



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9140/1
Permit Holder:	Ledge Point Lime Sands Pty Ltd
Duration of Permit:	From 22 July 2021 to 22 July 2031

The permit holder is authorised to clear native vegetation subject to the following conditions of this permit.

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of extractive industry and associated haulage roads.

2. Land on which clearing is to be done

Lot 1 on Diagram 40956, Breton Bay
Lot 2 on Diagram 40956, Breton Bay

3. Clearing authorised

The permit holder must not clear more than 3.5 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1` of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 22 July 2026.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- avoid the clearing of *native vegetation*;
- minimise the amount of native vegetation to be cleared; and
- reduce the impact of clearing on any environmental value.

6. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known dieback or weed-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared; and
- (d) at least once in each 12-month period, the permit holder must remove or kill any weeds growing within areas cleared under this permit.

7. Revegetation and rehabilitation – retention of vegetative material and topsoil

- (a) The permit holder must retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared.
 - (i) Topsoil mounds to be no greater than three (3) metres in height.
- (b) The permit holder must within 2 months following completion of works *revegetate* and *rehabilitate* the areas that are no longer required for the purpose for which they were cleared under this permit by:
 - (i) re-shaping the surface of the land so that it is consistent with the surrounding five (5) metres of land; and
 - (ii) the overburden will be returned and contoured; and
 - (iii) ripping the ground on the contour to remove soil compaction; and
 - (iv) laying the vegetative material and topsoil retained under condition 7(a) on the cleared area(s).
- (c) The permit holder must within 18 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 7(b) of this permit:
 - (i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and
 - (ii) engage an *environmental specialist* to make a determination as to whether the composition, structure and density determined under condition 7(c)(i) of this permit will, without further *revegetation*, result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, as identified in *the rehabilitation plan*.
- (d) If the determination made by the *environmental specialist* under condition 7(c)(ii) is that the species composition, structure, and density determined under condition 7(c)(i) will not, without further *revegetation*, result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, as identified in *the rehabilitation plan*, the permit holder must *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation seeds at an *optimal time* that will result in a similar species composition, structure, and density of native vegetation to pre-clearing vegetation types in that area identified in *the rehabilitation plan*.
- (e) Where additional *planting* or *direct seeding* of native vegetation is undertaken in accordance with condition 7(d), the permit holder must repeat the activities

required by condition 7(c) and 7(d) of undertaking the additional *planting* or *direct seeding* of native vegetation.

- (f) Where a determination is made by an *environmental specialist* under condition 7(c)(ii) that the composition, structure and density within areas *revegetated* and *rehabilitated* will result in a similar species composition, structure and density to that as identified in *the rehabilitation plan*, in that area, that determination shall be submitted to the *CEO* within three months of the determination being made by the *environmental specialist*.

8. Fauna management – direction of clearing

The permit holder shall conduct clearing in a slow, progressive manner in a single direction towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

PART III - RECORD KEEPING AND REPORTING

9. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) the direction that the vegetation was cleared; (f) the date that extraction works ceased; (g) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and (h) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 6;
2.	In relation to <i>revegetation</i> and <i>rehabilitate</i> of areas pursuant to condition 7 of this permit	<ul style="list-style-type: none"> (a) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken. (b) the size of the areas <i>revegetated</i> and <i>rehabilitated</i> (in hectares);

No.	Relevant matter	Specifications
		<p>(c) the date that <i>revegetation</i> and <i>rehabilitation</i> works began;</p> <p>(d) remedial actions undertaken where the <i>environmental specialist</i> determined the species composition, structure and density of the <i>revegetation</i> and <i>rehabilitation</i> will not result in a similar species composition, structure and density to that as identified in <i>the rehabilitation plan</i>; and</p> <p>(e) the location of any areas <i>revegetated</i> and <i>rehabilitated</i>, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees.</p>

10. Reporting

The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:

- (a) of records required under condition 9 of this permit;
- (b) concerning activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year;
- (c) if no clearing authorised under this permit was undertaken between 1 January to 31 December of the preceding calendar year, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 30 June of each year; and
- (d) prior to 23 April 2031, the permit holder must provide to the *CEO* a written report of records required under condition 9 of this permit where these records have not already been provided under condition 10(a) of this permit.

DEFINITIONS

In this permit, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.

Term	Definition
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent and has a minimum of two (2) years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the <i>CEO</i> as a suitable environmental specialist.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	means the period from MAY to AUGUST for undertaking planting and seeding.
planting	means the re-establishment of vegetation by creating soil conditions and planting seedlings of the desired species
rehabilitate	means actively managing an area containing native vegetation in order to improve the ecological function of that area
the rehabilitation plan	means the rehabilitation plan submitted by Bio Diverse Solutions (2021) <i>Rehabilitation Plan, Supporting information for clearing permit application CPS 9140/1</i> , received 04 March 2021 (DWER Ref: DWERDT 423199).
revegetate	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area
weeds	means any plant – <ul style="list-style-type: none"> (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

