completely degraded' (Keighery 1994) condition due to prolonged land degradation processes including land clearing and livestock grazing. This has resulted in the complete absence of mid and understorey species, with native vegetation being limited to occasional paddock trees. The paddock trees located within Cells 7 and 9 consist of seven marri trees. Vegetation present within Cells 8-9 is limited to *Podocarpus drouynianus* over pasture grasses.

There are several Threatened and Priority Flora within a 1,000 m radius of the property boundary, including a stand of *Grevillea brachystylis subsp. Grandis* located 20 m to the east. The proposal will not result in any direct or indirect impacts to flora of conservation significance given that the disturbance footprint will be restricted to existing paddock areas.

A clearing permit application will be submitted to the DWER for the vegetation requiring clearing within cells 4 to 9.

2.3.1 Threatened Ecological Communities

An ecological community is defined as "a naturally occurring assemblage that occurs in a particular type of habitat" (PWS 2015). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC).

As well as protection under State legislation, selected ecological communities are also afforded statutory protection at a Federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182.

A search of the DBCA's and EPBC databases found three TEC endorsed under State and Commonwealth legislation and policy recorded within proximity to the subject site. This included the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region ecological community, the Shrublands on southern Swan Coastal Plain ironstones and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan. Coastal Plain ecological community.

None of the vegetation within the subject site is representative of these TEC due to the absence of key indicator species such as Banksia spp. and *Eucalyptus gomphocephala* and the lack of ironstone soils present within the site.

2.3.2 Environmentally Sensitive Areas

Section 51B of the *Environmental Protection Act 1986* (EP Act) allows the Minister to declare an Environmentally Sensitive Area (ESA). Once declared, the exemptions to clear native vegetation under the regulations do not apply in these areas. TEC's areas within 50 m of any Declared Rare flora (DRF) and defined wetland areas constitute ESAs. However, a number of other areas of environmental significance are also listed. Current declared ESAs are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

The subject site is mapped within an ESA associated with the abovementioned TEC and Priority Flora.

2.4 Fauna

Fauna habitat within the subject site is restricted to the presence of isolated paddock trees, attributed to a history of anthropogenic disturbances which has resulted in an altered land use and the removal of the majority of native vegetation. Consequently, the total fauna assemblage within the subject site is likely to be depauperate as the isolated paddock trees are considered unlikely to provide significant habitat for conservation significant fauna recorded within the local area.

The area of remnant vegetation located within the centre of the property is mapped as having a 'Medium' suitability for Western Ringtail Possum (WRP) (Shedley and Williams 2014). Vegetation within this area is largely Jarah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) with only occasional/very occasional sheoak (*Allocasuarina fraseriana*), bull banksia (*Banksia grandis*), peppermint (*Agonis flexuosa*) and Kingia (*Kingia australis*) (Harewood 2021). No impacts to this area of vegetation are proposed, however it is considered very unlikely to provide habitat suitable for Western Ringtail Possums (WRP) due to the low incidence of preferential foraging species (i.e. peppermint trees) within the area.

2.5 Hydrology

2.5.1 Groundwater

The subject site is located within the proclaimed Busselton-Capel Groundwater Area.

Site investigations were undertaken throughout October and November in 2014 which involved the excavation of test pits across the property to a depth of 3 m below ground level (BGL). During the investigation, no groundwater was intercepted. Given the maximum depth of excavation is 2 m BGL, no interactions with groundwater are expected at any time of the year.

2.5.2 Surface Water

The subject site is located in the Geographe Bay Rivers proclaimed surface water area which was proclaimed under the *Rights in Water and Irrigation Act 1914.* The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

There is a stream running through the eastern portion of the property associated with Dawson Gully and a drainage line joining this on which a small dam is situated. There are no other surface water features within the subject site.

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 Southwest*' 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 are three Multiple Use (MU) wetlands (ID 15, 16 and 18) and one Resource Enhancement (RE) wetland mapped within the property (refer to **Figure 2**). The excavation footprint has been designed to ensure a 100 m buffer from the RE wetland is maintained at all times.

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.

2.6 Aboriginal Heritage

All Aboriginal sites in Western Australia are provided protection under the *Aboriginal Heritage Act 1972* in which it is an offence for anyone to excavate, damage, destroy, conceal or in any way alter an Aboriginal site without the Minister's permission.

An online search for relevant Aboriginal heritage information was undertaken using the Department for Planning, Lands and Heritage *Aboriginal Inquiry System* that incorporates both the heritage site register and the heritage survey database (DPLH 2021). The Aboriginal Heritage Site Register is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* and contains information on over 22,000 listed Aboriginal sites throughout Western Australia.

Results of the database search revealed that no Aboriginal heritage sites are present within the subject site.

3 EXTRACTION ACTIVITIES

The gravel quarry will cover an area of approximately 18.3 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in seven cells, ranging from 2.0 ha to 3.2 ha in size. Indicative stage locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of gravel to be removed from the seven cells will be approximately 325,000 m^3 with approximately 65,000 m^3 excavated each year, depending on supply and demand.

The sand quarry will cover an area of approximately 2.6 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in two cells, approximately 1.2 to 1.4 ha in size. Indicative cell locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of sand to be removed from the two cells will be approximately 50,000 m^3 with approximately 10,000 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 productive agricultural land.

3.1 Operational Works

Using a loader, the topsoil (nominally 15 cm of the soil profile) will be stripped and placed in stockpiles less than 2 m high. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

3.1.1 Truck Movements

Access from the property will be via Jindong-Treeton Road, utilising Payne Road, Queen Elizabeth Avenue or North Jindong Road and Roy Road and onto Bussell Highway (refer to **Figure 4**). Both proposed routes are on Main Roads WA Permit Network 2 roads. It is therefore not considered necessary to show traffic counts as these roads have already been assessed and considered suitable for this type of haulage.

Access to the subject site will be restricted to existing internal roads and the existing, previously approved crossover, as shown in **Figure 4**.

Gravel

It is proposed to extract approximately 65,000 m^3 or bank cubic metres (BCM) per year. The average daily extraction rate:

= 65,000 BCM / 52 weeks / 5 working days per week
= 250 BCM per day.

It is estimated that approximately 70% of the haulage is proposed to be undertaken from October to May (8 months). Therefore, the average daily extraction rate (main season):

= 65,000 BCM x 70% / 32 weeks / 5 working days
= 284 BCM per day.

The average daily extraction rate (LCM):

= 284 BCM x 1.15
= 327 LCM

It is proposed to utilise 22 tonne semi-trailers with a capacity of approximately 39.6 LCM of gravel. Accordingly, the average daily truck movements during the main season are as follows:

= 327 LCM/ 39.6 LCM truck capacity
= 8 truck movements per day x 2 (to and from)
= 16 trips per day x 2 (peak fluctuations)
= 32 trips per day maximum.

The two routes will be used at different times. It is predicted that usage of the Queen Elizabeth Avenue route will be 70%, and 30% for the Roy Road route. Based on this, each road will have a number of trips per day as follows:

- Jindong- Treeton Road – 32 trips/day
- Payne Road (east) and Queen Elizabeth Avenue – 22 trips/day
- Payne Road (west), North Jindong Road and Roy Road – 10 trips/day.

Sand

It is proposed to extract approximately 10,000 m^3 or BCM of sand per year. The average daily extraction rate is provided as follows:

= 10,000 BCM / 52 weeks / 5 working days per week
= 40 BCM per day.

It is estimated that approximately 70% of the haulage is proposed to be undertaken from October to May (8 months). Therefore, the average daily extraction rate (main season) is provided as follows:

= 10,000 BCM x 70% / 32 weeks / 5 working days
= 43.75 BCM per day.

The average daily extraction rate (LCM):

= 43.75 BCM x 1.15
= 50 LCM

It is proposed to utilise 22 tonne semi-trailers with a capacity of approximately 30.8 LCM of sand. Therefore, the average daily truck movements during the main season are as follows:

= 50 LCM/ 30.8 LCM truck capacity
= 2 truck movements per day x 2 (to and from)
= 4 trips per day x 2 (peak fluctuations)
= 8 trips per day maximum.

The two routes will be used at different times. It is predicted that usage of the Queen Elizabeth Avenue route will be 70% and 30% for the Roy Road route. Based on this, each road will have a number of trips per day as follows

- Jindong- Treeton Road – 8 trips/day
- Payne Road (east) and Queen Elizabeth Avenue – 6 trips/day
- Payne Road (west), North Jindong Road and Roy Road – 2 trips/day.

Based on the above, each road will have a number of trips per day as follows:

- Jindong- Treeton Road – 40 trips/day

- Payne Road (east) and Queen Elizabeth Avenue – 28 trips/day
- Payne Road (west), North Jindong Road and Roy Road – 12 trips/day.

3.1.2 Gravel Extraction

The gravel within the subject site can be removed within an excavator or loader without the need for blasting. The material will then be crushed and screened to produce products of the correct site.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- Vegetation cover will be removed by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.
- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- An excavator or front-end loader will be used to excavate the gravel material.
- The material will then be picked up by a rubber tyred loader and fed to the mobile crusher.
- A loader will then transfer the laterite rock into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the gravel into various sizes for stockpiling. On an as needed basis, gravel product will be loaded on to road trucks of various configurations for transport off-site.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening.
- 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.

3.1.3 Sand Extraction

The sand within each cell will be excavated by a bulldozer to a stockpile. Stockpiles will be limited to the anticipated volume for cartage on the following operating day where possible. A summary of the proposed sand extraction activities is provided below:

- Prior to excavation commencing the subject site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- The topsoil (nominally 15 cm of the soil profile) and overburden (if present) will be stripped and stockpiled using a loader.
- An excavator or front-end loader will be used to excavate the sand and transport it to a stockpile.
- The sand will then be picked up by a loader and loaded onto 15m semi-trailer trucks.
- Excavation will commence in the west of the quarry and then move in an easterly direction. The face and walls of the pit will act as noise barriers.
- Upon completion of each cell, the cell 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.

3.1.4 Final Contours

The slope of the final contours of the quarry will be an undulating surface at between 58 m AHD and 64 m AHD which is consistent with the adjoining land.

Slopes of the batters at the end of excavation will be retained at 1:5 vertical to horizontal.

3.1.5 Rehabilitation

During operations, quarrying and rehabilitation will be undertaken progressively. Following quarrying of each cell, rehabilitation will be undertaken.

Upon completion of each cell, the following broad completion criteria will be achieved:

- A self-sustaining cover of pasture;
- Weed levels that are not likely to impact on the viability of the reconstructed soils; and
- A safe and stable landform suitable for the proposed future land use which will be productive, grazing pasturelands.

Rehabilitation is discussed in further detail in **Section 6**.

3.2 Proposed Operating Times

Typical operating hours for quarries will be adopted for the subject site which involves 7am to 6pm each Monday to Friday and Saturdays 7am to 1pm (for rehabilitation works only), excluding public holidays. The subject site will be worked by 2 - 3 persons, depending on market demand.

Jindong – Treeton Road is a designated bus route with the bus passing the subject site at approximately 7:50am and 3:55pm. It is noted that trucks may not operate on designated school bus routes between 7:30am – 8:40am and 3:20pm – 4:20pm, Monday to Friday, during school periods. The pit operators will be careful to ensure compliance with these requirements.

3.3 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.
Bulldozer	Topsoil will be stripped using a bulldozer. Bulldozers will also be used for the movement of gravel and sand and loading trucks.
Loader	Loaders will be used for the movement of sand and gravel and loading road trucks.
Excavator	An excavator may be used for the removal of sand and gravel material.

Equipment	Description
Terex Finlay 1-140 Impact Crusher	Used for the crushing of gravel.
Terex Finlay 693 Supertrak	Used for the screening of crushed gravel.
Anaconda Radial Stockpiler	Used for stockpiling crushed gravel.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.
Tip truck	Removal of sand from site.

3.3.1 Water Usage

Water is only required for dust suppression within the quarry and the gravel access road. Water will be sourced from the Busselton Water's standpipe located on Queen Elizabeth Avenue, West Busselton. Water from the standpipe will be trucked to site on an as needs basis.

4 SOCIAL IMPACTS

4.1 Receptors

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The key amenity issues for sensitive premises associated with the proposal are:

- Visual amenity;
- Dust; and
- Noise.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for extractive industries, a buffer distance of 300 m to 500 m is recommended from sensitive land uses. A conservative buffer of 500 m to sensitive receptors has been adopted for this proposal given that onsite crushing and screening is proposed for short campaigns of 6 to 8 weeks per year.

The closest residential dwellings to the subject site are provided below and shown in **Figure 5.**

Table 4. Residential dwellings within 1,500 m of the subject site.

Resident No.	Distance to subject site (m)
1	736 m
2	936 m
3	967 m
4	971 m
5	1177 m
6	1214 m

The closest residential dwellings to the subject site are located greater than 700 m**.** There are six residential dwellings within 1,500 m of the proposed extraction area (measured from the closest point).

The proposed extraction activities will be low impact in nature and the minimal noise emanating from the subject site will be indistinct from typical rural noises and those currently generated by the locality. Furthermore, extraction activities will only be undertaken during standard hours of operation (in accordance with the conditions of the Extractive Industry Licence).

Management measures associated with noise and dust are discussed in further detail in **Sections 5.4** and **5.5**, respectively.

4.2 Visual Impact

Visual impact can occur in a number of circumstances, by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection.

The subject site is visible from Jindong – Treeton Road when travelling north but is sheltered from view when travelling south. Existing native vegetation located within the road reserves and throughout the property assist in obscuring the view of the subject site with most of the sensitive receptors located behind established vegetation.

The locality has been extensively developed for agricultural land uses and therefore is not located in a visually sensitive landscape. Rehabilitation will be progressive, and the subject site will be returned to pasture. Accordingly, no further management measures are proposed for potential visual impacts.

5 ENVIRONMENTAL IMPACTS AND MANAGEMENT

The following factors are considered to represent the potential environmental and amenity impacts associated with the proposal:

- Hydrology;
- Dust;
- Noise;
- Dieback and weeds; and
- Uncontrolled discharge of contaminants to land.

These environmental factors are discussed in more detail below, together with the proposed management actions.

5.1 Hydrology

5.1.1 Surface Water

The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing within the minor and major drains to the wider drainage system. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality to the watercourses is maintained.

Several surface water features have been identified within the subject site, including drains and a dam. A buffer of at least 100 m from the excavation area to all surface water features will be maintained (refer to **Figure 2**).

A Water Management Plan has been prepared for the subject site and is provided in **Appendix C**. This Plan documents the proposed surface water management measures associated with the extractive industry operation.

5.1.2 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 will be at 2.0 m BGL. Given that no water was encountered during the excavation of test pits to a depth of 3 m BGL during October to November 2014, no interaction with groundwater is expected during excavation works. Furthermore, a separation of at least 1 m between the final contours and the maximum groundwater elevation will be maintained.

Accordingly, no impacts to groundwater are expected as a result of this proposal.

5.2 Vegetation and Fauna

As described in **Section 2.3**, the subject site has largely been cleared of remnant native vegetation and is currently comprised of a variety of pasture grasses with isolated paddock trees.

No impacts to groundwater will result from the proposal and therefore any potential impacts to stygofauna or troglofauna are considered unlikely.

Fauna habitat within the subject site is predominantly restricted to black cockatoos (Forest Red-tailed black cockatoo (*Calyptorhynchus banksia naso*), Baudin's black cockatoo (*Calyptorhynchus baudinii*) and Carnaby's black cockatoo (*Calyptorhynchus latirostris*)). Based on available mapping there is about 11,800

ha of remnant native vegetation within 12 km of the survey area, including approximately 20 ha located within the property. Given the poor condition of the habitat and the proximity of habitat nearby the removal of these isolated trees are unlikely to present a significant impact to the species.

Based on the above, the proposal will not result in any direct impacts to native flora, vegetation or fauna, and therefore no management measures are proposed.

5.3 Dieback (*Phytophthora cinnamomi*)

Given that native vegetation has largely been altered within the subject site to enable the establishment of pasture, dieback indicator species are largely absent and therefore it is not possible to detect whether dieback is present or absent. On this basis, it is reasonable to classify the subject site as 'uninterpretable', denoting that a precautionary management approach should be adopted.

The primary objective of dieback management during operations is to minimise the risk of entry of dieback to the subject site. This can be achieved by preventing the importation of soil or plant material to and from the subject site. The risk of transportation via vehicles and equipment is low given that sealed roads will be utilised prior to entering the subject site.

The management measures proposed for dieback control are developed in accordance with the *Dieback Working Group (DWG) – Best Practice Guidelines* (DWG, 2005) for an uninterpretable site and are provided within **Table 5**

Table 5. Dieback management measures.

Timing	Management Measures
Topsoil removal, excavation and rehabilitation activities	Training will be provided to all personnel during an initial safety and environment induction course. This will include an explanation of the specific requirements with regard to Phytophthora dieback management.
	Fencing and lockable gates will be maintained and used to control unauthorised access to the excavation area.
	As far as reasonable and practicable haulage vehicles are to be cleaned of all loose external soil and plant material prior to entry and exit from the extraction area.
	Access to the subject site during operation will be restricted to the proposed roads. No other access points should be established. The access location and vehicle inspection point should be clearly sign posted.
	The extraction area will be managed to avoid ponding of surface water where vehicle access is required.
	Trucks will be loaded and covered to ensure there is no spillage of material during transport.

A risk assessment to determine the residual risk associated with dieback is provided below. The risk assessment indicates that with the application of suitable management measures the potential risk associated with dieback introduction and spread is 'Low'.

Table 6. Risk assessment associated with dieback.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk

Introduction/ spread of dieback	Importation of soil/plant material. Onsite movement of soil.	Impacts to the condition of remnant vegetation. Spread to offsite locations.	Refer to Management Measures provided in **Table 5**.	1	2	Low

5.4 Noise

Noise can originate from various operations and may impact on onsite workers, or travel offsite and impact nearby sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

The proponent will ensure that all noise emissions comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. A Noise Management Plan has been prepared for the subject site and is provided in **Appendix D**. This Plan documents the proposed noise management measures associated with the extraction industry operation.