28 June 2021

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (

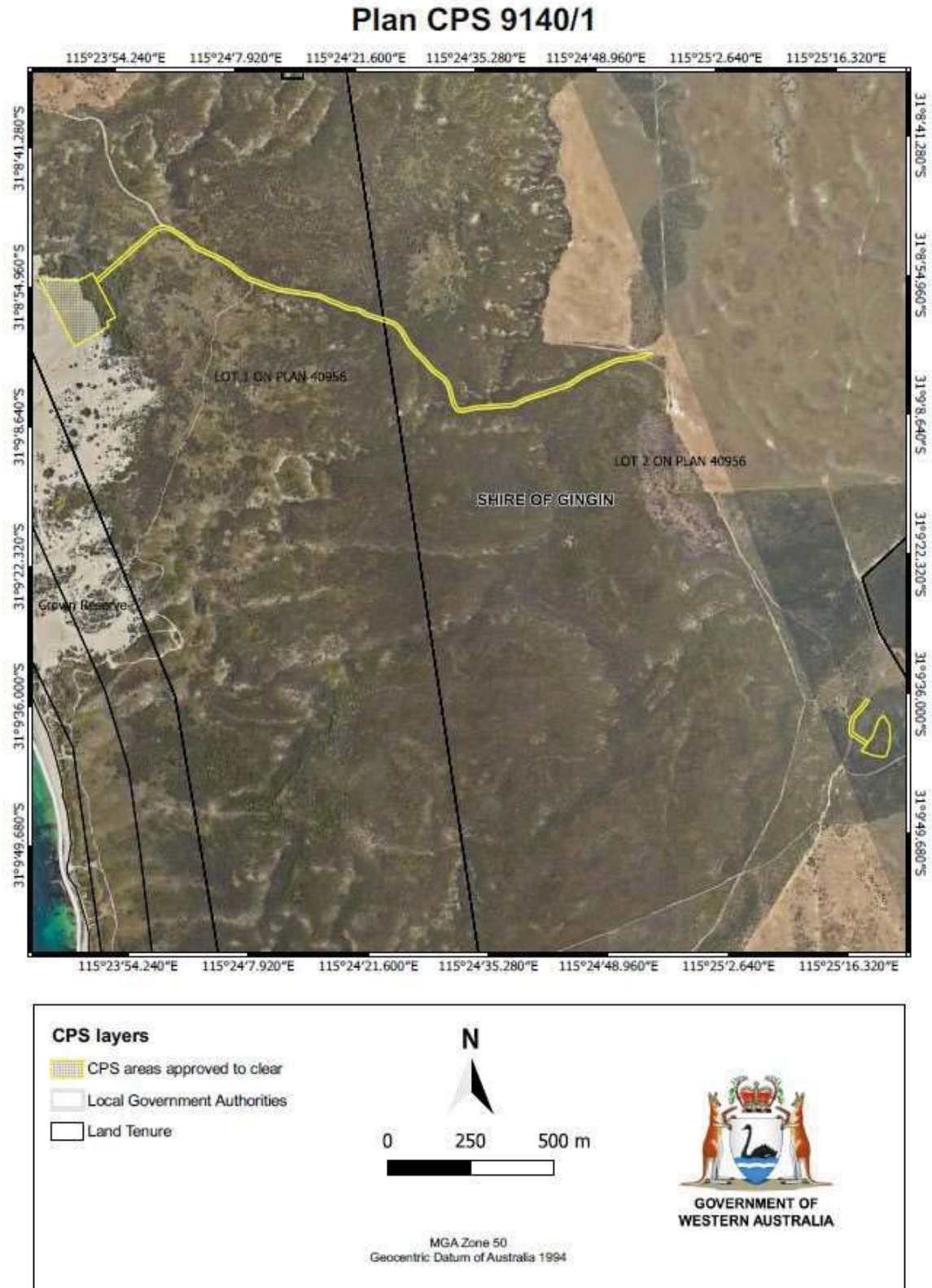


Figure 1).

Plan CPS 9140/1

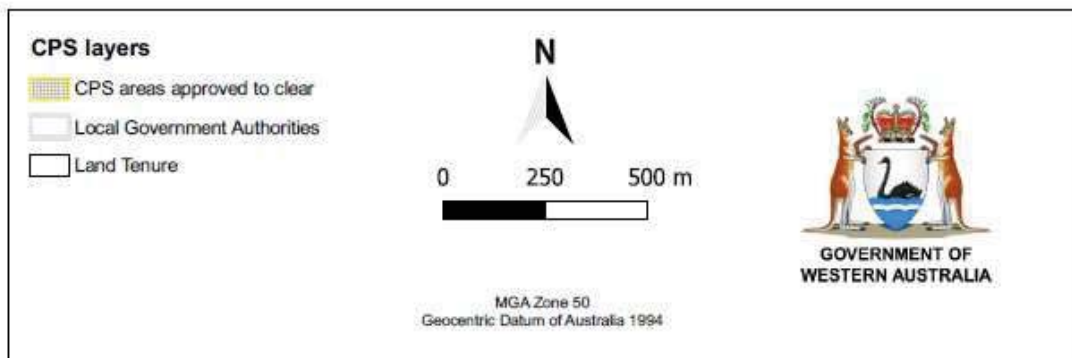


Figure 1: Map of the boundary of the area within which clearing may occur



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9140/1
Permit type:	Purpose permit
Applicant name:	Ledge Point Lime Sands Pty Ltd
Application received:	08 December 2020
Application area:	3.5 hectares of native vegetation within an approximately 5.52 hectare footprint
Purpose of clearing:	Extractive industry and associated haulage roads.
Method of clearing:	Mechanical removal.
Property:	Lot 1 on Diagram 40956 and Lot 2 on Diagram 40956
Location (LGA area/s):	Shire of Gingin
Localities (suburb/s):	Breton Bay

1.2. Description of clearing activities

The proposed clearing is distributed across two separate areas (see Figure 1, Section 1.5). The sites are approximately three kilometres apart, separated by an undisturbed tract of native vegetation. The application is to clear 3.5 hectares of vegetation within a 5.52 hectare footprint. Approximately 60 percent of Site 1 is unvegetated as it includes a sparsely vegetated portion of a coastal dune blowout and an extensive section of cleared track.

For the purpose of this report, the two sites will be referred to as Site 1 and Site 2 (see Appendix D, Figure 2 and 3), both sites include an extraction area and a section of haul road. Clearing within haul road sections will be for the purpose of joining an established track or widen an established track to allow road trains access.

1.3. Decision on application

Decision:	Granted
Decision date:	28 June 2021
Decision area:	3.5 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the findings of a reconnaissance flora / vegetation survey (see Appendix D), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3.3).

The assessment identified that the proposed clearing may result in:

- Land degradation in the form of wind erosion due to removal of native vegetation in sandy soils in a wind prone area.
- The introduction or spread of weeds and dieback into adjacent native vegetation could impact on the quality of that vegetation and its habitat values.
- Injured fauna that may be present at the time of the clearing activity.

A floristic reconnaissance survey (Bio Diverse Solutions 2021a) did not identify any, locally or regionally significant fauna, habitats or assemblages of plants. The area proposed to be cleared does not contain foraging, roosting, or breeding habitat for conservation significant fauna.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the impacts of the proposed clearing on conservation significant flora and land degradation can be minimised and managed to unlikely lead to an unacceptable risk to environmental values, and that the applicant has suitably demonstrated avoidance and minimisation measures.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback;
- conduct clearing in a slow progressive manner in a single direction towards adjacent native vegetation to allow fauna to move into adjacent native vegetation ahead of the clearing activity; and
- retain cleared vegetation and topsoil and respread this on a cleared area of equivalent size within the adjacent existing limestone extraction area and relevant haul road section, within 2 months of completing works, to ensure wind erosion is minimised and native vegetation is not permanently lost.