5.5 Dust

The proposed extraction activities will involve the disturbance of large quantities of soil and earthen material. Specifically, this may include the following activities:

- Earthworks during extraction activities;
- Topsoil stripping;
- Loading and transportation of material;
- Crushing and screening of material;
- Vehicle movement within the site; and
- Wind erosion of exposed surfaces.

These activities have the potential to generate dust that, if not adequately controlled, can cause nuisance and safety risks. In-pit operations tend to generate less dust than surrounding activities due to the reduced airflow within the pit. The removal and replacement of topsoil material has the highest risk associated with dust generation due to the large volumes of material involved and generally lower levels of soil moisture.

A Dust Management Plan has been prepared for the subject site and is provided in **Appendix E**. This Plan documents the proposed dust management measures associated with the extraction industry operation.

5.6 Heritage Sites

A search of the DPLH *Aboriginal Heritage Inquiry System* shows no specific sites of Aboriginal significance occurring within or in proximity to the subject site. If during the course of mining an Aboriginal cultural heritage site is discovered, the proponent will immediately advise the DPLH and abide by the *Aboriginal Heritage Act 1972*.

5.7 Domestic and Industrial Waste Products

No domestic or industrial waste will be stored onsite. Any waste material generated during the operational activities will be taken offsite for disposal at an approved landfill facility on a daily basis. Hydrocarbon wastes such as accidental oil spills will be mopped up with absorbent material and segregated for removal and disposal offsite by a licensed contractor.

An approved portable toilet system may be temporarily placed onsite during construction activities. Waste from the toilet system will be disposed of offsite at an approved treatment facility.

5.8 Hydrocarbons and Dangerous Goods Management

Hydrocarbons are the only dangerous goods that will be utilised within the proposed extraction area. However, storage of hydrocarbons on the 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 an incidental hydrocarbon leakages or spills during the operation of machinery. Accordingly, management measures for hydrocarbons spills are provided in the Water Management Plan (refer to **Appendix C**).

6 REHABILITATION MANAGEMENT PLAN

6.1 Objectives

The objective is to return the land to a condition capable of supporting agricultural activities, with pasture production rates equivalent to or better than pre-mining production rates. This will include dryland pasture with a variety of species.

Table 7. Rehabilitation Objectives

Land Use	Closure Objectives	Completion Criteria	Performance Criteria	Measurement Tool
Agriculture	A self sustaining cover of pasture	Crops cover the entire stage after completion of the rehabilitation	Less than 5% bare ground	Annual monitoring as provided in **Section 6.8**
	Weed levels that are not likely to impact on the viability of the reconstructed soils	No declared weed species are present. Weed species are not competing with cover crop across the site.	Declared weed species absent from the rehabilitation area. Weed species cover less than 10% of rehabilitation area	Annual monitoring as provided in **Section 6.8**
	A safe and stable landform suitable for the proposed future land use	No areas of erosion or soil collapse are observed.	Rehabilitation surface remains flat and stable, with no evidence of surface erosion.	Annual monitoring as provided in **Section 6.8**

6.2 Topsoil and Overburden Removal

Topsoil is an integral part of rehabilitation as it contains organic matter and a seed bank which assists in establishing vegetation when respread on disturbed areas.

Topsoil at the subject site will be stripped and stockpiled separately, prior to commencing quarrying. If possible, progressive rehabilitation will be undertaken whereby topsoil will be directly replaced onto a previously excavated area.

The soils will be stripped in a dry state to preserve soil structure and stripping will be undertaken in relatively still weather conditions. Management of the topsoil will involve the following:

- Stockpiles will be located sufficiently distant from quarrying operations so that they will not be disturbed prior to being used in rehabilitation (if progressive rehabilitation is not possible).
- Topsoils should be stripped to a depth of approximately 1 to 2 cm. In some areas, topsoil depth may differ due to the topography of the subject site.
- Soil stripping should be avoided during wet conditions.
- The dimensions of the topsoil stockpiles will not exceed 2 m in height. This is to prevent topsoil becoming anaerobic and deteriorating in soil structure, organic matter, nutrients, seed resource and populations of beneficial soil micro-organisms.

6.3 Landform Reconstruction and Contouring

Landform reconstruction and contouring will involve the following:

- The final landform will be formed to approximately 58 to 64 m AHD.
- The post extraction landform will be designed with maximum batters of 1:5.
- The excavated floor will be deep ripped in two directions. The width between rip lines will be 1 m intervals.
- A minimum of 200 mm of overburden will be spread over the surface where available to provide a substrate for agricultural soils, followed by topsoil.

6.4 Site Preparation

To ensure the success of the revegetation works, site preparation should occur well before planting is undertaken. This includes landform reconstruction and contouring measures as outlined in **Section 6.3** the implementation of a weed control programme as outlined in **Section 6.5**.

In the event that compacted areas are identified within the revegetation area, contour ripping may be required. Ripping loosens soil aggregates and provides a softer soil surface for the establishment of plant roots. Ripping also promotes aeration of soil, assisting in the breakdown of organic matter and water infiltration.

6.5 Weed Management

The invasion of weeds and disease is a key threat to the conservation values of the subject site and the surrounding vegetated areas. Subsequently, the implementation of measures to limit or control weed infestation is necessary.

6.5.1 Weed Control

The primary objective of a weed control program is to prevent weed species competing with native plants for light, nutrients and moisture. The two methods of weed control are chemical and non-chemical. Chemical controls can be applied by water spraying (from small backpacks to large machinery operated systems), wiping and pasting (used in conjunction with manual cutting of woody weeds). Methods of non-chemical weed control include using steam, manual removal (mainly for woody weeds using either machinery or hand implements), soil scalping, soil cultivation and mulching.

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species. Given the current land use, it is not anticipated that weed control will be other than normal agriculture practice. If required, weed control will only be conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate.

Herbicides will be selected for the target species, taking into account the surrounding environment and the constraints this may present. Amongst remnant native vegetation, selective herbicides (i.e. grass or broadleaf-specific) will be favoured over general knockdown herbicides to keep off-target damage to a minimum. In consideration of the identified weed species, the most suitable method for weed control is chemical spraying. It is recommended that spot spraying with a backpack spray unit is utilised to reduce impacts to non-target species.

Based on the location and species of weeds present, the recommended weed treatments are detailed in **Table** . The timing for weed control is specified within **Table 9**.

Table 8. Weed control treatment.

Treatment	Suggested Constituents	Target Species
Glyphosate spray	2% Glyphosate including Pulse®, wetting agent and Chlorsulfuron	Broadleaf species e.g. *Pelargonium capitatum*

		Woody weeds e.g. *Zantedeschia aethiopica*
Selective grass spray	Fusilade and approved adjuvant (e.g. Pulse®)	Grass species e.g. *Ehrharta longifolia*

6.5.2 Weed Hygiene

The following weed hygiene practices will be employed:

- Machinery will be checked prior to entering rehabilitation areas to ensure that weed seeds and propagules are not transported to this area;
- All weed plant material containing seed heads, weeds that have allopathic properties and weeds that are able to reproduce vegetatively, including topsoil containing weed propagules will be disposed of to an appropriate waste management facility. Local council should be contacted for a list of disposal facilities within the local area; and
- Weed free fill is to be used for on-site earthworks.

6.5.3 Weed Management Plan

The following weed and disease controls will be implemented within the subject site to assist in the control of invasive species and enhance the outcomes of the proposed rehabilitation works.

Table 9. Management actions for weed control.

Parameter	Action	Timing
Surface Material	Assess weed potential within topsoil material prior to removal and separate weed affected topsoil for treatment or disposal.	Prior to and during topsoil removal
	Store significantly weedy surface material separately to clean surface material.	Surface material removal
	Stockpile all surface materials in the general vicinity of its origin.	Surface material removal
Hygiene Measures	Avoid moving surface material or fill material from weed infected areas to non-infested areas.	At all times
	All earthmoving and ground engaging equipment will be cleaned of vegetation, mud and soil prior to entry and exit of the subject site.	At all times
	No soil and vegetation should be brought to the site apart from that to be used in rehabilitation and plants used in rehabilitation should be free of weeds.	At all times
Access	Control access within the quarry area to reduce the spread of weeds, especially off-road vehicle access, to prevent disturbance to vegetation and weed invasion.	At all times
	Restrict access to areas outside the subject site to reduce the spread of weeds into or out of the site.	At all times
Weed Control	Chemical spraying is to be undertaken as per **Section 6.5.1**.	Refer to **Section 6.8**
Monitoring and Reporting	Monitoring and reporting work are required to ensure that the revegetation objections are achieved.	

6.6 Rehabilitation

As previously discussed, it is proposed to return the extraction area to pasture. Ripping will be undertaken within the completed cells to reduce the potential for surface erosion and promote a seed bed for establishing pasture. During this process, a number of measures will be utilised to ensure maximum efficiency with minimal disturbance. Any ripping that occurs along slopes will have regular contour banks built across the tracks to prevent erosion from water runoff.

As far as possible, topsoil will be placed along the contour to help reduce erosion. Placing the topsoil in such a manner will reduce the down slope flow of water and increase water storage. The final landform will resemble the pre-mining landform where practicable (minus the excavated material). The overburden storage area will take into consideration the surrounding landform and as far as practicable match the surrounding features.

While no specific soil preparation is anticipated, the requirement for the application of lime and/or fertiliser can be determined by soil testing once the landform has been rehabilitated.

For pasture revegetation it is essential that the species are matched to the soil types and rainfall. The location falls into the “High Rainfall Coastal” planting regime with sandy to gravelly soils. Suitable perennial legumes include birdsfoot trefoil, lucerne, strawberry clover and sulla. Perennial pasture includes perennial ryegrass, phalaris, cocksfoot and Rhodes grass. Annual pasture species include ryegrass, serradella and subterranean clover.

The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time.

Seeding rates are 2 – 5 kg/ha depending on the species used; for example, ryegrass is seeded at 3 kg/ha whereas Rhodes grass is seeded at 4 kg/ha. Seed will be broadcast uniformly within the marked areas in overlapping passes using mechanical equipment to allow for complete and even seed coverage of the pre-prepared area. Seed will be mixed with a bulking agent such as vermiculite, clean sand or sawdust in a ratio of 2 parts bulking agent to 1 part seed. If deemed necessary, seed will be covered by very light harrowing, scarifying, bagging, dragging or light raking of the seeded area as soon as practical and within the same day of seeding.

6.7 Maintenance

Maintenance will be undertaken following planting/seeding with all activities to be conducted in response to the maintenance inspections and monitoring (as discussed below). The key elements associated with maintenance works will include suppression of smothering weeds and infill planting. The requirement to implement revegetation maintenance and infill planting measures will be determined following each monitoring event.

6.8 Monitoring and Reporting

A program of monitoring of the rehabilitation works is required to ensure that the objectives are achieved.

Maintenance inspections will be undertaken annually in spring by the proponent to determine the requirement for maintenance measures.

During these monitoring events, the area will be assessed to determine pasture and weed coverage within areas that have been rehabilitated.

A report will be prepared on the results from each monitoring event, addressing the criteria provided above. A copy will be provided to the City of Busselton by way of reporting on the success of the program.

6.8.1 Completion Criteria

To achieve the objectives of the Management Plan and ensure that future management is minimised, the measurable goals for rehabilitated areas are as follows:

- Self-sustaining crop cover with less than 5% bare ground;
- Reduce weed cover to less than 10% (noting that the pasture is not considered a 'weed' in this zone); and
- Rehabilitation surface remains flat and stable, with no evidence of surface erosion.

Maintenance will continue to be undertaken as required until this criterion has been achieved or as otherwise agreed with the City of Busselton. Following the successful completion of the revegetation program, and the submission of the final report, the City will, upon application from the owner, refund the bond lodged against the implementation of the Plan.

6.9 Scheduling

The rehabilitation will be undertaken on a progressive basis, depending on the completion of excavation cells. Accordingly, a definitive timeline for rehabilitation is not prescribed, but rather a commitment to establish pasture by the first month of August, following completion of a stage. Prior to undertaking topsoil removal within a stage, it is necessary to commence rehabilitation within the prior stage, to ensure that the maximum pit area does not exceed 2.0 ha.

Rehabilitation works within Zone 2 will be undertaken at the following specified times of year:

1. Spring/summer:
    - Excavated area to be graded to levels and contours conforming to the adjacent unaffected areas minus the thickness of the excavated material.
    - Deep ripping along the contour at 1 m intervals.
    - Embankment batters will be cut to no more than 1 in 5.
    - Stockpiled topsoil will be spread over the shaped surface.
2. Autumn:
    - Pre-seeding weed control.
3. Autumn/winter:
    - Seeding with appropriate agricultural seed mix.
    - If sufficient vegetation does not germinate following initial seeding, the area will be re-seeded.
4. Spring:
    - Maintenance inspections to determine extent of maintenance requirements.
    - Formal monitoring will be undertaken in areas that have been rehabilitated.

6.10 Decommissioning

Following completion of the extraction activities, the applicant will undertake the following actions to decommission the site:

- All buildings and infrastructure will be removed;
- Any hard stand surfaces will be removed and used to backfill the pit;

- Overburden will be used as backfill;
- The area will have the slopes and soils constructed to allow for the future proposed land use.

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.

Dieback Working Group (DWG) (2004). *Managing Phytophthora Dieback: Guidelines for Local government.* Dieback Working Group, Western Australia.

Dieback Working Group (DWG) (2005). *Management of Phytophthora Dieback in Extractive Industries*. Dieback Working Group, Western Australia.

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.

Harewood, G. (2021). *Black Cockatoo Habitat Assessment, Lot 4201 Jindong-Treeton Road, Kaloorup.* Unpublished, Busselton, Western Australia.

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

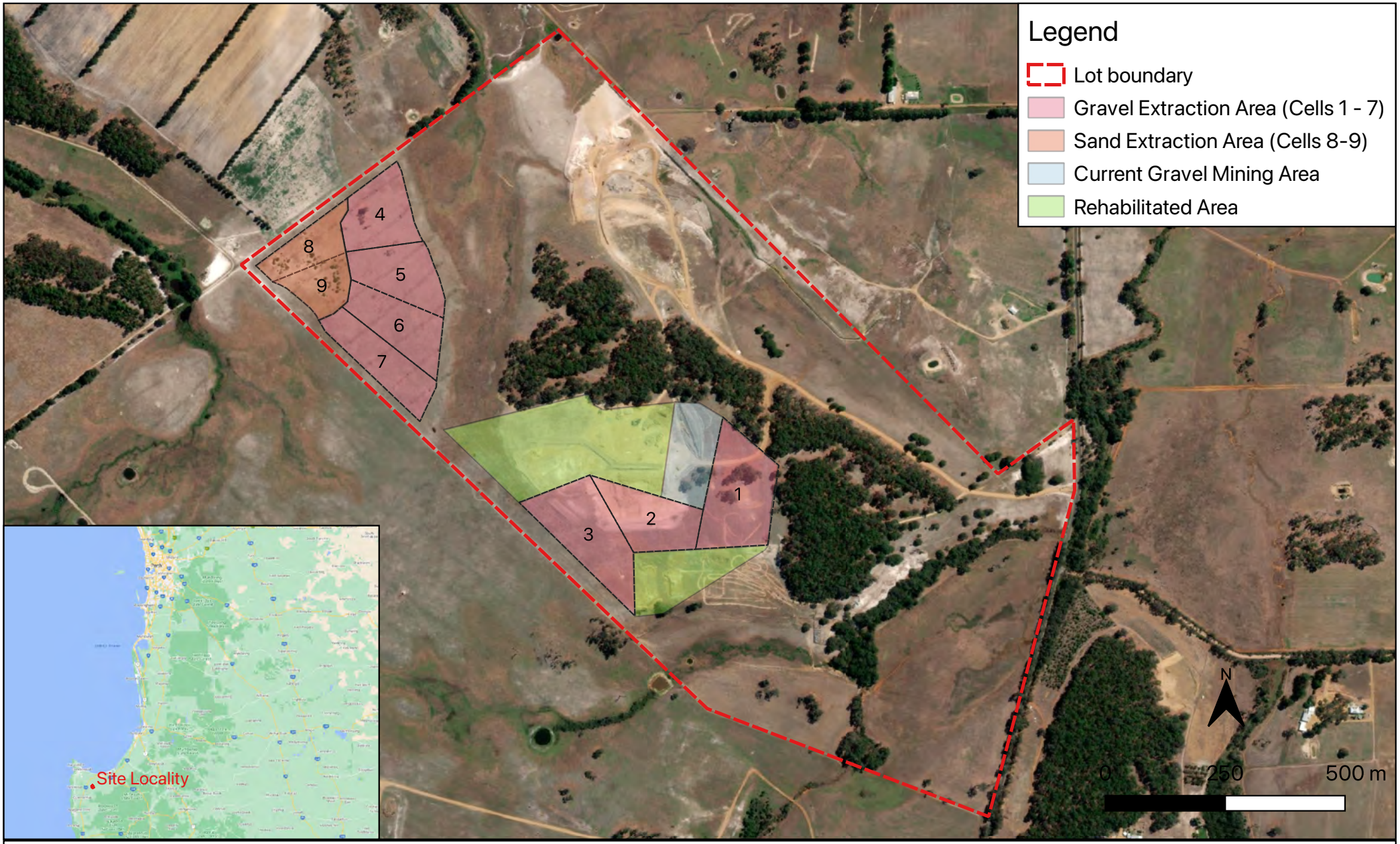
Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

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.