1.5. Site map

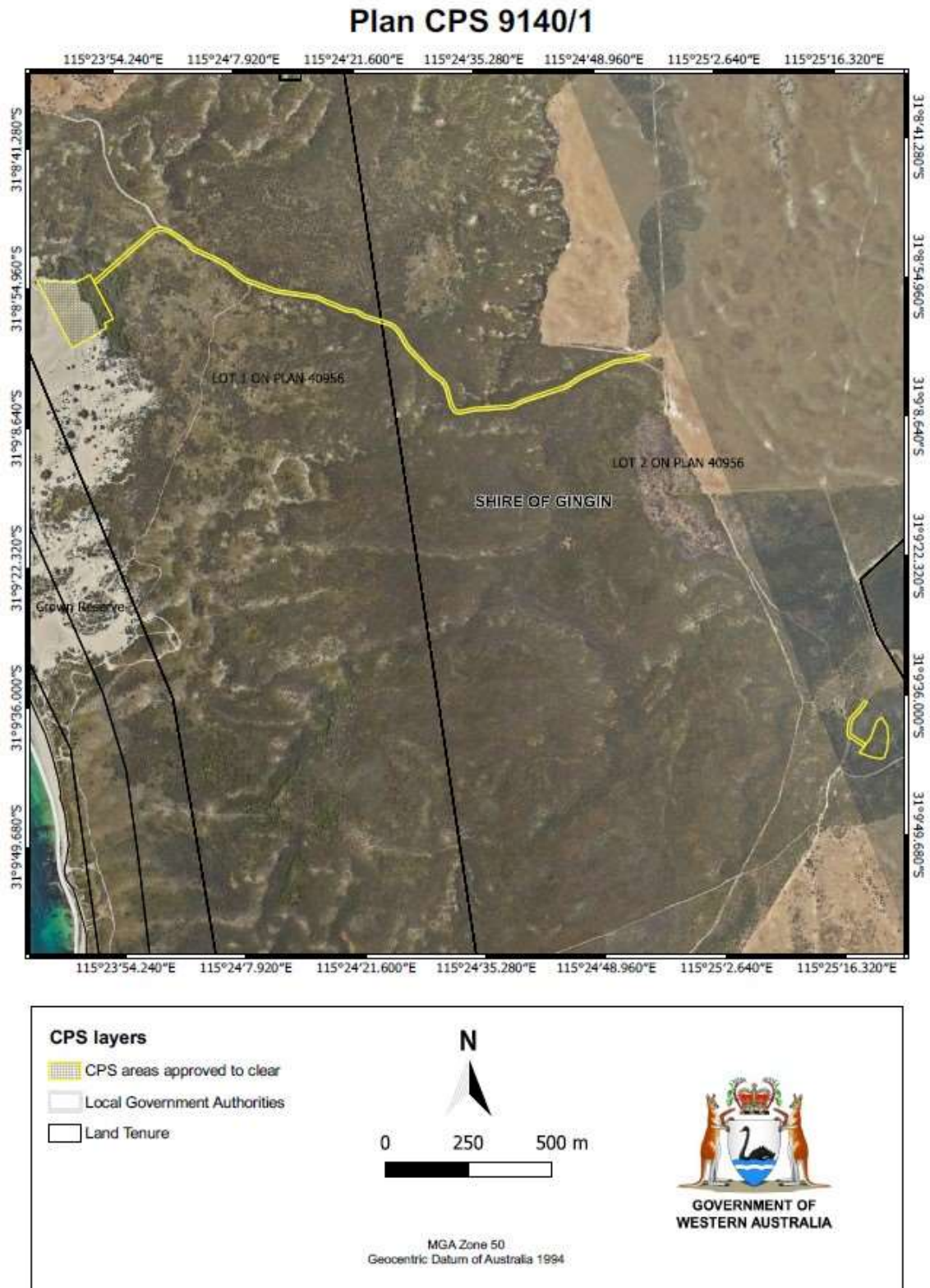


Figure 1 Map of the application area

The area cross hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values. The applicant advised that the area required to be cleared has been kept to the minimum area required for access and excavation, utilising existing cleared area (i.e. tracks) where possible (Bio Diverse Solutions 2020).

A dust management plan (see Appendix D, Exerts E1 and 2) and a site rehabilitation plan (see Appendix D exerts E3) has been prepared for the proposed clearing area, demonstrating that soil erosion risk had been considered. The limestone extraction areas are proposed to be rehabilitated by stabilising the site and re-establishing a functional landscape representing existing vegetation types and species. The success of the rehabilitation will be monitored and a contingency plan is proposed to be enacted if a functional and sustainable landscape is not established (Bio Diverse Solutions 2021c). Tracks will remain unvegetated for land management purposes (Bio Diverse Solutions 2020). The dust management plan includes a range of measures to reduce the risk of dust as a result of the proposed works, that will assist in minimising wind erosion (Bio Diverse Solutions 2021b).

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix A) identified that the impacts of the proposed clearing to conservation significant flora and land degradation required further consideration. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. *Biological values (Biodiversity, conservation significant flora) - Clearing Principles (a) and (c)*

Assessment

The application area was subject to a reconnaissance flora survey (Bio Diverse Solutions 2021a) in January 2021. Though the survey was not carried during the flowering period of most species recorded within the local area. All species resembling non conservation significant flora but contained similar characteristics to conservation significant flora were identified and rational for their identification provided (see Appendix D, Exert E4). Conservation significant flora with habitat requirement similar to the application area or a poorly recorded distribution included:

- *Conostylis pauciflora* subsp. *euryrhipis*, Priority 4;
- *Conostylis bracteate*, Priority 3;
- *Tetradlea pilifera*, Priority 3;
- *Thryptomene* sp. Lancelin (M.E. Trudgen 14000), Priority 3;
- *Dodonaea hackettiana*, Priority 4; and

- *Eucalyptus argutifolia*, Threatened

All the above species are perennial and have distinctive features to enable identification outside the flowering period. None of the above species were identified in the application area.