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

FIGURES



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 1 - Site Locality and Extent
CLIENT	Leeuwin Civil Pty Ltd

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

Project Number	2154	Designed	PN
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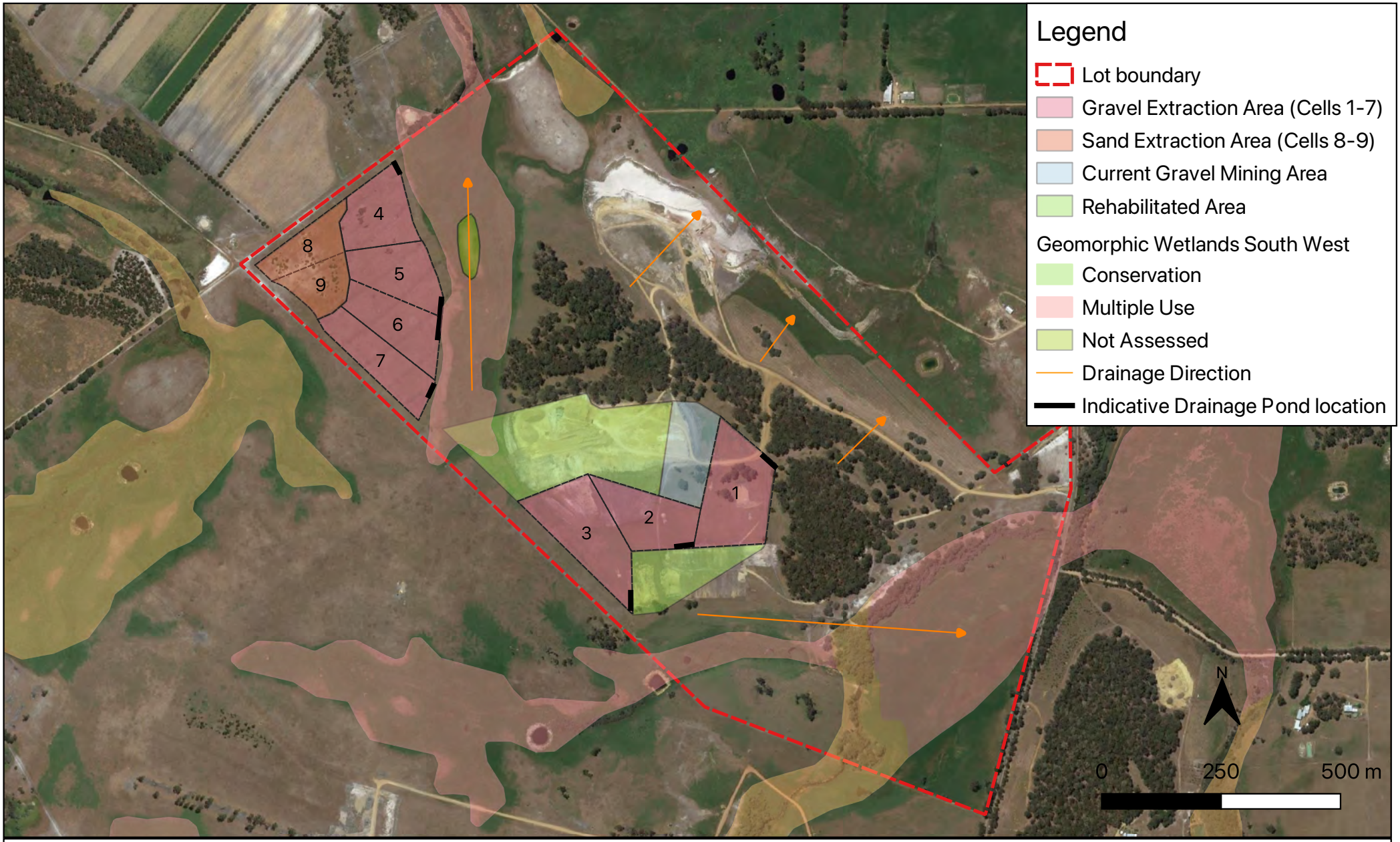
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT Lot 4201 Jindong - Treeton Road, Kaloorup

DRAWING TITLE Figure 2 - Surface Water Features

CLIENT Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
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Date	13/8/2021	Approved	
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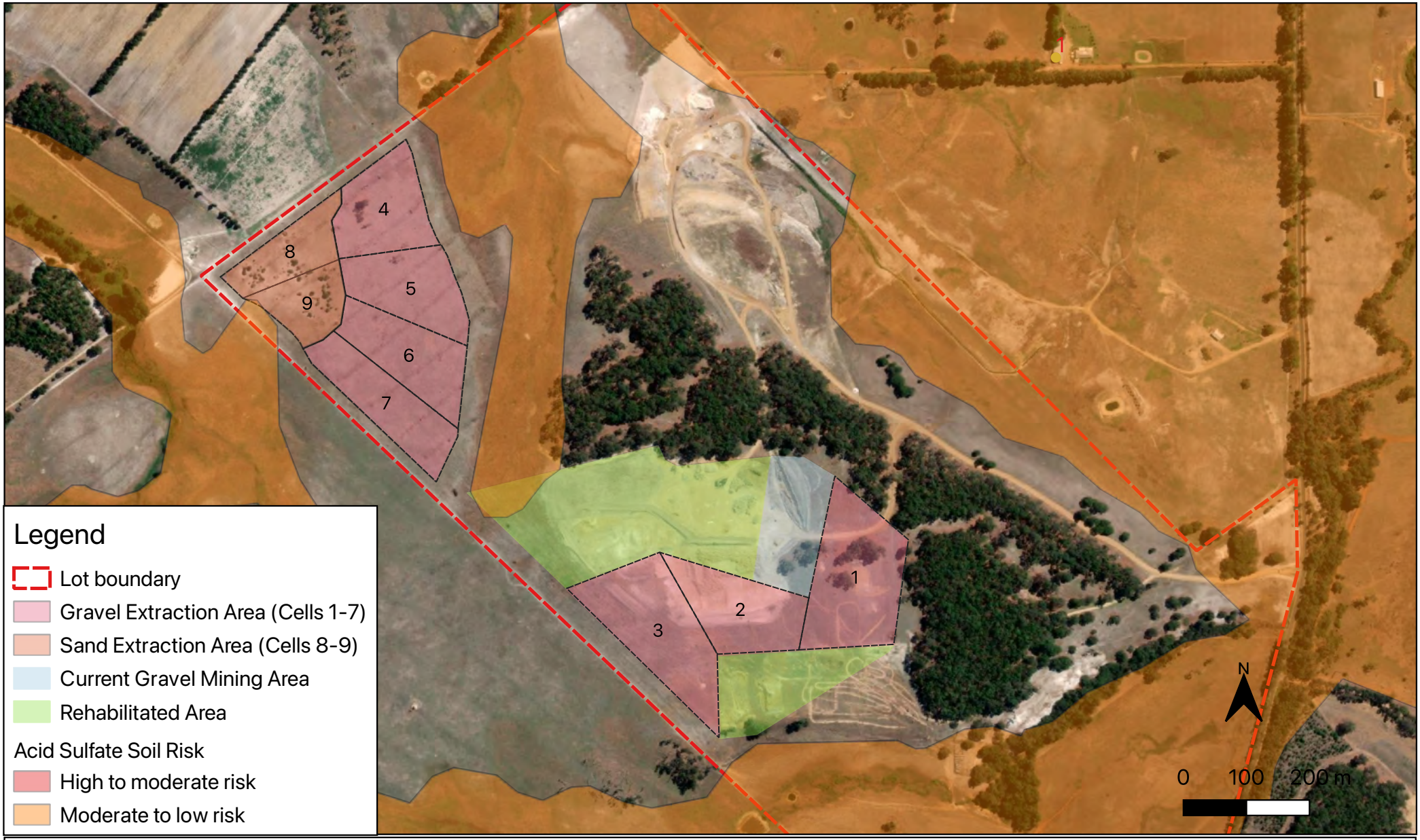

PROJECT	Lot 4201 Jindong - Treeton Road,Kaloorup
DRAWING TITLE	Figure 3 - ASS Mapping
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
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Revision	A	Checked	
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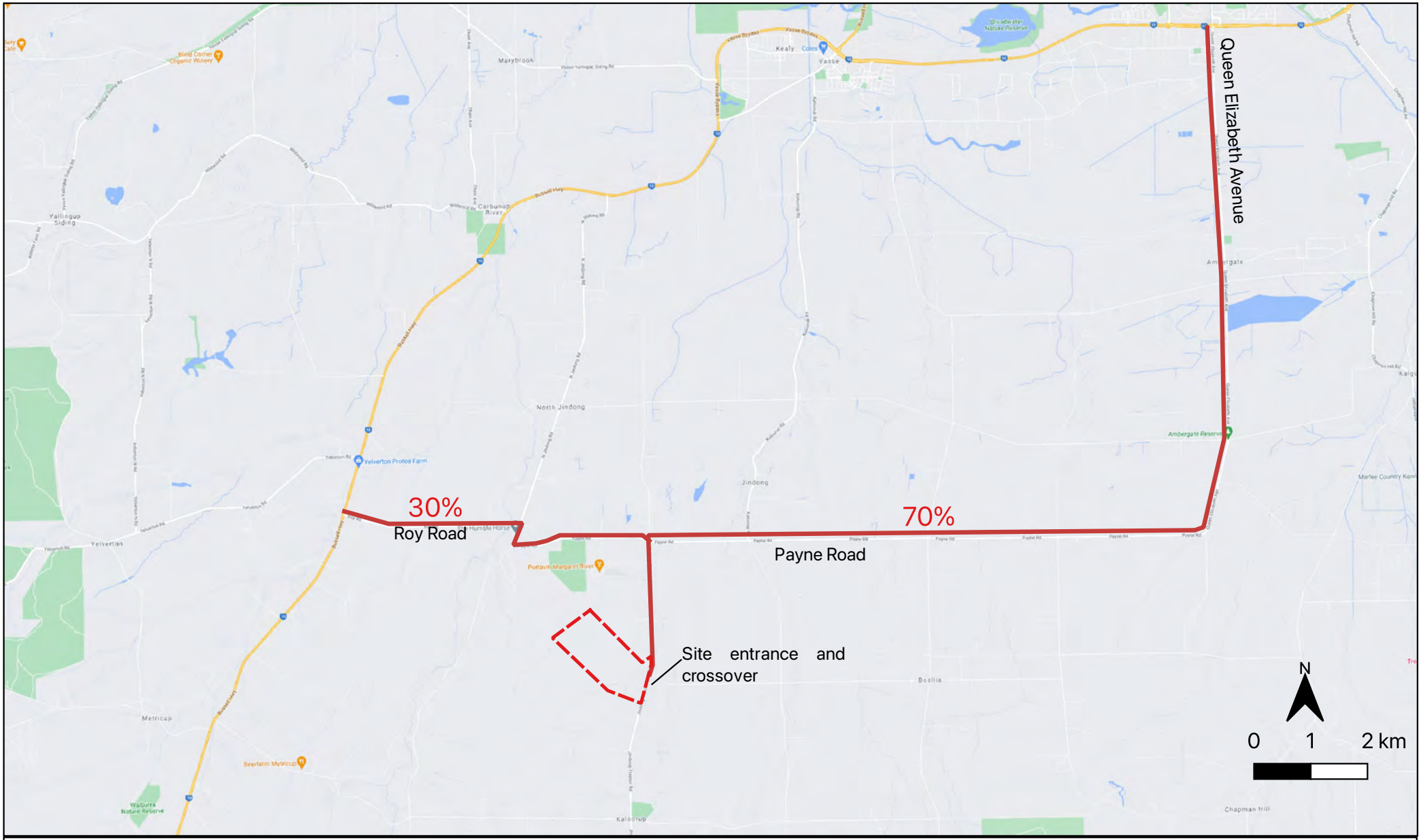

PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 4 - Haulage Route
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
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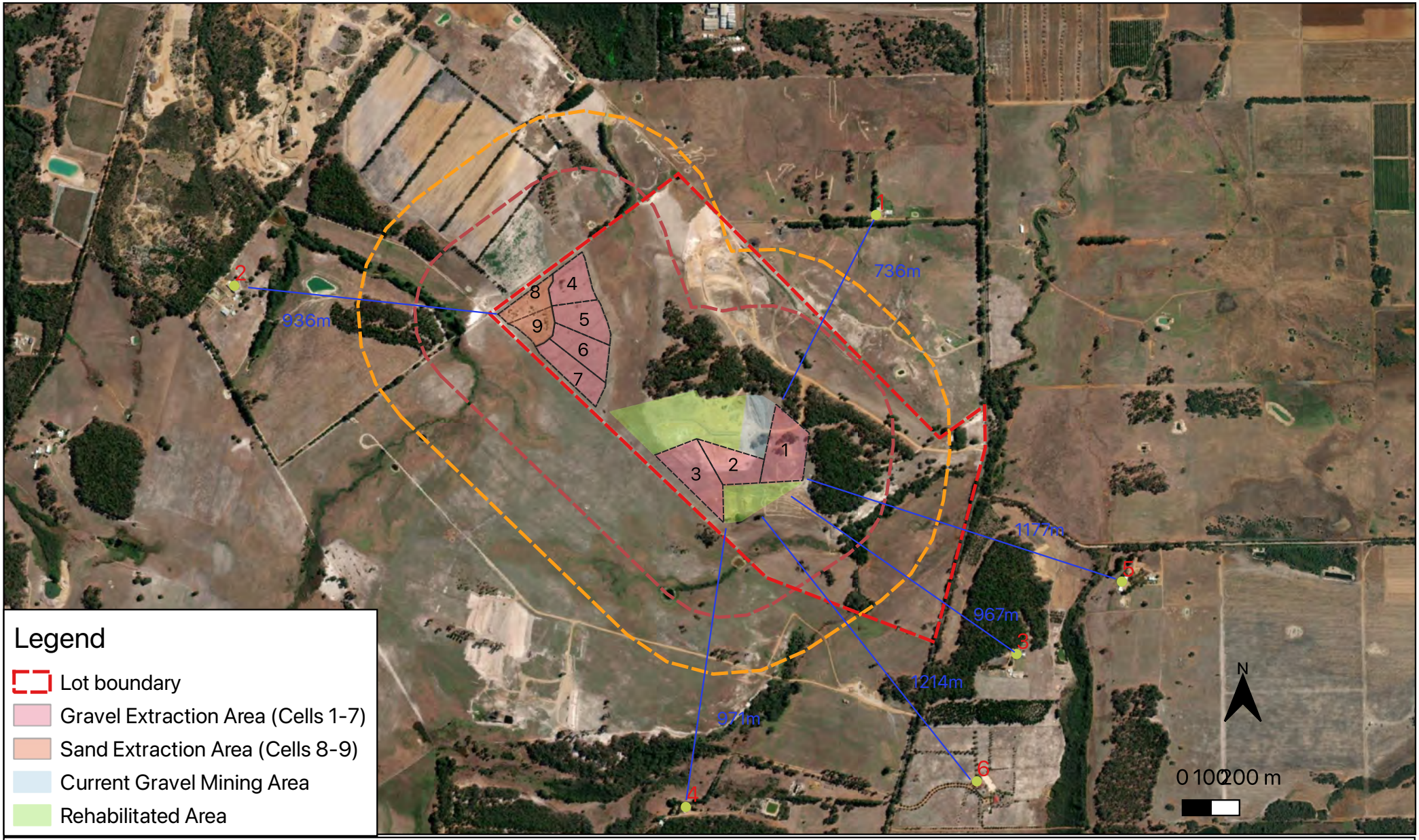
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



Legend

- Lot boundary
- Gravel Extraction Area (Cells 1-7)
- Sand Extraction Area (Cells 8-9)
- Current Gravel Mining Area
- Rehabilitated Area

PROJECT	Lot 4201 Jindong - Treeton Road,Kaloorup
DRAWING TITLE	Figure 5 - Sensitive Receptors
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
Drawing Number	Figure 5	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX A – CERTIFICATE OF TITLE

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ORIGINAL – NOT TO BE REMOVED FROM OFFICE OF

CT 1560 0047 F

1560 047

Transfer B897531

Volume 551 Folio 77A

WESTERN AUSTRALIA

CERTIFICATE OF TITLE

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

Page 1 (of 2 pages) VOL. 1560 FOL. 047

I certify that the person described in the First Schedule hereto is the registered proprietor of the undermentioned estate in the undermentioned land subject to the easements and encumbrances shown in the Second Schedule hereto.

REGISTRAR OF TITLES

Dated 9th April, 1980

ESTATE AND LAND REFERRED TO

Estate in fee simple in Sussex Location 4201, delineated and coloured green on the map in the Third Schedule hereto, limited however to the natural surface and therefrom to a depth of 60.96 metres.

FIRST SCHEDULE (continued overleaf)

Allan John Guthrie of Yallingup, Farmer.

SECOND SCHEDULE (continued overleaf)

NIL

REGISTRAR OF TITLES

THIRD SCHEDULE

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

APPENDIX B – AUTHORISATION FROM LANDOWNER

THIS AGREEMENT is made the 2nd day of December, 2016.

B E T W E E N:

Allen John Guthrie of PO Box 7, Busselton in the State of Western Australia ("the Owner")

AND

LEEUWIN CIVIL PTY LTD (ACN 117 828 789) of Suite 1, 16 Prince Street, Busselton in the State of Western Australia (registered office) ("the Contractor" and, if applicable "guarantors").

R E C I T A L S:

A. The Owner is the registered proprietor of Lot 4201 Jindong-Treeton Road, Kaloorup being the whole of the land comprised in Certificate of Title (the Land).

B. On the 17th of November, 2016 the Contractors were given consent by the City of Busselton to extract gravel from the Land in accordance with the conditions set out in the consent (the Consent).

C. A copy of the Consent is set out in the First Schedule hereto.

D. The Owners have agreed with the Contractor to allow the Contractor to remove gravel from the area identified on the plan set out in the Second Schedule hereto (the Plan) and otherwise upon the terms and conditions of this Agreement.

APPENDIX C - WATER MANAGEMENT PLAN

accendo AUSTRALIA

WATER MANAGEMENT PLAN

LOT 4201 JINDONG-TREETON ROAD, KALOORUP

August 2021

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Document Control

Version	Date	Author	Reviewer
V1	18/8/2021	PN	KMT
Filename	2154_Lot 4201 Jindong Treeton Rd WMP_v1		

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1 INTRODUCTION

1.1 Background

Leeuwin Civil Pty Ltd (the applicant) is currently extracting gravel from within Lot 4201 Jindong - Treeton Road, Kaloorup in accordance with a Development Approval (DA16/0376), issued by the City of Busselton on the 17th November 2016. This approval was granted for a period of five years and will therefore expire in November 2021. To date, of the 23.4 hectares (ha) approved, 9.2 ha has been mined and rehabilitated, 2 ha is currently being mined and 8.3 ha will be mined in the future. The remaining 3.9 ha is not viable for gravel extraction and has therefore been removed from this application. As not all gravel has been extracted from the approved area, a new approval is required for the applicant to continue extraction of the remaining resource. The scope of this application has also been increased to include an area of sand and gravel located in the north-western portion of the property (refer to **Figure 1**). Accordingly, this application is made for the remaining 10.3 ha associated with the previously approved Development Approval (DA16/0376), and the additional 10.6 ha area located in the north-western portion of the property. The total extraction footprint is 20.9 ha and herein is referred to as the subject site.

The available volume of gravel (*insitu* volume of approximately 325,000 m^3) is to be extracted in seven cells ranging from 2.0 to 3.2 ha, each separated into stages of less than 2 ha in size to ensure that no more than 2 ha is disturbed at any time. Currently, works are progressing in an easterly direction, which will continue into Cells 1-3. Upon completion of Cells 1-3, extraction works will then commence in the Cells 4-7.

The available volume of sand in Cells 8-9 is approximately 50,000 m^3 and will be extracted in two cells (8 and 9) in response to market demands. The post extraction landform will be designed with maximum batters of 1:5.

1.2 Purpose and Scope

This Water Management Plan (WMP) has been prepared to fulfil the relevant requirements provided within the City of Busselton's *Local Planning Scheme No. 21* and the City of Busselton's *Local Planning Policy No. 2.3 Extractive Industries*. It is intended to provide the City of Busselton, the public and relevant government agencies with an understanding of the proposal and the environmental strategies and commitments proposed to address water management. This document has been prepared to support and should be read in conjunction with, the Extractive Industry Licence application prepared by Accendo Australia (2021) for sand extraction within the subject site.

The purpose of this Plan is to describe the proposed management measures necessary to ensure the environmental impacts to groundwater and surface water within and surrounding the subject site are avoided.

The scope of the Plan is to cover the following:

- A description of the existing environment;
- A description of the proposed extraction activities and their impact on surrounding water features;
- A description of the waste management measures to ensure no impacts to water features; and
- A description of the proposed surface and groundwater management measures.

2 EXISTING ENVIRONMENT

2.1 Land Use

The subject site is zoned "Rural" under the City of Busselton *Local Planning Scheme No.21*. The extraction area has previously been cleared of all remnant vegetation excluding several isolated paddock trees.

The surrounding properties are also zoned 'Rural' under the City of Busselton *Local Planning Scheme No.21*.

2.2 Topography and Soils

The current topography of the subject site can be described as undulating with the elevation ranging from 60 m Australian Heigh Datum (AHD) to 66 m AHD. There is a stream running through the eastern portion of the property associated with Dawson Gully which discharges north into the Buayanyup River. The site drains towards the front of the property in a northern direction into the wider drainage system. The site also drains towards the rear of the property again in a northerly direction (refer to **Figure 2**).

The subject site is located within the Donnybrook Sunkland Zone landform consisting of "*moderately dissected lateritic plateau on Perth Basin sedimentary rocks. Soils are formed in lateritic colluviam, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south*", and the Whicher Scarp System described as "*Low scarp and raised platform on the northern edge of the Donnybrook Sunkland. Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils.*" (Tille 2006).

Within the Whicher Scarp System, the subject site is located within the following sub-systems:

- Yelverton deep sandy flats Phase – Level to gently undulating raised shelf, lying 10 – 40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton very gentle slopes Phase – Undulating terrain. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.
- Yelverton flats Phase – Raised flats. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.

2.2.1 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain when the naturally anaerobic conditions in which they are situated are disturbed and they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS produce sulfuric acid, which can result in a range of impacts to the surrounding environment. ASS that has oxidised and resulted in the creation of acidic conditions are termed "Actual ASS" (AASS), and those that have acid generating potential but remain in their naturally anaerobic conditions are termed "Potential ASS" (PASS).

ASS risk mapping (DWER 2021) indicates that there is a 'moderate to low' risk of ASS occurring within a small portion of the subject site (refer to **Figure 3**). The Department of Water and Environmental Regulation (DWER) guidelines *Identification and investigation of acid sulfate soils and acidic landscapes* (2015) indicate that sites should be investigated for ASS within areas mapped as having a 'moderate to low' risk of ASS when 'soil or sediment disturbance of 100 m^3 or more with excavation from below the natural watertable is proposed'.

This proposal involves the excavation of material largely outside of the areas mapped as having a 'moderate to low' risk of ASS. Furthermore, no excavations below the watertable (a 1 m separation to maximum

groundwater levels will be maintained at all times) and no dewatering will be undertaken during excavation works. Accordingly, the potential impacts associated with ASS are expected to be low and therefore no further investigations regarding ASS are considered necessary.

2.3 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 Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Rainfall for the area is approximately 680 mm per annum with approximately 89% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

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 10 year average return interval storm event for the subject site as 42 mm/hr.

2.4 Hydrology

2.4.1 Groundwater

The subject site is located within the proclaimed Busselton-Capel Groundwater Area.

Site investigations were undertaken throughout October and November in 2014 which involved the excavation of test pits across the property to a depth of 3 m below ground level (BGL). During the investigation, no groundwater was intercepted. Given the maximum depth of excavation is 2 m BGL, no interactions with groundwater are expected at any time of the year.

2.4.2 Surface Water

The subject site is located in the Geographe Bay Rivers proclaimed surface water area which was proclaimed under the *Rights in Water and Irrigation Act 1914.* The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

There is a stream running through the eastern portion of the property associated with Dawson Gully and a drainage line joining this on which a small dam is situated. There are no other surface water features within the subject site.

2.4.3 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 Southwest*' 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 are three Multiple Use (MU) wetlands (ID 15, 16 and 18) and one Resource Enhancement (RE) wetland mapped within the property (refer to **Figure 2**). The excavation footprint has been designed to ensure a 100 m buffer from the RE wetland is maintained at all times.

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 gravel quarry will cover an area of approximately 18.3 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in seven cells, ranging from 2.0 ha to 3.2 ha in size. Indicative stage locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of gravel to be removed from the seven cells will be approximately 325,000 m^3 with approximately 65,000 m^3 excavated each year, depending on supply and demand.

The sand quarry will cover an area of approximately 2.6 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in two cells, approximately 1.2 to 1.4 ha in size. Indicative cell locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of sand to be removed from the two cells will be approximately 50,000 m^3 with approximately 10,000 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 productive agricultural land.

3.1 Operational Works

Using a loader, the topsoil (nominally 15 cm of the soil profile) will be stripped and placed in stockpiles less than 2 m high. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

3.1.1 Truck Movements

Access from the property will be via Jindong-Treeton Road, utilising Payne Road, Queen Elizabeth Avenue or North Jindong Road and Roy Road and onto Bussell Highway (refer to **Figure 4**). Both proposed routes are on Main Roads WA Permit Network 2 roads. It is therefore not considered necessary to show traffic counts as these roads have already been assessed and considered suitable for this type of haulage.

Access to the subject site will be restricted to existing internal roads and the existing, previously approved crossover, as shown in **Figure 4**

3.1.2 Gravel Extraction

The gravel within the subject site can be removed within an excavator or loader without the need for blasting. The material will then be crushed and screened to produce products of the correct site.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- Vegetation cover will be removed by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.

- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- An excavator or front-end loader will be used to excavate the gravel material.
- The material will then be picked up by a rubber tyred loader and fed to the mobile crusher.
- A loader will then transfer the laterite rock into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the gravel into various sizes for stockpiling. On an as needed basis, gravel product will be loaded on to road trucks of various configurations for transport off-site.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening.
- 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.

3.1.3 Sand Extraction

The sand within each cell will be excavated by a bulldozer to a stockpile. Stockpiles will be limited to the anticipated volume for cartage on the following operating day where possible. A summary of the proposed sand extraction activities is provided below:

- Prior to excavation commencing the subject site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- The topsoil (nominally 15 cm of the soil profile) and overburden (if present) will be stripped and stockpiled using a loader.
- An excavator or front-end loader will be used to excavate the sand and transport it to a stockpile.
- The sand will then be picked up by a loader and loaded onto 15m semi-trailer trucks.
- Excavation will commence in the west of the quarry and then move in an easterly direction. The face and walls of the pit will act as noise barriers.
- Upon completion of each cell, the cell 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.

3.1.4 Final Contours

The slope of the final contours of the quarry will be an undulating surface at between 58 m AHD and 64 m AHD which is consistent with the adjoining land.

Slopes of the batters at the end of excavation will be retained at 1:5 vertical to horizontal.

3.1.5 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.
Bulldozer	Topsoil will be stripped using a bulldozer. Bulldozers will also be used for the movement of gravel and sand and loading trucks.
Loader	Loaders will be used for the movement of sand and gravel and loading road trucks.
Excavator	An excavator may be used for the removal of sand and gravel material.
Terex Finlay 1-140 Impact Crusher	Used for the crushing of gravel.
Terex Finlay 693 Supertrak	Used for the screening of crushed gravel.
Anaconda Radial Stockpiler	Used for stockpiling crushed gravel.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.
Tip truck	Removal of sand from site.

3.1.6 Water Usage

Water is only required for dust suppression within the quarry and the gravel access road. Water will be sourced from the Busselton Water's standpipe located on Queen Elizabeth Avenue, West Busselton. Water from the standpipe will be trucked to site on an as needs basis.

4 WATER MANAGEMENT

4.1 Surface Water

The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing within the minor and major drains to the wider drainage system. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality to the drains is maintained.

Several surface water features have been identified within the subject site, including drains and a dam. A buffer of at least 100 m from the excavation area to all surface water features will be maintained (refer to **Figure 2**).

4.2 Drainage

The DWER recommends that surface water runoff produced within the mined area from the two hour 10 year average return interval storm event should be contained within the pit (DWER 2014). As outlined in **Section 2.4**, this equates to a rainfall intensity of 42 mm/hour. Since the size of the stages will not exceed 2.0 ha in area, it is calculated that a holding volume of 840 m^3 is required for each stage. In order to contain this volume of water within the pit, drainage ponds with the dimensions of 20 m by 42 m by 1 m deep, will be established (refer to **Figure 2**). Topsoil will be cleared and placed into bunds to assist with drainage management and ensure surface water runoff is directed into these ponds.

During excavation activities, the surface will be internally drained. A low bund will be installed down slope of any excavation area, established from the wall of the pit to the edges of the excavation. The processing area will also be bunded by a low bund to ensure no surface water runoff occurs.

The pit will be monitored post rainfall events for any incidences of erosion damage and any required repairs will be undertaken as soon as practicable.

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 a 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 ranging from 58 m AHD to 64 m AHD which is consistent with the adjoining land. This will provide a separation of at least 1 m between the final contours and the maximum groundwater elevation.

The extraction and processing of sand and gravel is a chemically free operation with the liquids used being lubricants for machinery and refuelling. There will be no storage of chemicals or fuel on site.

4.4 Hydrocarbons and Dangerous Goods Management

Hydrocarbons are the only dangerous goods that will be utilised within the proposed extraction area. However, storage of hydrocarbons on the 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 an incidental hydrocarbon leakages or spills during the operation of machinery. In such instances the management measures specified below will be implemented.

Table 4. Hydrocarbon and dangerous goods management measures.

Timing	Management Measure
During quarry operations	Mobile refuelling of equipment and vehicles will be undertaken following set procedures to acceptably minimise the risk of spills and to ensure adequate containment and bunding is in place to contain any spills that may occur.
	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 extraction area.

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

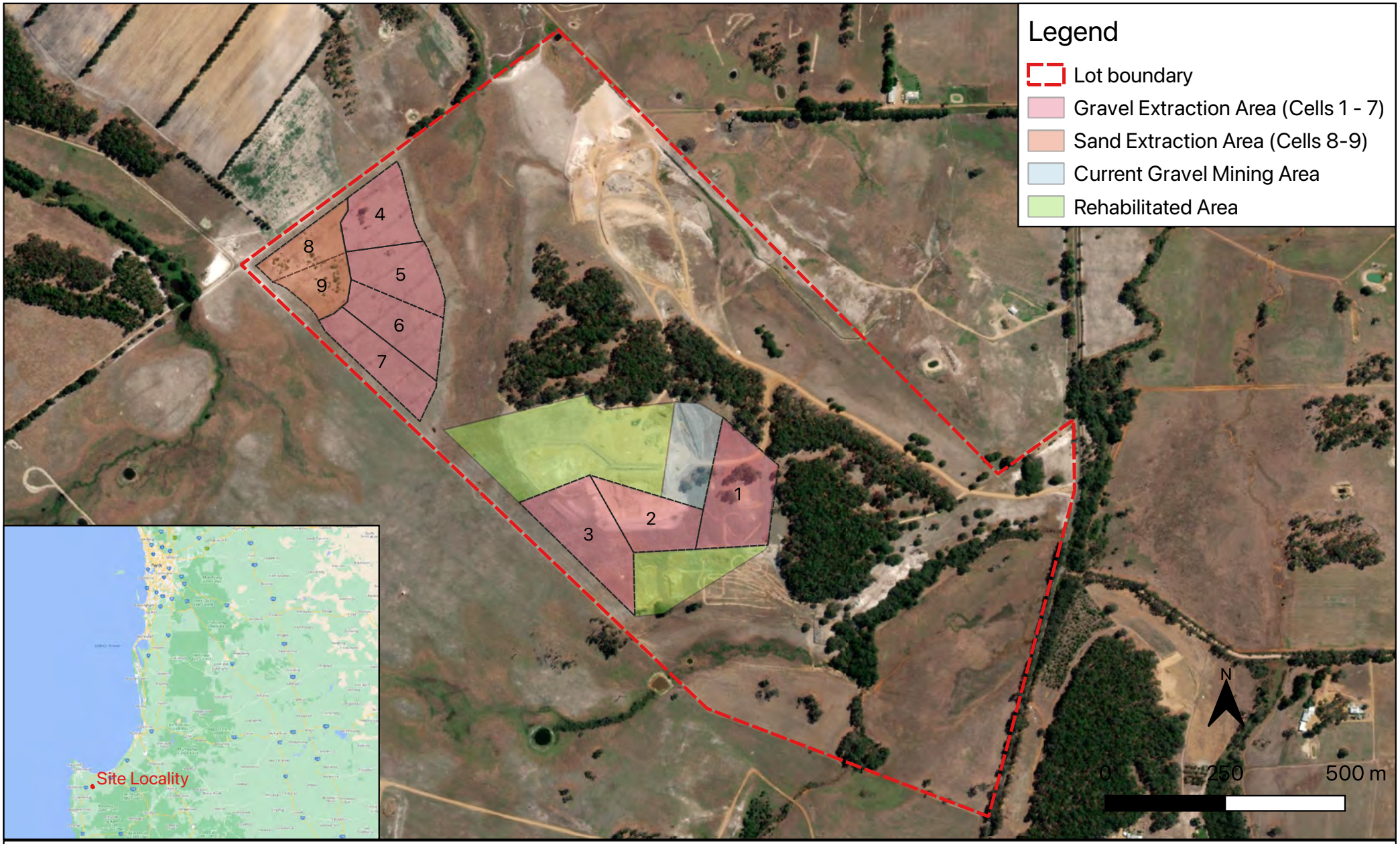
Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

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.

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

FIGURES



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 1 - Site Locality and Extent
CLIENT	Leeuwin Civil Pty Ltd

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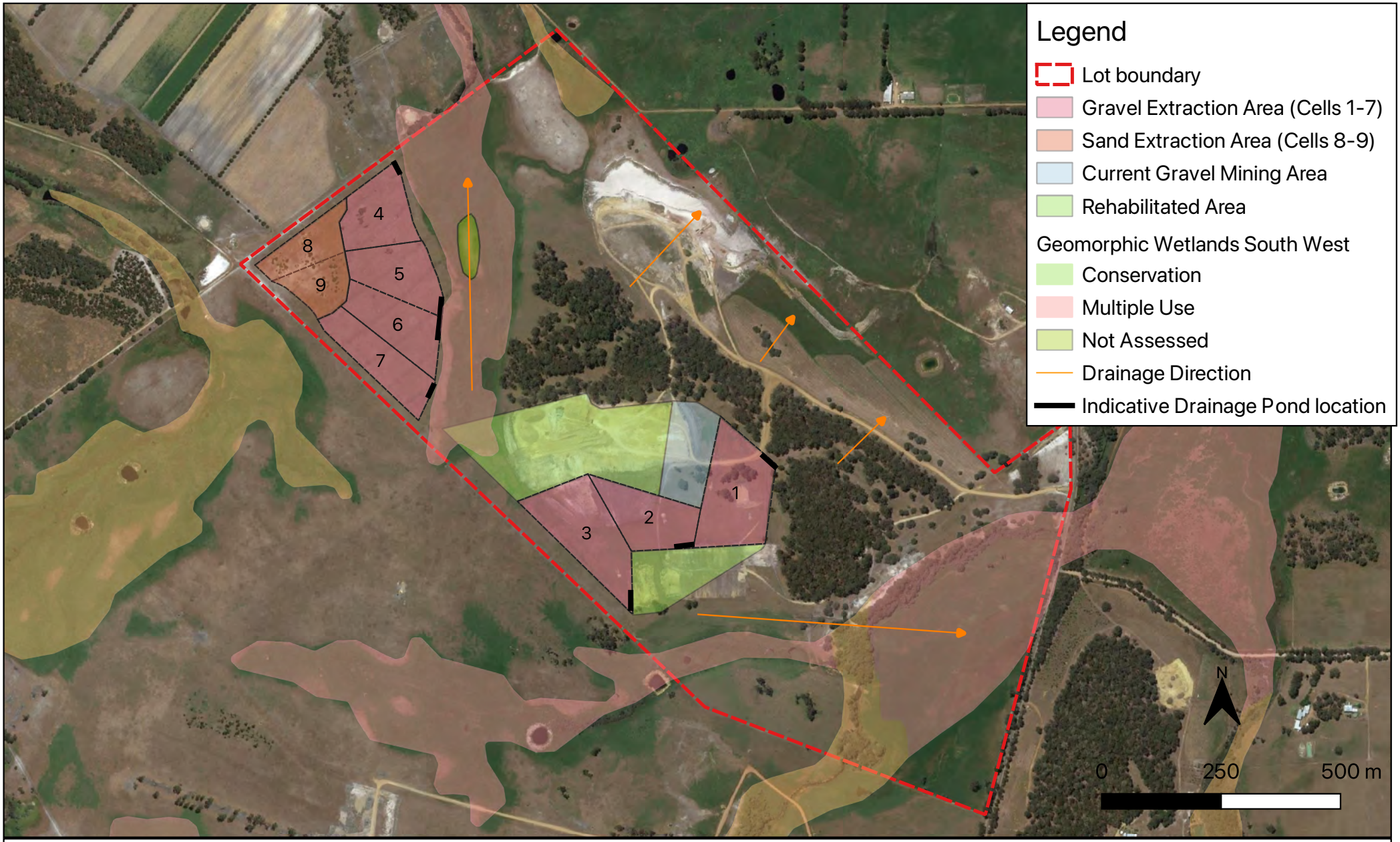
Project Number	2154	Designed	PN
Drawing Number	Figure 1	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT Lot 4201 Jindong - Treeton Road, Kaloorup