Vegetation condition within the application area ranged from Excellent (Keighery 1994) to Completely Degraded (Keighery 1994). Completely Degraded (Keighery 1994) areas were confined to either the dune blowout at Site 1 or pre-existing cleared tracks. No weeds were recorded within the vegetated portions of the application area, therefore measures to prevent the introduction of weeds to adjacent vegetation are required.

The proposed clearing area does not contain foraging, roosting, breeding, or habitat suitable for conservation significant fauna recorded within the local area. Fauna habitat types found within the application area will remain well-connected and part of a larger contiguous landscape of similar habitats within the local area and surrounding region. Noting the density of the vegetation, native fauna may be present at the time of the clearing activity. Fauna management measures such as undertaking clearing in a slow/progressive manner towards adjacent vegetation may mitigate any potential impacts to fauna.

Conclusion

Based on the above assessment, the proposed clearing is unlikely to result in significant impact to local populations of threatened or priority flora. Clearing activity may introduce weeds and dieback into the adjacent vegetation that is in excellent condition. Fauna may be present at the time of the clearing activity.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Weed and dieback hygiene measures to mitigate impacts to adjacent vegetation.
- Conduct clearing in a slow/progressive manner towards adjacent vegetation to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

3.2.2. Land and water resources - Clearing Principles (g)

Limestone extraction in Site 1 will occur mostly within the coastal blow out section of the application area with approximately 50 percent of the vegetated area comprising a road train turning area. The applicant has indicated that the turning area will be covered with limestone rubble and compacted to create a surface suitable for road trains to traverse. Approximately 78 percent of Site 2 will be cleared for limestone extraction.

Site 1 occurs at a low elevation (10 meters), approximately 660 meters from the shoreline. Though two kilometres further inland, Site 2 is in a slightly elevated position (40 meters). Both sites are surrounded by intact vegetation. The application area comprises three land unit subsystems. The proposed limestone extraction areas within Site 1 and 2, occur within the Quindalup South second dune Phase and Quindalup South third dune Phase, respectively. A 150-meter section of the Site 1 haul road is mapped as Quindalup South Qr Phase, land unit. Given the location, landform and soil type, the application area is likely to be prone to wind erosion if left bare for extended periods (see section C4 for soil risk analysis). To reduce and mitigate this risk, the applicant has submitted a dust management plan (Bio Diverse Solutions 2021b) and a rehabilitation plan (Bio Diverse Solutions 2021c). Key soil erosion reduction and mitigation methods within the plans include:

- Avoiding operations if wind speed exceeds the average of 'fresh' (33.85 km/h) from any westerly variation in wind direction.
- Land clearing will be kept to the minimum required for the project, clearing and topsoil stripping will be avoided on high wind days; predominantly westerly variations (as above).
- Clearing will be carried out in stages as the project progresses to minimise dust generation from cleared areas.
- Topsoil will be stripped in increments, stockpiles will not exceed three metres in height.
- Rehabilitation of cleared land will be carried out within two months of the cessation of works.
- Rehabilitation will include:
 - Overburden will be returned and contoured.
 - Retained vegetative material and topsoil will be spread over the cleared area.
 - If stabilisation of the area cannot be achieved within 12 months after replacing the above, additional seed of appropriate species and providence, will be broadcast across the site at an appropriate time of year.

It is anticipated that the integration of erosion management and land rehabilitation methods, will significantly stabilise cleared areas and reduce the risk of soil erosion via wind.

Conclusion

The proposed clearing is likely to result in land degradation via wind erosion. However, the dust management and rehabilitation methods proposed by the applicant will mitigate the impact of wind erosion from the proposed clearing.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Revegetation to occur within two months of the cessation of the proposed lime extraction works to ensure the area is not left exposed for an extended period of time.

3.3. Relevant planning instruments and other matters

An advice referral was submitted on the 22 January 2021 on the *Rights in Water and Irrigation Act 1914* (RIWI). The Swan Avon Region's Planning Advice section has assessed this referral and has no objections or advice to provide (DWER 2021). No licence under the RIWI Act is required for the proposed clearing.

The Shire of Gingin (Shire) advised DWER that local government approvals are required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme. The Shire did not have any objections to the proposed clearing (Shire 2021). On 23 November 2020, the Shire granted Ledge Point Lime Sands Pty Ltd with an Extractive Industry Licence (Licence number 60) (Bio Diverse Solutions 2020)

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details																		
Local context	The area proposed to be cleared is part of an expansive tract of native coastal heath shrub thicket vegetation, in the extensive land use zone of Western Australia. It is located in a partial cleared strip of native vegetation situated between Indian Ocean Drive and the coast line. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains 73.75 per cent of the original native vegetation cover.																		
Ecological linkage	The application area is not part of any ecological linkage.																		
Conservation areas	The Gnangara-Moore River State Forest occurs 4.3 kilometres east of Site 2.																		
Vegetation description	<p>A recognisance flora survey (Bio Diverse Solutions 2021a) indicate the vegetation within Site 1 of the proposed clearing area consists of <i>Acacia rostellifera</i> dominated thicket associated with mobile dunes. Site 2 consisted of <i>Melaleuca systena</i> and <i>Calothamnus quadrifidus</i>, with <i>Melaleuca cardiophylla</i>, <i>Banksia nivea</i>, <i>Banksia sessilis</i> and <i>Acacia truncata</i> in the substratum. Representative photos and vegetation descriptions are available in Appendix D (Figure 4- 5 and Exerts).</p> <p>The vegetation observed by Bio Diverse Solutions (2021a) contains elements of the mapped vegetation type:</p> <ul style="list-style-type: none"> Quindalup Complex, which is described as a coastal dune complex consisting mainly of two alliances - the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of <i>Melaleuca lanceolata</i> (Rottnest Teatree) - <i>Callitris preissii</i> (Rottnest Island Pine), the closed scrub of <i>Acacia rostellifera</i> (Summer-scented Wattle) and the low closed <i>Agonis flexuosa</i> (Peppermint) forest of Geographe Bay. <p>The mapped vegetation type retains approximately 60.5 per cent of the original extent (Government of Western Australia, 2019).</p>																		
Vegetation condition	<p>Vegetation survey (Bio Diverse Solutions 2021a) indicate the vegetation within the proposed clearing area is in Excellent to Completely Degraded (Keighery 1994) condition, as listed below:</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Description of Area</th> <th>Vegetation Condition</th> </tr> </thead> <tbody> <tr> <td>Site 1</td> <td>Vegetated area</td> <td>Good to Excellent</td> </tr> <tr> <td>Site 1</td> <td>Blow out</td> <td>Completely Degraded</td> </tr> <tr> <td>Site 1 Haul road</td> <td>Vehicle Track</td> <td>Completely Degraded</td> </tr> <tr> <td>Site 2</td> <td>Vegetated area</td> <td>Good to Excellent</td> </tr> <tr> <td>Site 1 Haul road</td> <td>Vehicle Track</td> <td>Completely Degraded</td> </tr> </tbody> </table> <p>The full Keighery (1994) condition rating scale is provided in Appendix C. Representative photos available in Appendix DD.</p>	Area	Description of Area	Vegetation Condition	Site 1	Vegetated area	Good to Excellent	Site 1	Blow out	Completely Degraded	Site 1 Haul road	Vehicle Track	Completely Degraded	Site 2	Vegetated area	Good to Excellent	Site 1 Haul road	Vehicle Track	Completely Degraded
Area	Description of Area	Vegetation Condition																	
Site 1	Vegetated area	Good to Excellent																	
Site 1	Blow out	Completely Degraded																	
Site 1 Haul road	Vehicle Track	Completely Degraded																	
Site 2	Vegetated area	Good to Excellent																	
Site 1 Haul road	Vehicle Track	Completely Degraded																	
Climate and landform	<p>Mean annual rainfall: 615.9 millimetres</p> <ul style="list-style-type: none"> Temperature: mean annual minimum: 24.7 Degrees centigrade Temperature: mean annual maximim:24.8 Degrees centigrade <p>Landform: Undulating Dunes and dune swales</p>																		