DRAWING TITLE Figure 2 - Surface Water Features

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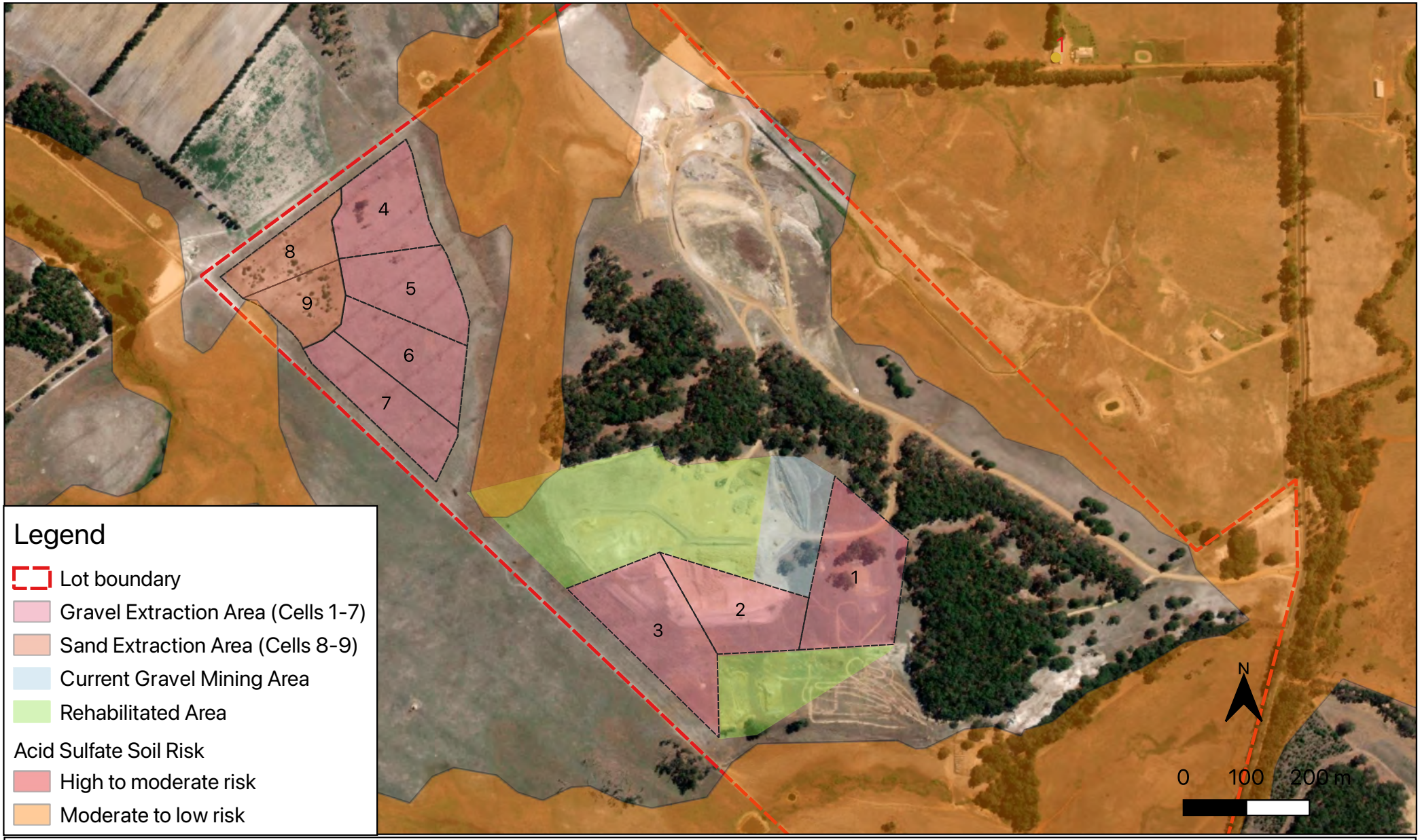
Project Number	2154	Designed	PN
Drawing Number	Figure 2	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT	Lot 4201 Jindong - Treeton Road,Kaloorup
DRAWING TITLE	Figure 3 - ASS Mapping
CLIENT	Leeuwin Civil Pty Ltd

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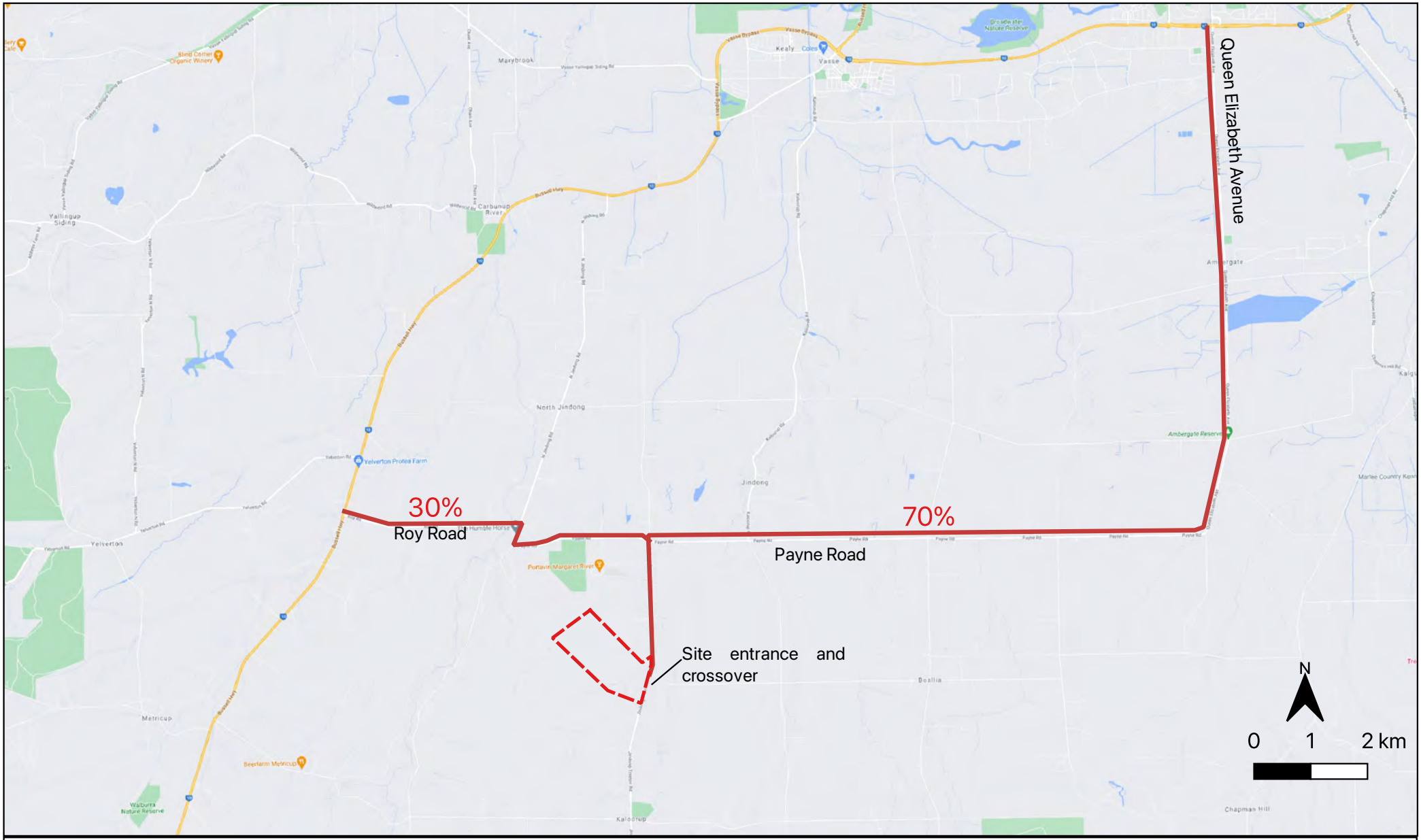
Project Number	2154	Designed	PN
Drawing Number	Figure 3	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 4 - Haulage Route
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
Drawing Number	Figure 4	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX D – NOISE MANAGEMENT PLAN

accendo AUSTRALIA

NOISE MANAGEMENT PLAN

LOT 4201 JINDONG-TREETON ROAD, KALOORUP

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Document Control

Version	Date	Author	Reviewer
V1	18/8/2021	PN	KMT
Filename	2154_Lot 4201 Jindong Treeton Rd NMP_v1		

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1 INTRODUCTION

1.1 Background

Leeuwin Civil Pty Ltd (the applicant) is currently extracting gravel from within Lot 4201 Jindong - Treeton Road, Kaloorup in accordance with a Development Approval (DA16/0376), issued by the City of Busselton on the 17th November 2016. This approval was granted for a period of five years and will therefore expire in November 2021. To date, of the 23.4 hectares (ha) approved, 9.2 ha has been mined and rehabilitated, 2 ha is currently being mined and 8.3 ha will be mined in the future. The remaining 3.9 ha is not viable for gravel extraction and has therefore been removed from this application. As not all gravel has been extracted from the approved area, a new approval is required for the applicant to continue extraction of the remaining resource. The scope of this application has also been increased to include an area of sand and gravel located in the north-western portion of the property (refer to **Figure 1**). Accordingly, this application is made for the remaining 10.3 ha associated with the previously approved Development Approval (DA16/0376), and the additional 10.6 ha area located in the north-western portion of the property. The total extraction footprint is 20.9 ha and herein is referred to as the subject site.

The available volume of gravel (*insitu* volume of approximately 325,000 m^3) is to be extracted in seven cells ranging from 2.0 to 3.2 ha, each separated into stages of less than 2 ha in size to ensure that no more than 2 ha is disturbed at any time. Currently, works are progressing in an easterly direction, which will continue into Cells 1-3. Upon completion of Cells 1-3, extraction works will then commence in the Cells 4-7.

The available volume of sand in Cells 8-9 is approximately 50,000 m^3 and will be extracted in two cells (8 and 9) in response to market demands. The post extraction landform will be designed with maximum batters of 1:5.

1.2 Purpose and Scope

This Noise Management Plan (NMP) has been prepared to fulfil the relevant requirements provided within the City of Busselton's *Local Planning Scheme No. 21* and the City of Busselton's *Local Planning Policy No. 2.3 Extractive Industries*. It is intended to provide the City of Busselton, the public and relevant government agencies with an understanding of the proposal and the environmental strategies and commitments proposed to address noise emissions associated with the proposed land use. This document has been prepared to support and should be read in conjunction with, the Extractive Industry Licence application prepared by Accendo Australia (2021) for sand and gravel extraction within the subject site.

The Plan will describe the proposed management measures necessary to ensure noise impacts on surrounding receptors will be managed in accordance with best practice and the *Environmental Protection (Noise) Regulations 1997*.

2 EXISTING ENVIRONMENT

2.1 Land Use

The property is zoned 'Rural' pursuant to the City of Busselton's *Local Planning Scheme No. 21.* The proposed extractive industry is a permitted land use within this zone subject to development approval from the City of Busselton. Land uses abutting the boundaries of the subject site are rural based, predominantly grazing and pastoral land uses.

2.2 Topography and Soils

The current topography of the subject site can be described as undulating with the elevation ranging from 60 m Australian Heigh Datum (AHD) to 66 m AHD. There is a stream running through the eastern portion of the property associated with Dawson Gully which discharges north into the Buayanyup River. The site drains towards the front of the property in a northern direction into the wider drainage system. The site also drains towards the rear of the property again in a northerly direction (refer to **Figure 2**).

The subject site is located within the Donnybrook Sunkland Zone landform consisting of "*moderately dissected lateritic plateau on Perth Basin sedimentary rocks. Soils are formed in lateritic colluviam, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south*", and the Whicher Scarp System described as "*Low scarp and raised platform on the northern edge of the Donnybrook Sunkland. Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils.*" (Tille 2006).

Within the Whicher Scarp System, the subject site is located within the following sub-systems:

- Yelverton deep sandy flats Phase – Level to gently undulating raised shelf, lying 10 – 40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton very gentle slopes Phase – Undulating terrain. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.
- Yelverton flats Phase – Raised flats. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.

2.3 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 Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Rainfall for the area is approximately 680 mm per annum with approximately 89% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

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 10 year average return interval storm event for the subject site as 42 mm/hr.

3 EXTRACTION ACTIVITIES

The gravel quarry will cover an area of approximately 18.3 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in seven cells, ranging from 2.0 ha to 3.2 ha in size. Indicative stage locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of gravel to be removed from the seven cells will be approximately 325,000 m^3 with approximately 65,000 m^3 excavated each year, depending on supply and demand.

The sand quarry will cover an area of approximately 2.6 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in two cells, approximately 1.2 to 1.4 ha in size. Indicative cell locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of sand to be removed from the two cells will be approximately 50,000 m^3 with approximately 10,000 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 productive agricultural land.

3.1 Operational Works

Using a loader, the topsoil (nominally 15 cm of the soil profile) will be stripped and placed in stockpiles less than 2 m high. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

3.1.1 Truck Movements

Access from the property will be via Jindong-Treeton Road, utilising Payne Road, Queen Elizabeth Avenue or North Jindong Road and Roy Road and onto Bussell Highway (refer to **Figure 4**). Both proposed routes are on Main Roads WA Permit Network 2 roads. It is therefore not considered necessary to show traffic counts as these roads have already been assessed and considered suitable for this type of haulage.

Access to the subject site will be restricted to existing internal roads and the existing, previously approved crossover, as shown in **Figure 4**.

3.1.2 Gravel Extraction

The gravel within the subject site can be removed within an excavator or loader without the need for blasting. The material will then be crushed and screened to produce products of the correct site.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- Vegetation cover will be removed by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.

- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- An excavator or front-end loader will be used to excavate the gravel material.
- The material will then be picked up by a rubber tyred loader and fed to the mobile crusher.
- A loader will then transfer the laterite rock into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the gravel into various sizes for stockpiling. On an as needed basis, gravel product will be loaded on to road trucks of various configurations for transport off-site.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening.
- 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.

3.1.3 Sand Extraction

The sand within each cell will be excavated by a bulldozer to a stockpile. Stockpiles will be limited to the anticipated volume for cartage on the following operating day where possible. A summary of the proposed sand extraction activities is provided below:

- Prior to excavation commencing the subject site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- The topsoil (nominally 15 cm of the soil profile) and overburden (if present) will be stripped and stockpiled using a loader.
- An excavator or front-end loader will be used to excavate the sand and transport it to a stockpile.
- The sand will then be picked up by a loader and loaded onto 15m semi-trailer trucks.
- Excavation will commence in the west of the quarry and then move in an easterly direction. The face and walls of the pit will act as noise barriers.
- Upon completion of each cell, the cell 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.

3.1.4 Final Contours

The slope of the final contours of the quarry will be an undulating surface at between 58 m AHD and 64 m AHD which is consistent with the adjoining land.

Slopes of the batters at the end of excavation will be retained at 1:5 vertical to horizontal.

3.1.5 Rehabilitation

During operations, quarrying and rehabilitation will be undertaken progressively. Following quarrying of each cell, rehabilitation will be undertaken.

Upon completion of each cell, the following broad completion criteria will be achieved:

- A self-sustaining cover of pasture;
- Weed levels that are not likely to impact on the viability of the reconstructed soils; and
- A safe and stable landform suitable for the proposed future land use which will be productive, grazing pasturelands.

3.2 Proposed Operating Times

Typical operating hours for quarries will be adopted for the subject site which involves 7am to 6pm each Monday to Friday and Saturdays 7am to 1pm (for rehabilitation works only), excluding public holidays. The subject site will be worked by 2 - 3 persons, depending on market demand.

Jindong – Treeton Road is a designated bus route with the bus passing the subject site at approximately 7:50am and 3:55pm. It is noted that trucks may not operate on designated school bus routes between 7:30am – 8:40am and 3:20pm – 4:20pm, Monday to Friday, during school periods. The pit operators will be careful to ensure compliance with these requirements.

3.3 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 1. 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.
Bulldozer	Topsoil will be stripped using a bulldozer. Bulldozers will also be used for the movement of gravel and sand and loading trucks.
Loader	Loaders will be used for the movement of sand and gravel and loading road trucks.
Excavator	An excavator may be used for the removal of sand and gravel material.
Terex Finlay 1-140 Impact Crusher	Used for the crushing of gravel.
Terex Finlay 693 Supertrak	Used for the screening of crushed gravel.
Anaconda Radial Stockpiler	Used for stockpiling crushed gravel.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.
Tip truck	Removal of sand from site.

4 NOISE IMPACTS AND MANAGEMENT

4.1 Sensitive Receptors

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for extractive industries, a buffer distance of 300 m to 500 m is recommended from sensitive land uses. A conservative buffer of 500 m to sensitive receptors has been adopted for this proposal given that onsite crushing and screening is proposed for short campaigns of 6 to 8 weeks per year.

The closest residential dwellings to the subject site are provided below and shown in **Figure 3.**

Table 2. Residential dwellings within 1,500 m of the subject site

Resident No.	Distance to subject site (m)
1	736 m
2	936 m
3	967 m
4	971 m
5	1177 m
6	1214 m

The closest residential dwelling (Resident No. 1) is located 736 m from the subject site**.** There are six residential dwellings within 1,500 m of the proposed extraction area (measured from the closest point).