Characteristic	Details
Soil description	<p>The soil in Site 1, is mapped as:</p> <ul style="list-style-type: none"> Quindalup South second dune Phase, described as a complex pattern of dunes with moderate relief. Calcareous sands have organic staining to about 20 cm, passing into pale brown sand; some cementation below 1 m. Quindalup South Qr Phase, described as undulating dunes. Shallow calcareous sands over limestone with much rock outcrop. <p>The soil in Site 2, is mapped as:</p> <ul style="list-style-type: none"> Site 2. Quindalup South third dune Phase, described as irregular dunes with high relief and slopes up to 20%. Loose calcareous sand with little surface organic staining and incipient cementation at depth.
Land degradation risk	Land degradation risk is analysed in Table A.4 below.
Waterbodies	The desktop assessment and aerial imagery indicated that one non perineal inland natural lake occurs 9.3 kilometres from the application area. This water body forms part the Karakin Lakes system, within the Moore River system, which runs along the eastern edge of the application area.
Hydrogeography	The application area falls within the Gingin Groundwater Area, under the RIWI Act, Groundwater Areas (DWER-034).
Flora	There are two Threatened flora species recorded in the local area and eight priority species. The floristic survey carried out in January 2021 (Bio Diverse Solutions 2021a) was adequate to confirm the Priority and Threatened flora recorded in the local area. No Priority or Threatened flora were identified within the application area (Bio Diverse Solutions 2021a).
Ecological communities	<p>Available datasets identified two Threatened Ecological Communities (TEC) within the local area:</p> <ul style="list-style-type: none"> Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region. Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain. <p>Both TEC's area listed as Endangered' under the EPBC Act and 'Priority 3' Priority Ecological Community (PEC) by DBCA.</p> <p>No TECs or PECs were identified within the application area (Bio Diverse Solutions 2021a).</p>
Fauna	<p>A total of 14 species of conservation significant fauna are recorded in the local area. This includes <i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo), listed as Endangered and <i>Synemon gratiose</i> (Graceful sunmoth) listed as Priority 4. The remainder of records are sea bird species and shore and wetland bird species. These include <i>Arenaria interpres</i> (Ruddy turnstone), <i>Calidris acuminata</i> (Sharp-tailed sandpiper), <i>Calidris alba</i> (sanderling), <i>Calidris melanotos</i> (pectoral sandpiper) <i>Calidris subminuta</i> (Long-toed Stint), <i>Chlidonias leucopterus</i> (White-winged black tern, white-winged tern), <i>Limosa lapponica</i> (Bar-tailed godwit), <i>Plegadis falcinellus</i> (Glossy ibis), <i>Pluvialis squatarola</i> (Grey plover), <i>Thalasseus bergii</i> (Crested tern), and <i>Tringa nebularia</i> (Common greenshank, greenshank. There is no suitable habitat for the above species within the application area.</p> <p>The application area is not mapped as Cockatoo feeding habitat, also no breeding or roosting sites are recorded within the local area. No flora species identified as critical habitat for Graceful sunmoth were identified within the application area (Bio Diverse Solutions 2021a).</p>

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	17.98
Vegetation complex					
Quindalup Complex *	54,573.87	33,011.64	60.5	5,994.64	10.98
Local area (calculation - delete if not required)					
10km radius	22625.88	16687.69	73.75	-	-

*Government of Western Australia (2019)

A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and floristic survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Scholtzia laciniata</i>	P2	Yes	No	Yes	1.5	3	Yes
<i>Tetradlea pilifera</i>	P3	No	No	yes	2.6	1	Yes
<i>Chorizema varium</i>	T	Yes	No	No	2.6	2	Yes
<i>Conostylis pauciflora</i> subsp. <i>euryrhipis</i>	4	Yes	Yes	Yes	2.6	3	Yes
<i>Eucalyptus argutifolia</i>	T	Yes	Yes	Yes	2.9	2	Yes
<i>Thryptomene</i> sp. Lancelin	P3	Yes	Yes	Yes	3	3	Yes
<i>Dodonaea hackettiana</i>	P4	Yes	No	Yes	4.2	1	Yes
<i>Leucopogon</i> sp. Yanchep	P3	Yes	Yes	No	4.8	11	Yes
<i>Conostylis bracteata</i>	P3	yes	Yes	Yes	4.8	3	Yes
<i>Banksia dallanneyi</i> subsp. <i>pollostata</i>	P3	Yes	No	No	6.5	1	Yes

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Land degradation risk table

Risk categories	Quindalup South second dune Phase	Quindalup South Qr Phase,	Quindalup South third dune Phase
Wind erosion	50-70% of map unit has a high to extreme risk	>70% of map unit has a high to extreme risk	50-70% of map unit has a high to extreme risk
Water erosion	<3% of map unit has a high risk	<3% of map unit has a high risk	10-30% of map unit has a high to extreme risk
Salinity	<3% of map unit has a high risk	<3% of map unit has a high risk	<3% of map unit has a high risk
Subsurface Acidification	<3% of map unit has a high risk	<3% of map unit has a high risk	<3% of map unit has a high risk

Flood risk	<3% of map unit has a high risk	<3% of map unit has a high risk	<3% of map unit has a high risk
Water logging	<3% of map unit has a high risk	<3% of map unit has a high risk	<3% of map unit has a high risk
Phosphorus export risk	0-30% of map unit has a high to extreme risk	<3% of map unit has a high risk	30-50% of map unit has a high to extreme phosphorus export risk

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared may contain habitat suitable for a number of conservation significant flora species. A floristic reconnaissance survey (Bio Diverse Solutions 2021a) did not identify any, locally or regionally significant fauna, habitats, or assemblages of plants.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain foraging, roosting, breeding, habitat that is deemed critical for conservation significant fauna.</p>	Not at variance	No
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The threatened flora species, <i>Chorizema varium</i> and <i>Eucalyptus argutifolia</i> were recorded in the local area. The area proposed to be cleared may include suitable or partially suitable habitat for these species.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>The recognisance flora survey (Bio Diverse Solutions 2021a) did not identify any vegetation assemblage that would indicate the resemblance to any state listed TECs.</p>	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type (Quindalup Complex), within the application area retains 60.5 percent of its pre-European extent. The local area reattains 73.75 percent of its pre-European extent. Therefore, the proposed clearing will not significantly impact an area that has been extensively cleared. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not at variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment</u></p> <p>Given no water courses or wetlands are recorded within 9.3 kilometres of the application area, the proposed clearing is unlikely to impact an environment associated with a watercourse or wetland.</p>	Not at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soils are highly susceptible to wind erosion. Given a large proportion of the application area includes a sand dune blowout and the location of the application area along the coast, the proposed clearing is likely to cause land degradation through wind erosion.</p>	At variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (i):</u> <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.”</i></p> <p><u>Assessment:</u></p> <p>Given no water courses, wetlands or Public Drinking Water Sources Areas are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>Given no water courses or wetlands are recorded within 9.3 kilometres of the application area and the sandy nature of the soils, the proposed clearing is unlikely to contribute to increased incidence or intensity of flooding.</p>	Not at variance	No

Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types. Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D. Biological survey information/ dust management plan and rehabilitation plan excerpts

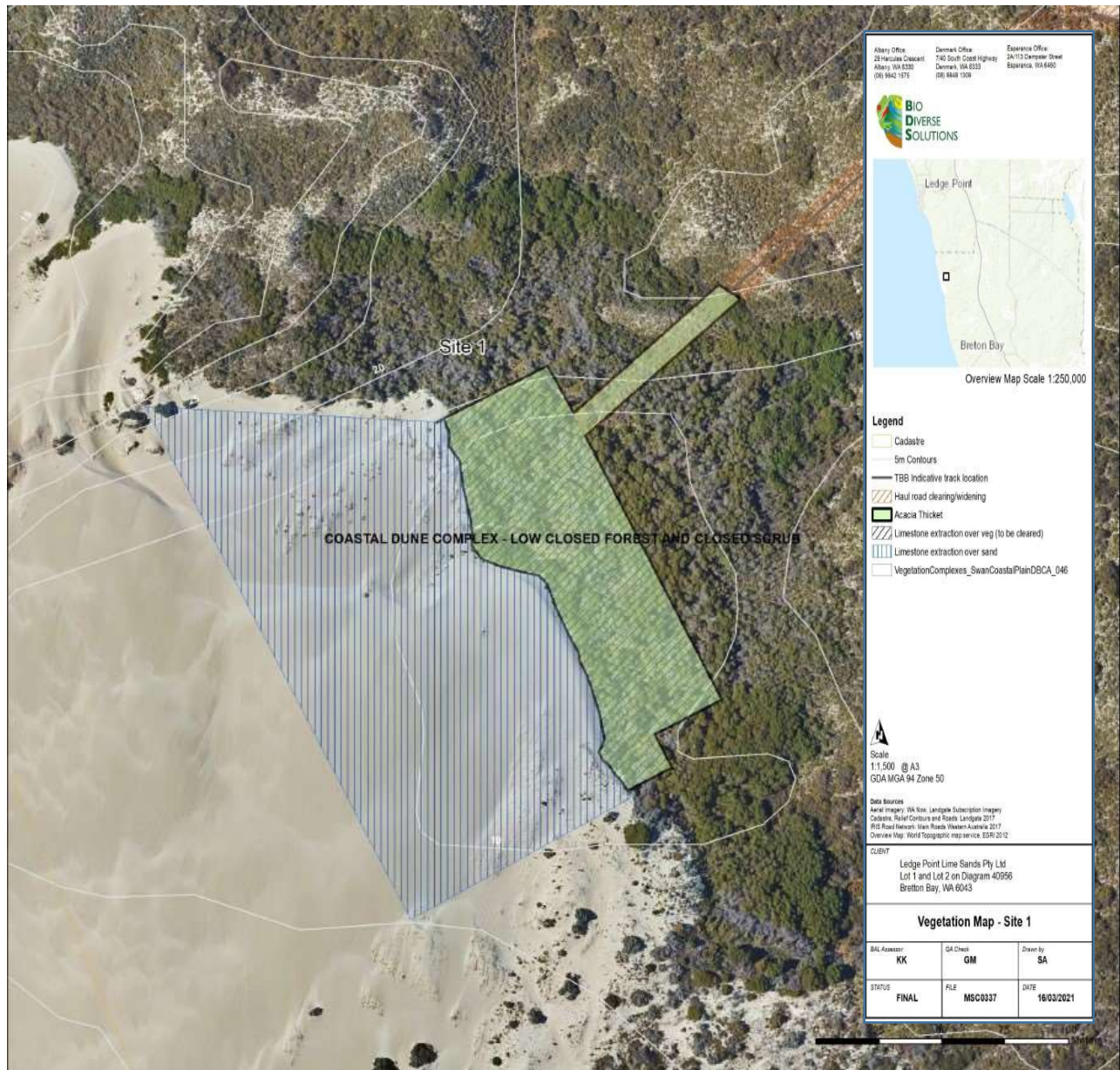


Figure 2: Site 1 limestone extraction and haul road area. Includes a portion of coastal dune blowout (Bio Diverse Solutions 2021a).