4.2 Noise Generating Activities

The proposed extraction activities will be low impact in nature and the noise emanating from the subject site will be indistinct from typical rural noises. Furthermore, extraction activities will only be undertaken during standard hours of operation (in accordance with the conditions of the Extractive Industry Licence). A summary of potential noise generating activities is presented in **Table 3**.

Table 3. Noise generating activities.

Activity	Duration	Equipment to be used	Sound pressure Level (dB(A))	Comments
Topsoil stripping	3 weeks per year	CAT 972 Front end Wheel Loader (FEL) or similar	109	Initial impact to closest resident which will reduce as stockpiles increase.
Excavation and stockpiling of sand	80% of works undertaken within 6 months of the year	CAT 330F Excavator	105	Noise will be muffled by stockpiles present at edge of excavation areas.

Activity	Duration	Equipment to be used	Sound pressure Level (dB(A))	Comments
Crushing and screening of gravel	6 weeks per year	Terex Finlay I - 140 Impact Crusher, Terex Finlay Supertrak	111	Noise will be muffled by stockpiles present at edge of excavation areas.
Loading of trucks from stockpiles	A maximum of 5 years with up to 50 loads per day, dependent on demand.	Single Semi-loader, semi – tipper or road train	102	Noise will be muffled by stockpiles, vehicles are new and well maintained.
Rehabilitation of completed stages	To be undertaken in conjunction with excavation works where applicable.	CAT 16M Grader	108	Limited period of moderate noise levels, indistinguishable from excavation noise when undertaken concurrently.

Noise levels have been obtained from a combination of manufacturers' specifications and from the *Environmental Noise Assessment Report* (Lloyd George Acoustics 2021) prepared for Lot 1494, 13242 Bussell Hwy, Kudardup for the extraction of gravel and sand.

The above sound pressure level estimates were inputted into the *Environmental Noise Screening Tool*, located at Appendix 1 in DWER's *Draft Guideline on Environmental Noise for Prescribed Premises* (May 2016). The preliminary screening assessment (Part 1) indicated no requirement for detailed noise emission assessment given that the distance to the nearest sensitive land use is greater than the recommended separation distance (300 m to 500 m).

4.3 Noise Management Measures

The proponent will ensure that noise emissions comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. In addition, the management measures prescribed within **Table 4** will be implemented to reduce noise emissions as far as practicable.

Table 4. Management actions for noise.

Item	Action	Trigger/Timing	Responsibility
Inductions			
1	As part of site inductions, employees, contractors and visitors to the site are reminded of their responsibility to undertake work activities in an environmentally sensitive manner, including minimising noise while on site, or entering and leaving the site.	Ongoing	Site Manager
Planning Controls			
2	Daily Planning • The use of significant noise generating equipment or activities simultaneously is avoided. • The noisiest activities are scheduled to the least sensitive times of the day.	Where possible	Site Manager
3	Regular review of meteorological data, specifically wind speed and direction, to guide decisions on quarrying activities.	As required, with consideration to the intensity of activities onsite and the prevailing weather conditions	Site Manager
Operational Controls			
4	Equipment and Machinery • Use machinery and equipment with minimal noise output levels. • Ensure all machinery is regularly serviced as per the equipment's maintenance schedule to minimise noise generation. • Where appropriate, all machinery and equipment will be shut off when not in use. • Use flashing lights/broadband alarms instead of tonal reversing alarms on excavators/loaders. • Apply speed restrictions (10 km/hr within site) and a ban on exhaust braking.	Continuous	All employees & contractors
5	Overburden and topsoil will be used to form perimeter bunds to assist with noise screening.	Prior to quarrying	Site Manager
Complaints Management			
6	Erect on-site signage directing public to make complaints to the relevant person.	Prior to quarrying	Site Manager

Item	Action	Trigger/Timing	Responsibility
Inductions			
7	Maintain a complaints register (refer to **Appendix A**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance. • Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance. If the complaint is verified as being due to a site source, remedial action will be undertaken within 2 hours. The City of Busselton will be advised of all complaints as soon as they are received. If a compliant cannot be resolved within the 2 hour response period, it may be necessary to cease operations.	Upon receiving complaint	Site Manager

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

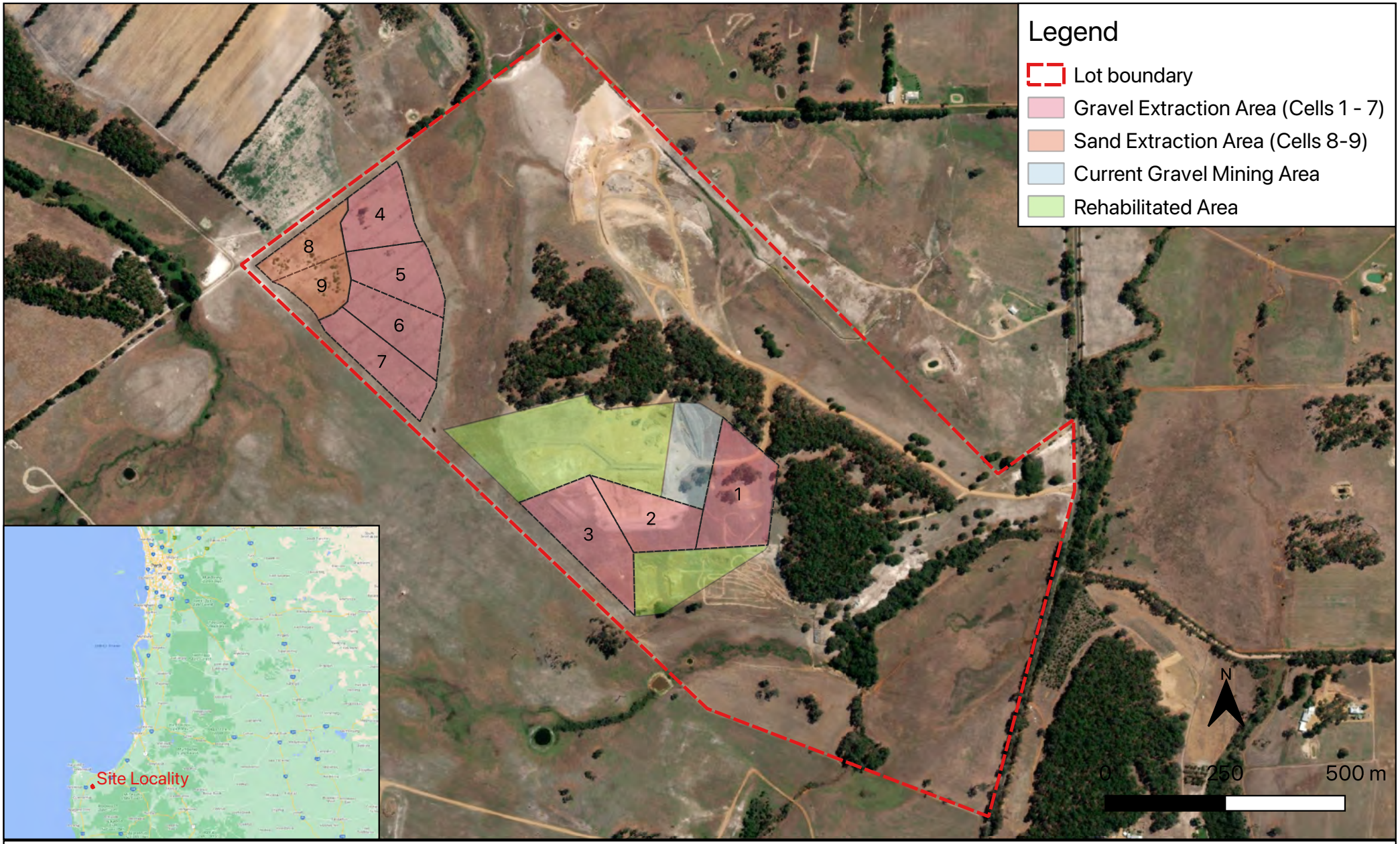
Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

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.

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

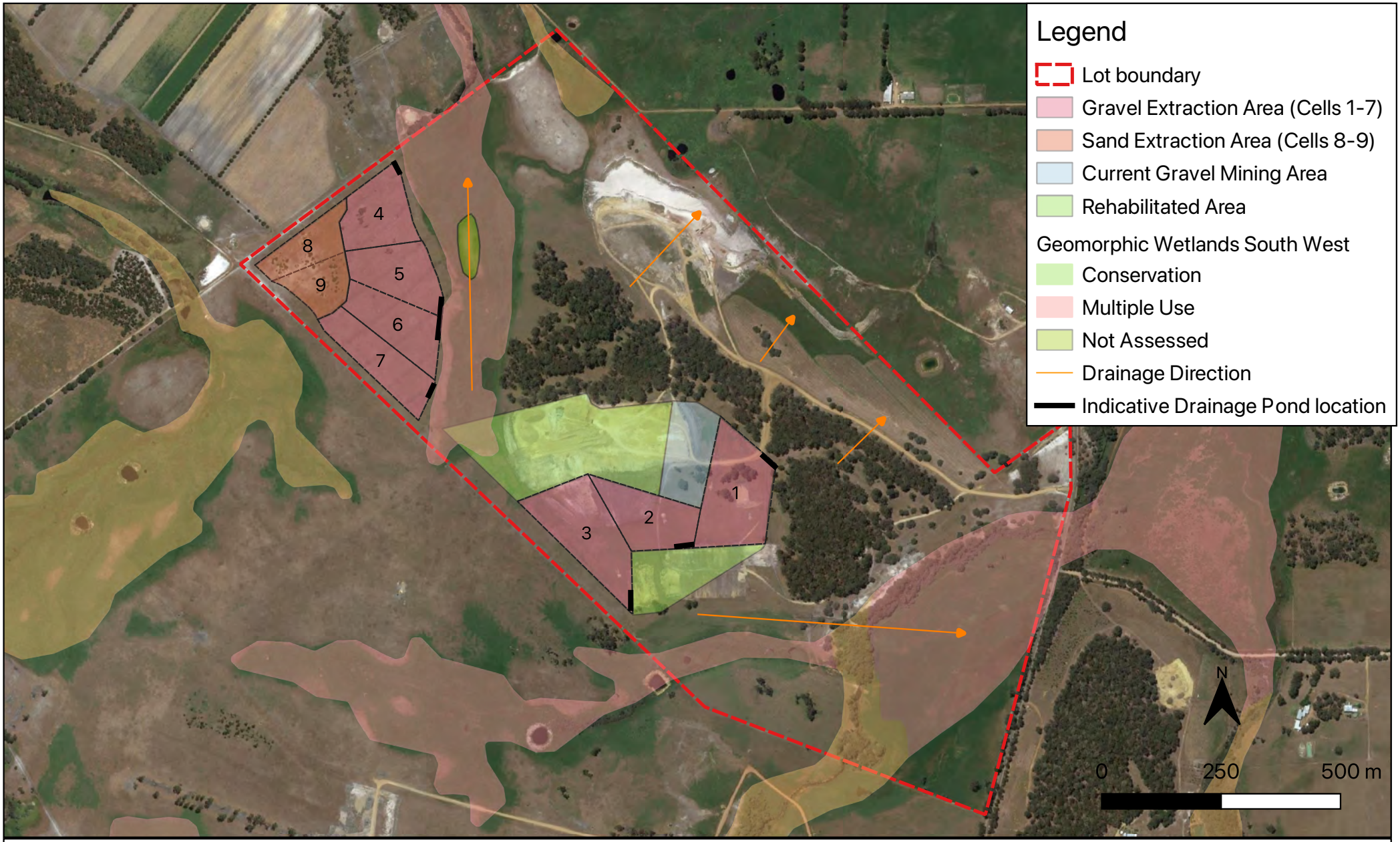
FIGURES



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 1 - Site Locality and Extent
CLIENT	Leeuwin Civil Pty Ltd

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

Project Number	2154	Designed	PN
Drawing Number	Figure 1	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT Lot 4201 Jindong - Treeton Road, Kaloorup

DRAWING TITLE Figure 2 - Surface Water Features

CLIENT Leeuwin Civil Pty Ltd

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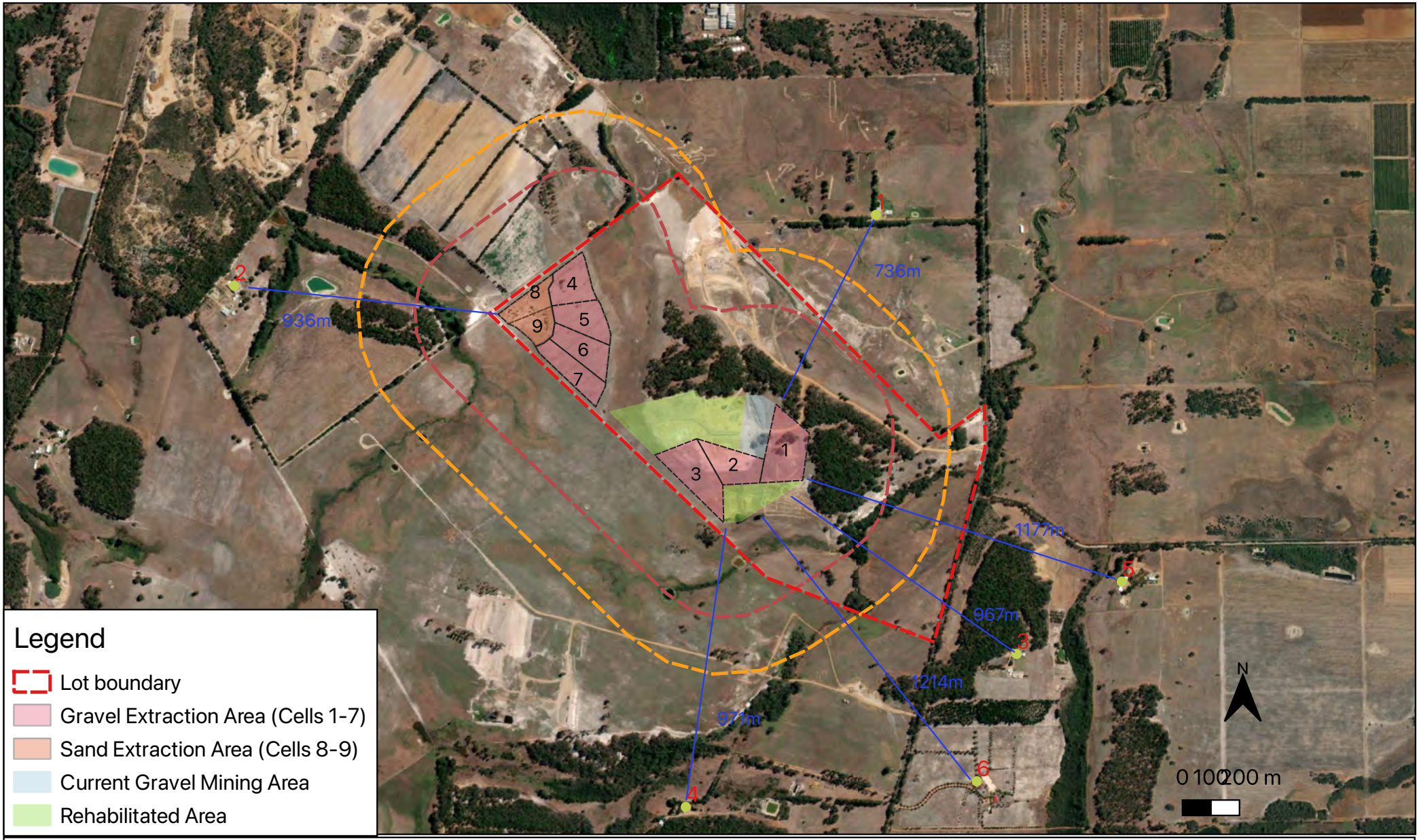
Project Number	2154	Designed	PN
Drawing Number	Figure 2	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



Legend

- Lot boundary
- Gravel Extraction Area (Cells 1-7)
- Sand Extraction Area (Cells 8-9)
- Current Gravel Mining Area
- Rehabilitated Area

PROJECT	Lot 4201 Jindong - Treeton Road,Kaloorup
DRAWING TITLE	Figure 3 - Sensitive Receptors
CLIENT	Leeuwin Civil Pty Ltd

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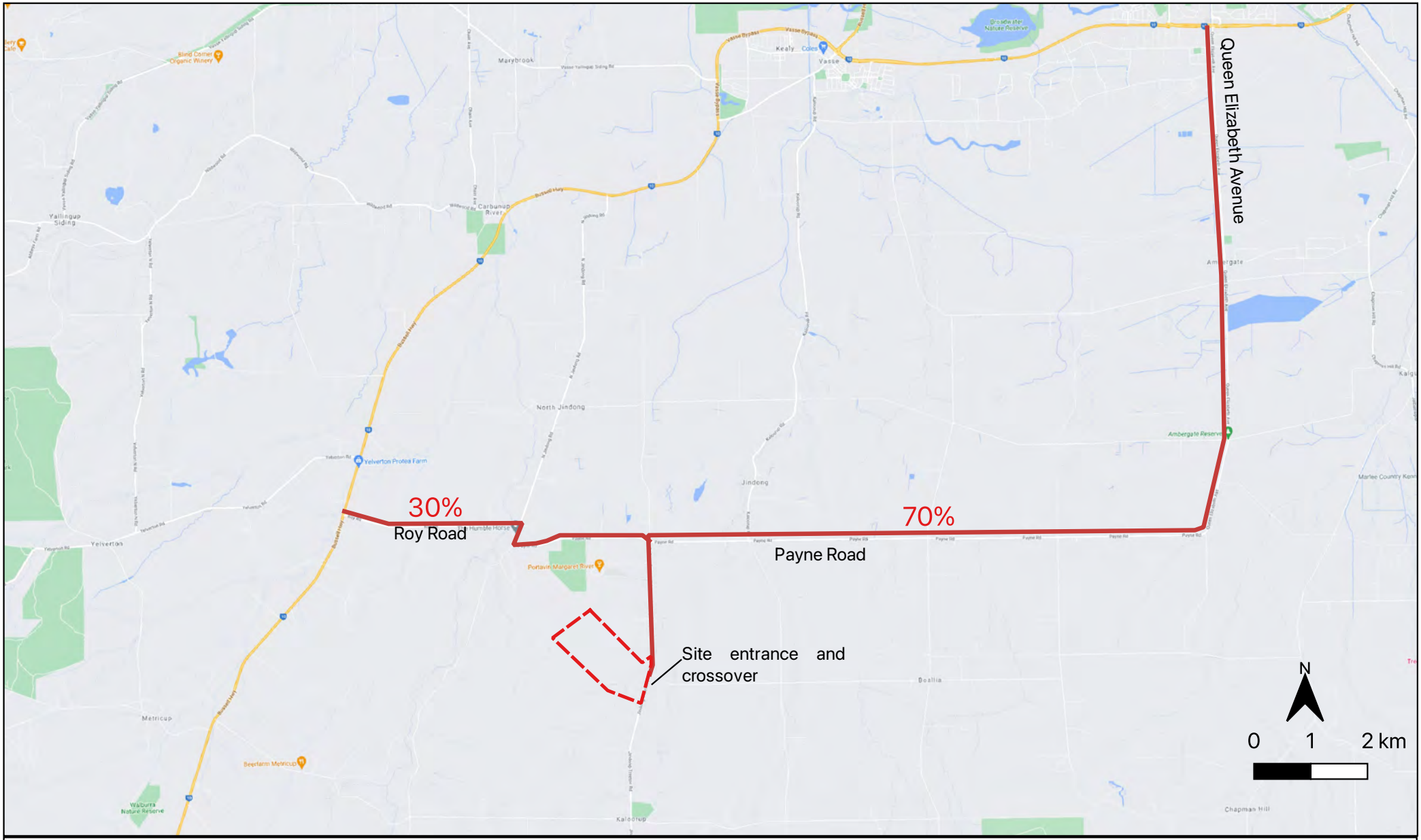
Project Number	2154	Designed	PN
Drawing Number	Figure 3	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 4 - Haulage Route
CLIENT	Leeuwin Civil Pty Ltd

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PO Box 5178
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Western Australia 6280
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Project Number	2154	Designed	PN
Drawing Number	Figure 4	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX A – COMPLAINTS REGISTER

Complaints Register

Ref. No.	Date	Name & Address of Complainant	Time/Date of Complaint	Detail of Complaint	Summary of Actions Taken	Shire Notified	Person Responsible

APPENDIX E – DUST MANAGMENT PLAN

DUST MANAGEMENT PLAN

LOT 4201 JINDONG-TREETON ROAD, KALOORUP

August 2021

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Document Control

Version	Date	Author	Reviewer
V1	18/8/2021	PN	KMT
Filename	2154_Lot 4201 Jindong- Treeton Road DMP_v1		

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Figure 2. Surface Water Features

Figure 3. Sensitive Receptors

Figure 4. Transport Route

1 INTRODUCTION

1.1 Background

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The available volume of sand in Cells 8-9 is approximately 50,000 m^3 and will be extracted in two cells (8 and 9) in response to market demands. The post extraction landform will be designed with maximum batters of 1:5.

1.2 Purpose and Scope

Recognised industry standard practices for dust control are well-established within Western Australia. The utilisation of these standard practices is proposed at the subject site to suppress dust and reduced potential impacts associated with dust emissions.

Management of these activities are an effective means to prevent adverse effects of dust. The purpose of this Dust Management Plan (DMP) is to review the risks and control measures to appropriately manage dust and mitigate its impact.

The scope of the DMP is to cover the following:

- Legislative and regulatory compliance;
- Existing environment;
- Risk assessment of potential dust sources and air quality impacts;
- Mitigation and measurement measures; and
- Roles and responsibilities in relation to dust management.

2 EXISTING ENVIRONMENT

2.1 Location

The subject site is located within Lot 4201 Jindong-Treeton Road, Kaloorup. The Lot is wholly owned by Allan John Guthrie.

The subject site is located within the municipality of the City of Busselton, approximately mid way between Cowaramup and Busselton, being approximately 14 km from each and approximately 200 km south of Perth.

2.2 Land Use

The property is zoned 'Rural' pursuant to the City of Busselton's *Local Planning Scheme No. 21.* The proposed extractive industry is a permitted land use within this zone subject to development approval from the City of Busselton. Land uses abutting the boundaries of the subject site are rural based, predominantly grazing and pastoral land uses.

2.3 Topography and Soils

The current topography of the subject site can be described as undulating with the elevation ranging from 60 m Australian Heigh Datum (AHD) to 66 m AHD. There is a stream running through the eastern portion of the property associated with Dawson Gully which discharges north into the Buayanyup River. The site drains towards the front of the property in a northern direction into the wider drainage system. The site also drains towards the rear of the property again in a northerly direction (refer to **Figure 2**).

The subject site is located within the Donnybrook Sunkland Zone landform consisting of "*moderately dissected lateritic plateau on Perth Basin sedimentary rocks. Soils are formed in lateritic colluviam, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south*", and the Whicher Scarp System described as "*Low scarp and raised platform on the northern edge of the Donnybrook Sunkland. Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils.*" (Tille 2006).

Within the Whicher Scarp System, the subject site is located within the following sub-systems:

- Yelverton deep sandy flats Phase – Level to gently undulating raised shelf, lying 10 – 40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton very gentle slopes Phase – Undulating terrain. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.
- Yelverton flats Phase – Raised flats. Duplex sandy gravels, semi-wet soils, yellow deep sands and sandy earths and loamy gravels.

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 Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Rainfall for the area is approximately 680 mm per annum with approximately 89% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

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).

2.1 Sensitive Receptors

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for extractive industries, a buffer distance of 300 m to 500 m is recommended from sensitive land uses. A conservative buffer of 500 m to sensitive receptors has been adopted for this proposal given that onsite crushing and screening is proposed for short campaigns of 6 to 8 weeks per year.

The closest residential dwellings to the subject site are provided below and shown in **Figure 3.**

Table 1. Residential dwellings within 1,500 m of the subject site.

Resident No.	Distance to subject site (m)
1	736 m
2	936 m
3	967 m
4	971 m
5	1177 m
6	1214 m

The closest residential dwellings to the subject site are located greater than 700 m**.** There are six residential dwellings within 1,500 m of the proposed extraction area (measured from the closest point).

3 EXTRACTION ACTIVITIES

The gravel quarry will cover an area of approximately 18.3 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in seven cells, ranging from 2.0 ha to 3.2 ha in size. Indicative stage locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of gravel to be removed from the seven cells will be approximately 325,000 m^3 with approximately 65,000 m^3 excavated each year, depending on supply and demand.

The sand quarry will cover an area of approximately 2.6 ha, with a current maximum elevation ranging from 60 m AHD to 66 m AHD. It will be excavated to a maximum depth of 2.0 m BGL in two cells, approximately 1.2 to 1.4 ha in size. Indicative cell locations are shown within **Figure 1** to illustrate their relative scale**.**

It is estimated that the total maximum volume of sand to be removed from the two cells will be approximately 50,000 m^3 with approximately 10,000 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 productive agricultural land.

3.1 Operational Works

Using a loader, the topsoil (nominally 15 cm of the soil profile) will be stripped and placed in stockpiles less than 2 m high. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

3.1.1 Truck Movements

Access from the property will be via Jindong-Treeton Road, utilising Payne Road, Queen Elizabeth Avenue or North Jindong Road and Roy Road and onto Bussell Highway (refer to **Figure 4**). Both proposed routes are on Main Roads WA Permit Network 2 roads. It is therefore not considered necessary to show traffic counts as these roads have already been assessed and considered suitable for this type of haulage.

Access to the subject site will be restricted to existing internal roads and the existing, previously approved crossover, as shown in **Figure 4**.

3.1.2 Gravel Extraction

The gravel within the subject site can be removed within an excavator or loader without the need for blasting. The material will then be crushed and screened to produce products of the correct site.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- Vegetation cover will be removed by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.

- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- An excavator or front-end loader will be used to excavate the gravel material.
- The material will then be picked up by a rubber tyred loader and fed to the mobile crusher.
- A loader will then transfer the laterite rock into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the gravel into various sizes for stockpiling. On an as needed basis, gravel product will be loaded on to road trucks of various configurations for transport off-site.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening.
- 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.

3.1.3 Sand Extraction

The sand within each cell will be excavated by a bulldozer to a stockpile. Stockpiles will be limited to the anticipated volume for cartage on the following operating day where possible. A summary of the proposed sand extraction activities is provided below:

- Prior to excavation commencing the subject site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- The topsoil (nominally 15 cm of the soil profile) and overburden (if present) will be stripped and stockpiled using a loader.
- An excavator or front-end loader will be used to excavate the sand and transport it to a stockpile.
- The sand will then be picked up by a loader and loaded onto 15m semi-trailer trucks.
- Excavation will commence in the west of the quarry and then move in an easterly direction. The face and walls of the pit will act as noise barriers.
- Upon completion of each cell, the cell 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.

3.1.4 Final Contours

The slope of the final contours of the quarry will be an undulating surface at between 58 m AHD and 64 m AHD which is consistent with the adjoining land.

Slopes of the batters at the end of excavation will be retained at 1:5 vertical to horizontal.

3.1.5 Rehabilitation

During operations, quarrying and rehabilitation will be undertaken progressively. Following quarrying of each cell, rehabilitation will be undertaken.

Upon completion of each cell, the following broad completion criteria will be achieved:

- A self-sustaining cover of pasture;
- Weed levels that are not likely to impact on the viability of the reconstructed soils; and
- A safe and stable landform suitable for the proposed future land use which will be productive, grazing pasturelands.

3.2 Proposed Operating Times

Typical operating hours for quarries will be adopted for the subject site which involves 7am to 6pm each Monday to Friday and Saturdays 7am to 1pm (for rehabilitation works only), excluding public holidays. The subject site will be worked by 2 - 3 persons, depending on market demand.

Jindong – Treeton Road is a designated bus route with the bus passing the subject site at approximately 7:50am and 3:55pm. It is noted that trucks may not operate on designated school bus routes between 7:30am – 8:40am and 3:20pm – 4:20pm, Monday to Friday, during school periods. The pit operators will be careful to ensure compliance with these requirements.

3.3 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 2. 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.
Bulldozer	Topsoil will be stripped using a bulldozer. Bulldozers will also be used for the movement of gravel and sand and loading trucks.
Loader	Loaders will be used for the movement of sand and gravel and loading road trucks.
Excavator	An excavator may be used for the removal of sand and gravel material.
Terex Finlay 1-140 Impact Crusher	Used for the crushing of gravel.
Terex Finlay 693 Supertrak	Used for the screening of crushed gravel.
Anaconda Radial Stockpiler	Used for stockpiling crushed gravel.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.
Tip truck	Removal of sand from site.

3.4 Water Usage

Water is only required for dust suppression within the quarry and the gravel access road. Water will be sourced from the Busselton Water's standpipe located on Queen Elizabeth Avenue, West Busselton. Water from the standpipe will be trucked to site on an as needs basis.

4 POTENTIAL IMPACTS

4.1 Dust Sources

The proposed extraction activities will involve the disturbance of large quantities of soil and earthen material. Specifically, this may include the following activities:

- Earthworks during extraction activities;
- Topsoil stripping;
- Loading and transportation of material;
- Vehicle movement within the site;
- Crushing and screening of material; and
- Wind erosion of exposed surfaces.

These activities have the potential to generate dust that, if not adequately controlled, can cause nuisance and safety risks. In-pit operations tend to generate less dust than surrounding activities due to the reduced airflow within the pit. The removal and replacement of topsoil material has the highest risk associated with dust generation due to the large volumes of material involved and generally lower levels of soil moisture.

4.2 Risk Assessment

In accordance with the DWER's "*A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities*", a risk assessment for dust emissions has been prepared.

For a site that is generating uncontaminated dust, such as extractive industry sites, the site classification chart in Appendix 1 of the DWER guideline can be used for assessing the site risk. Appendix 1 also details the provisions and contingency arrangements for dust management which apply to each site classification score.

The site classification assessment is provided below.

Part A. Nature of site

Item	**Score Options**				**Score**
1.Nuisance potential of soil when disturbed	Very low - 1	Low – 2	Medium – 4 *Soils with a dominant particle size corresponding to gravel size or larger have less potential of becoming airborne than finer particles such as fine sand*	High - 6	4

2. Topography and protection provided by undisturbed vegetation	Sheltered and screened - 1	Medium screening – 6	Little screening – 12 *The extraction area has some vegetative screening on all boundaries.*	Exposed and wind prone - 18	12
3. Area of site disturbed by the works	Less than 1ha - 1	Between 1 and 5ha – 3 *Only 2ha will be excavated at any time. Rehabilitation will be progressive denoting that the area of disturbed land will be limited to 2ha.*	Between 5 and 10ha - 6	More than 10ha - 9	3
4. Type of work being done	Roads and trenches - 1	Roads, drains and medium deep sewers - 3	Roads, drains, sewers and partial earthworks - 6	Bulk earthworks – 9 *Sand/gravel extraction*	9
Total score for Part A					28

Part B. Proximity of site to other land uses

Item	**Score Options**				**Score**
1.Distance of other land uses from site	More than 1km - 1	Between 1km and 500m – 6 *The closest dwellings are to the north at distances greater than 700m.*	Between 100m and 500m – 12	Less than 100m - 18	6
2. Affect of prevailing wind direction (easterly) on other land uses	Not affected - 1	Isolated land uses affected by one wind direction – 6 *The closest dwellings are to the north.*	Dense land uses affected by one wind direction – 9	Dense/sensitive land uses highly affected by prevailing winds - 12	6
Total score for Part A					12

Based on the risk assessment, a site classification score (A x B) of 336 has been provided. This results in a Classification 2 (Low Risk) (score between 200 and 399, DWER 2011). The provisions, contingency

arrangements and monitoring requirements as specified by the DWER (2011) associated with a Classification 2 proposal are provided below.

Provisions:

The developer shall supply a contingency plan to the local government, which shall detail the activities to be undertaken should dust impact occur.

Contingency arrangements:

Include an allowance for water-cart operation, wind fencing and surface stabilisation during construction period for the purposes of dust suppression.

All areas of disturbed land should be stabilised to ensure that the disturbed area exposed at any time is kept to a practical minimum.

Monitoring requirements:

Complaints management system in place.

Notice to be erected at the site providing contact details of the person to be contacted.

4.3 Management Measures

Based on the results from the risk assessment and in consideration of the separation distances to sensitive receptors, the following dust management measures are proposed.

4.3.1 Exposed Surfaces

Dust from stockpiles, un-stabilised surfaces and access roads will be supressed with water applied by an onsite watercart with a capacity of 15,000L. Water will be trucked to the site from the Busselton Water standpipe located on Queen Elizabeth Avenue, West Busselton.

The volumes of water required will be dependent on the prevailing weather conditions. An estimated volume of water required for dust suppression is provided below in **Table 3**.

Table 3. Parameters for estimated water requirements for dust suppression.

Parameter	Volume/Number
Truck movements in summer	Maximum of 50 trucks per day (depending on demand)
Volume of watercart	15 kL
Estimated days of watercart operation	120
Estimated average daily use	270 kL
Estimated annual use	324,000 kL

4.3.2 Material Transport

Material transported from the subject site will be carried in semi-trailer truck bodies of various configurations. During transport of the sand, dust can be generated. Accordingly, the proponent will implement the following measures to reduce dust during product transportation:

- Truck loads will be covered with tarpaulin or similar.

4.3.3 Processing Material

Excavation, stockpiling and loading the sand material into trucks has the potential to generate dust.

Operations will be undertaken in designated areas with the greatest natural protection from winds (concealed at the lowest contours) which simultaneously minimise wind-borne dust emissions and dissipate noise emissions. Excavation and processing will be conducted on the floor of the pit, between 0.8m to 2m below natural ground level, behind the excavation face.

4.3.4 Rehabilitation

The proposed extractive industry operation is staged. Accordingly, rehabilitation will be undertaken sequentially and as soon as reasonable possible to reduce the exposed areas. Where rehabilitation is delayed (i.e. staged completion occurs in summer), additional dust control measures will be considered. This includes the application of a paper-water mixture to exposed surfaces to create a temporary crust and prevent wind-borne dust lift-off.

4.3.5 Summary

The potential impacts to amenity from dust emissions are considered low with the application of suitable management measures. A summary of these proposed management measures is provided in **Table 4**.

Table 4. Dust management measures.