Figure 3: Site 2 limestone extraction and haul road area (Bio Diverse Solutions 2021a).



Photograph 1: Dune blowout site one
(photo taken looking south to south east)



Photograph 2: Acacia Thicket site two
(photo taken looking south to south east)



Photograph 3: Site two



Photograph 4: Site two

Figure 4: Representative photographs of vegetation at site 1 and 2 (Bio Diverse Solutions 2021a).



Figure 5: Representative photographs of vegetation at site 2 (Bio Diverse Solutions 2021a).

Exert E1: Floristic and vegetation descriptions (Bio Diverse Solutions 2021c).

Table 2: Species for Site One

Genus species	Common name	Species Identified on site
<i>Acacia cyclops</i>	red eyed wattle	*
<i>Acacia rostellifera</i>	summer- scented wattle	*
<i>Acacia saligna</i>	golden wreath wattle	*
<i>Melaleuca teretifolia</i>	bankbar	*

The number of species occurring in the Site One area is limited. The species in the above table were identified on site (marked with an asterisk*) and are typical of forests / thicket species known to grow in Quindalup soils. Seed may be collected from the *Acacia* species within the vicinity in December to March or be purchased.

Table 3: Species for Site Two

Genus species	Common Name	Seed quantity in grams for seedbank establishment	Species Identified on site
<i>Acacia lasiocarpa</i>	dune mooses	116	
<i>Banksia sessilis</i>	parrot bush	366	*
<i>Banksia nivea</i>	couch honeypot	214	*
<i>Conostylis candidans</i>	grey cottonhead	78	*
<i>Jacksonia furocellata</i>	grey stinkwood	250	*
<i>Templetonia retusa</i>	cookies' tongues	610	*
<i>Calothamnus quadrifidus</i>	one sided bottlebrush	21	*
<i>Thomasia triphylla</i>	coastal thomasia	793	*
<i>Melaleuca systena</i>	coastal honeymyrtle	6	*
<i>Melaleuca cardiophylla</i>	tangling melaleuca	55	*

The species in the above table were identified on Site Two (marked with an asterisk*) and or are typical of Quindalup soils. The seed quantities were estimated using viability per gram and estimated to average for seed per square metre in seed banks sand rehabilitation (Bellairs, 1993).

Exert E2: Risk assessment – Wind patterns (Bio Diverse Solutions 2021b).

2.2. Wind Patterns

As previously mentioned, the west coast of Australia experiences a great range of wind direction and speed throughout the year, with a primary dominant direction depending on the season and time of the year. The Ledge Point region experiences similar wind patterns to that of Perth. In most cases, the wind blows from an east (offshore) variation in the morning and turns west in the late morning (onshore). In the summer months, an easterly wind is the most prevalent which coincides with the months of January to April; the proposed annual period of operation for extraction activities for this project. In the winter and autumn months, westerly winds are more prevalent and are not preferred for extraction activities at this site. Note, it is not unusual to experience several days of easterly wind periods throughout winter, and vice-versa throughout summer.