Legislation and Key Standards		
Environmental Protection Act 1986 (EP Act) *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC 2011)		
Objectives		
• Minimise dust lift during all activities. • No adverse dust impacts to sensitive receptors from the quarry operations.		
Targets		
• No visible dust beyond the property boundary. • No dust complaints.		
Management Actions		
Description	**Responsibility**	**Timing**
Notice to be erected at the site, providing contact details of the person to be contacted regarding the works. This person will also be available outside of operational hours to address any complaints.	Site Manager	Prior to extraction
Induction for all employees will include information on: • Potential sources of dust • Dust Management Plan • Speed limits onsite and staying on designated roads • Reporting procedure for dust issues	Site Manager	Prior to extraction
Topsoil stripping shall not occur during the following conditions: • Winds in excess of 30 km/hr;	Site Manager	Topsoil stripping and bund construction

Areas of land cleared and the period of time they remain cleared are to be kept to a minimum.	Site Manager	At all times
Water trucks are to water down unsealed roads during operation to reduce dust lift.	Site Manager	As required
Stockpiles, where possible, will be limited to the anticipated cubic volume/vehicle movement for cartage on the following operating day.	Machine Operator	At all times
Temporary stockpiles and exposed areas will be watered and stabilised as required. Stabilisation techniques that will be considered depending on environmental conditions will include hydro-mulching.	Site Manager	As required
Transport of dust-prone material will be via covered trucks or dampened prior to transport to prevent dust lift during transport.	Drivers	During soil transport activities
Water trucks are to be available at all times during quarry activities to water the site on observation of dust lift.	Site Manager	As required
Vehicle speeds will be restricted to no more than 10km/hr on the site to minimize dust lift off.	Drivers	At all times
Maintain a complaints register (refer to **Appendix A**). A Complaints Register will be established for the site to record the following information: • Date, time, location and nature of the exceedance. • Identify the cause (or likely cause) of the exceedance and responsible parties. • Identify the activities that were occurring at the time of the non-compliance. • Determine the activities that were most likely contributing to the non-compliance. • Describe what action has been taken to date. • Describe the proposed measures to address the exceedance.	Site Manager	As required

Monitoring			
Description	**Parameter**	**Responsibility**	**Frequency**
Visual monitoring of dust will be ongoing throughout the day during operations. All monitoring is to be maintained on a logging sheet for reference and proof of compliance.	Dust lift and signs of dust deposition near property boundary. Evidence of no visible dust crossing the site boundary will be used as the monitoring criteria for compliance.	Site Manager	Continuous

Contingency and Corrective Actions		
Incident or Consequence	**Corrective Action**	**Responsibility**
Observation of excessive dust lift onsite	Report and investigate as incident.	Site Manager
	Halt work within proximity of the area until cause of dust is addressed.	Site Manager
	Increase dust mitigation measures (e.g. additional watering of exposed areas).	Site Manager
Complaint received	Report and investigate as incident. To determine the validity of the complaint, the wind direction, wind speed and activities being undertaken on site at the time of the complaint will be established.	Site Manager
	If required, halt work until cause of dust is addressed.	Site Manager
	If the complaint is verified as being due to a site source, remedial action will be undertaken within 2 hours. The City of Busselton will be advised of all complaints as soon as they are received. If a compliant cannot be resolved within the 2 hour response period, it may be necessary to cease operations.	Site Manger
	Review dust management procedures and adjust if deemed necessary.	Site Manager

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

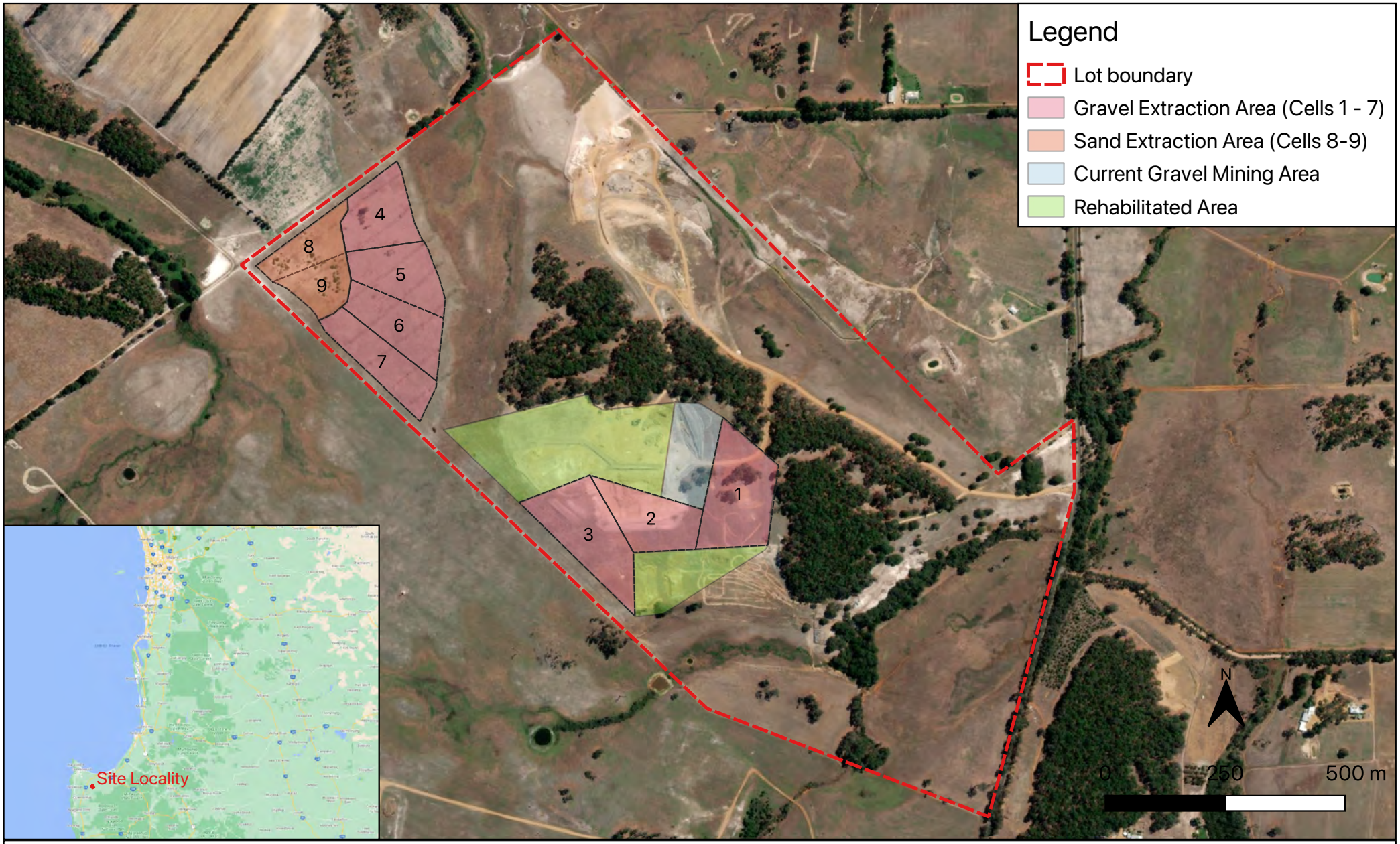
Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

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.

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

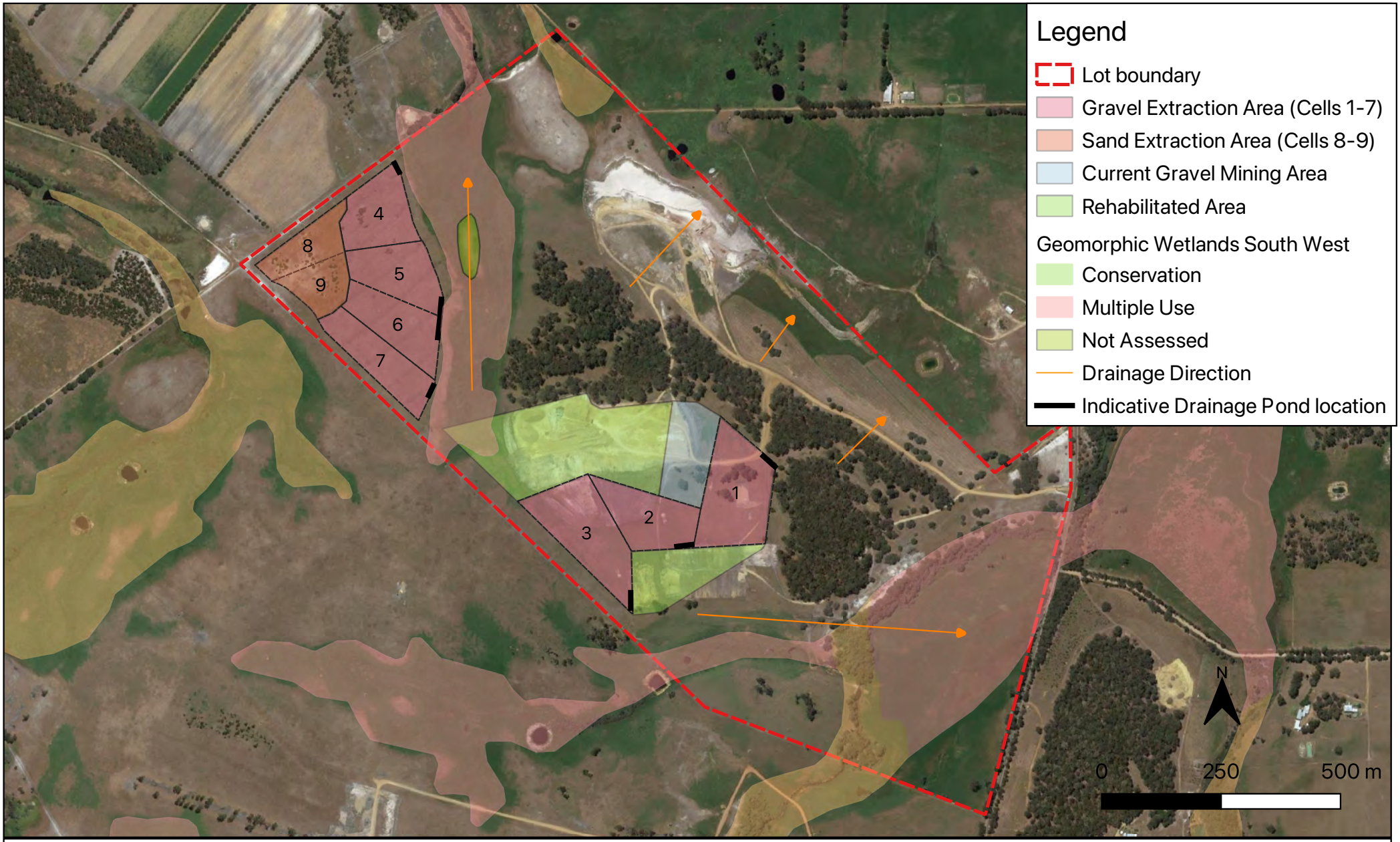
FIGURES



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 1 - Site Locality and Extent
CLIENT	Leeuwin Civil Pty Ltd

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

Project Number	2154	Designed	PN
Drawing Number	Figure 1	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT Lot 4201 Jindong - Treeton Road, Kaloorup

DRAWING TITLE Figure 2 - Surface Water Features

CLIENT Leeuwin Civil Pty Ltd

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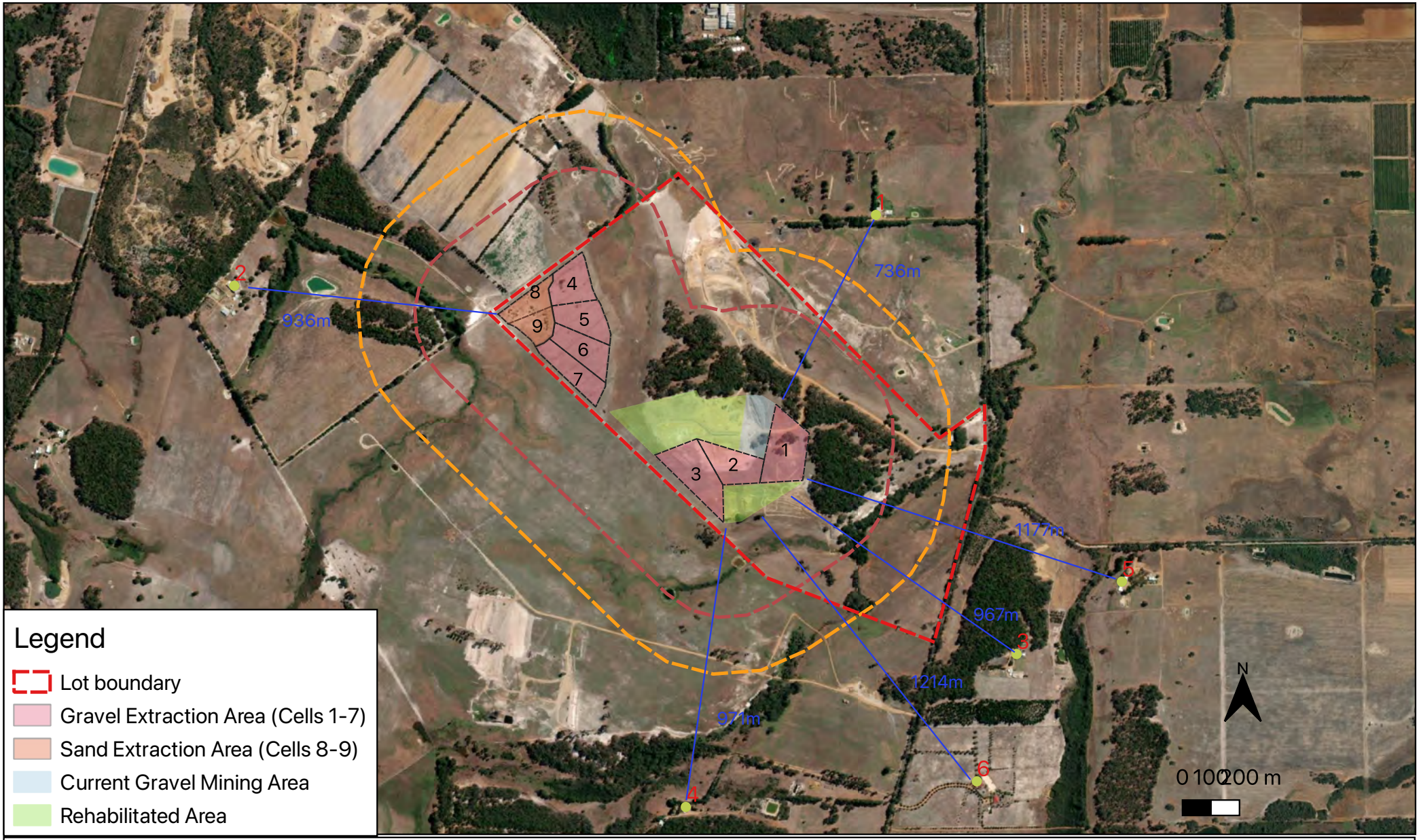
Project Number	2154	Designed	PN
Drawing Number	Figure 2	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



Legend

- Lot boundary
- Gravel Extraction Area (Cells 1-7)
- Sand Extraction Area (Cells 8-9)
- Current Gravel Mining Area
- Rehabilitated Area

PROJECT	Lot 4201 Jindong - Treeton Road,Kaloorup
DRAWING TITLE	Figure 3 - Sensitive Receptors
CLIENT	Leeuwin Civil Pty Ltd

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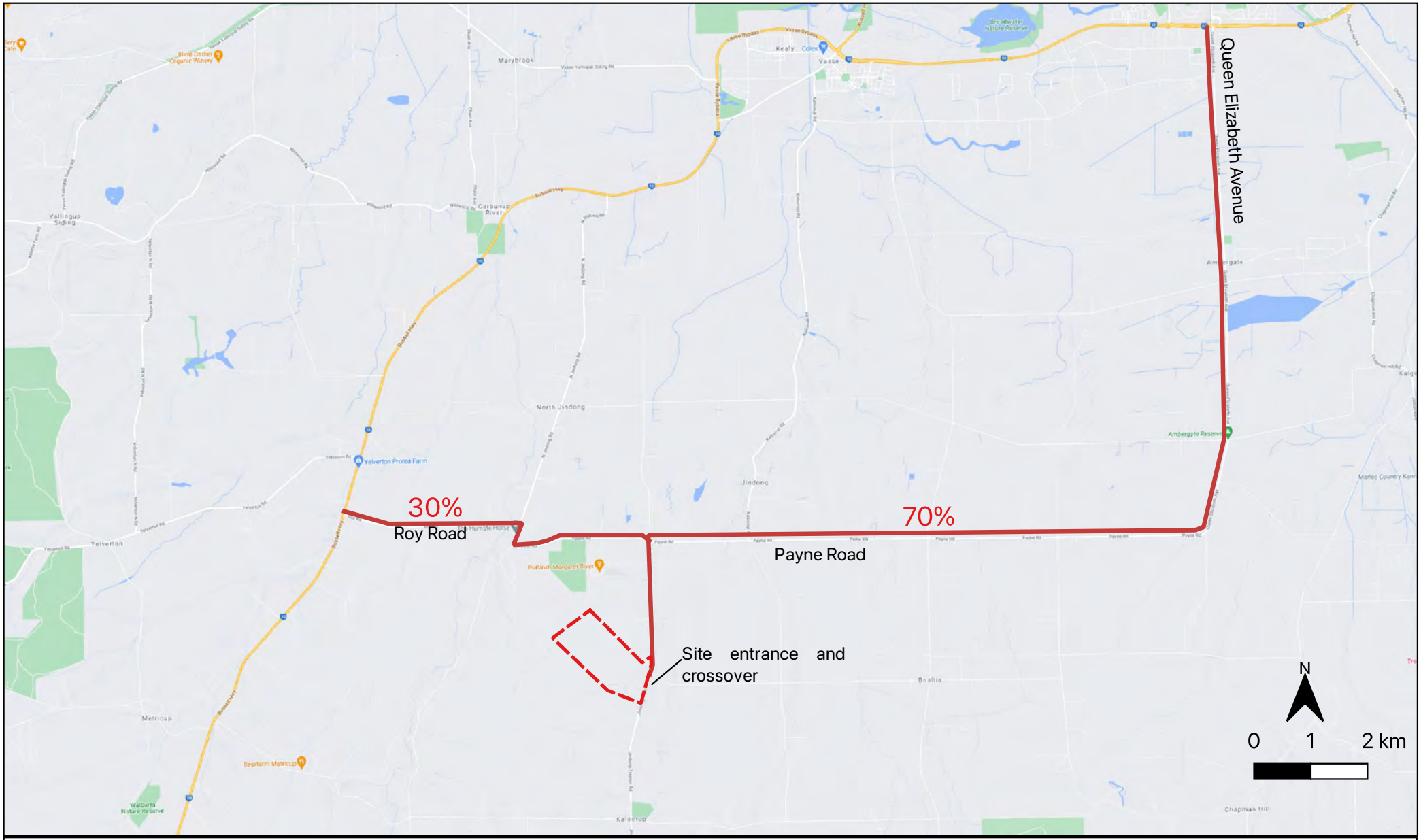
Project Number	2154	Designed	PN
Drawing Number	Figure 3	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton



PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 4 - Haulage Route
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	PN
Drawing Number	Figure 4	Drawn	PN
Revision	A	Checked	
Date	13/8/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX A – COMPLAINTS REGISTER

Complaints Register

Ref. No.	Date	Name & Address of Complainant	Time/Date of Complaint	Detail of Complaint	Summary of Actions Taken	Shire Notified	Person Responsible