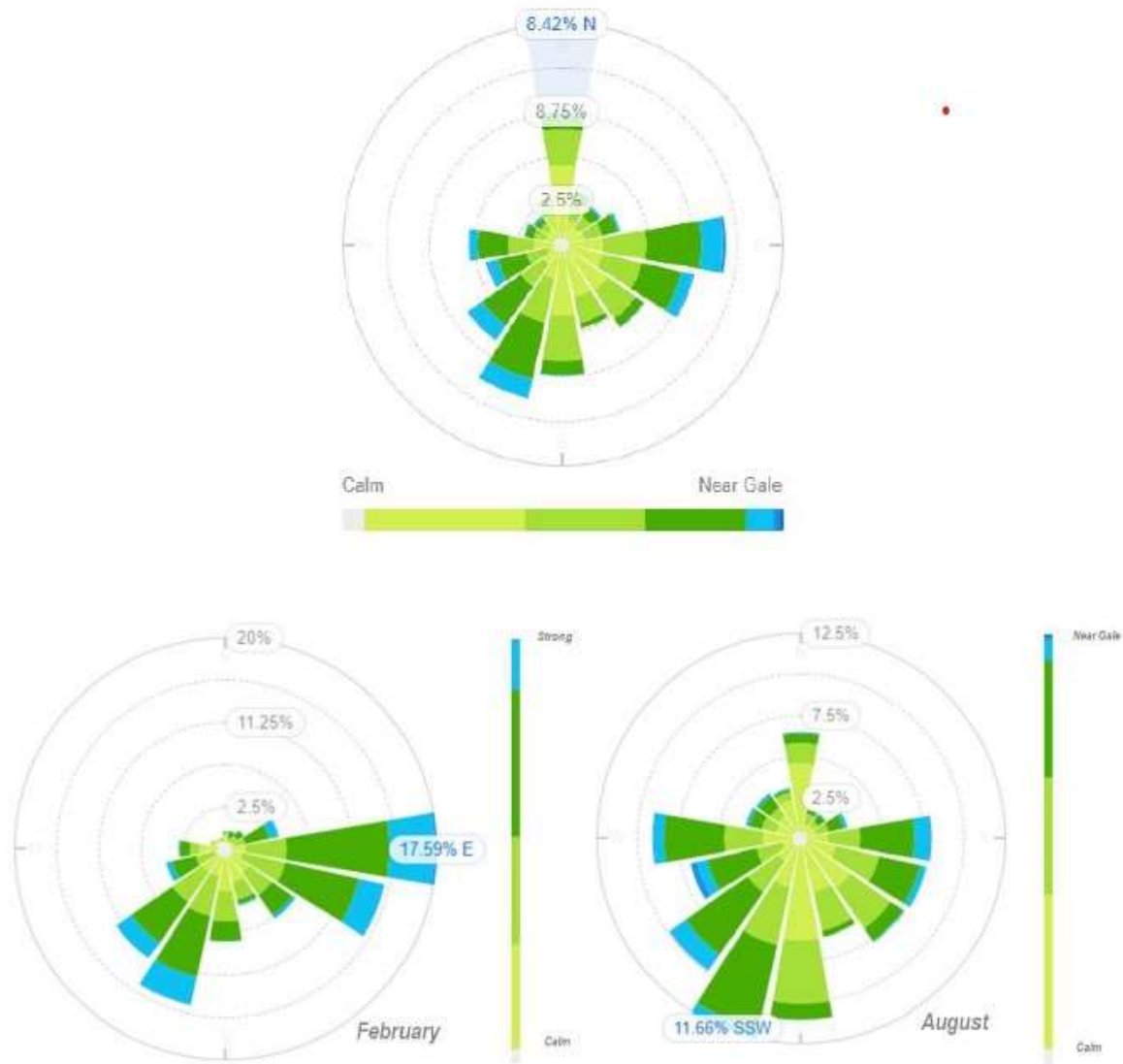


Figure 4: 5-year average wind rose of the most common wind directions and speeds, February and August respectively. (WillyWeather, 2021) - Based off Lancelin wind records.

Exert E3: Dust mitigation plan (Bio Diverse Solutions 2021b)

3. Dust Mitigation

Dust will be generated predominantly during the period of operation, which is limited to approximately 100 days a year, in the months of January to April. During this time of the year the prevailing wind is from the east.

Topsoil, overburden and the extracted lime sand have the potential to generate dust on and off site. However, this potential will be controlled by measures implemented on site during operations. These measures include but are not limited to the following: The topsoil and will be stripped in increments, stockpiles will not exceed three metres in height, and rehabilitation will be undertaken sequentially to minimise the area of exposed surfaces, as specified in the Ledge Point Rehabilitation Plan. There in reducing the potential for topsoil stockpiles to generate dust. The overburden will be removed and stored separately to the topsoil and returned sequentially to the sites to be contoured prior to topsoil return. The lime sand stockpiles will be confined to a manageable area of approximately 1,000–1, 500 square metres of area on site within the area approved for excavation and clearing; further assisting in dust reduction.

The following is to be implemented by Ledge Point Lime Sands Pty Ltd during operations.

Response to Weather Conditions:

- Weather forecast (wind speed and direction) must be checked daily and evaluated prior to limestone and lime sand extraction;
- Do not commence/undertake extraction if dust can be seen leaving the site;
- Avoid operations if wind speed exceeds the average of 'fresh' (33.85 km/h) from any westerly variation;
- Be aware wind speed and direction usually change throughout the day, extract when wind is of lowest velocity and offshore if possible (i.e., morning);
- Favourable conditions to extract include; east, southeast, and northeast (<1-38.9 km/h);
- Non-favourable conditions to extract include; west, southwest, and northwest (28.8+ km/h);
- Due northerlies and southerlies are also considered non-favourable winds (28.8+ km/h); and,
- It is still feasible to extract with onshore wind conditions – Although the cut off wind speed is theoretically 20 km/h. Winds as low as 15 km/h can still make dust airborne (depending on particle size).

Site Works Mitigating Processes (general):

- Land clearing will be kept to the minimum required for the project, clearing and topsoil stripping will be avoided on high wind days; predominantly westerly variations;
- Clearing will be carried out in stages as the project progresses to minimise dust generation from cleared areas;
- Topsoil mounds to be no greater than 3 metres in height;
- Stockpiles to be located in pit areas and along the edge of pits to assist in noise and dust reduction to the properties and will be no greater than a height of 4m;
- Gradual rehabilitation will be undertaken to minimise the area of exposed surfaces (refer to Rehabilitation Plan);
- Stockpiles to be configured to accommodate easy access for watering/dust minimisation;
- The access road, immediate extraction area and fixed plant (screen) to be watered as required to minimise dust emissions;
- Visually monitor emissions of dust from the works, if dust is visible water trucks are to be utilised to suppress dust and/or operations are to cease temporarily;
- Trucks to be fully covered by tarpaulins when fully loaded, prior to leaving extraction area;
- Vehicle travel speeds will be restricted to 40 km/hour on unsealed surfaces on-site; and
- Sign to be attached to the entry gate with contact number(s) of the site manager(s) if dust issues were to occur.

Exert E4: Post operations Rehabilitation plan (Bio Diverse Solutions 2021c).

2.2. Rehabilitation Site One

Site One is 2.77 ha in total, of which 0.76 ha will be cleared and rehabilitated. The vegetation mapping defines the site as Low Closed Forest and Closed Scrub (DBCA, 2020). The site visit verified that the area approved to be cleared is predominately a

thicket of tall to medium acacia species, growing in a depression, in Good to Excellent condition (Keighery, 1994). Refer to Map One in Appendix A.

The remainder of Site One is a blowout (as described above) that is devoid of vegetation and in Completely Degraded condition (Keighery, 1994). Refer to Map Two in Appendix A.

2.3. Rehabilitation Site Two

Site Two consists of 0.79 ha of which 0.61 ha will be cleared and rehabilitated. The vegetation mapping defines the site as Low Closed Forest and Closed Scrub (DBCA, 2020). The site visit verified that the area is mixed scrub in Good to Excellent condition (Keighery, 1994). Refer to Map Three in Appendix B.

3. Rehabilitation Plan

3.1. Overview of Rehabilitation

The limestone extraction areas are proposed to be rehabilitated by stabilising the site and re-establishing a functional landscape representing existing vegetation types and species. This will be achieved through the utilisation of coarse rehabilitation principles and methods. The success of the rehabilitation will be monitored and a contingency plan is proposed to be enacted if a functional and sustainable landscape is not established.

The principle is that topsoil is known to be a source of viable seed (soil dispersing/ geosporous seed), assumed topsoil piles are; not higher than 3 metres, not stored for more than 3 years, and is ripped to reduce compaction (Rokich, et al, 2000). Similarly, seed is known to be stored on some species (krotysporous/serotinous species), and therefore can be a source of viable seed. However, seed viability decreases incrementally after stockpiling, therefore it is imperative that seed be returned to the rehabilitation areas as soon as feasible.

Temporary stockpiles of overburden, topsoil and vegetative material will be stored within the areas approved for extraction and clearing. Following excavation, the overburden will be returned and contoured, the topsoil returned and ripped, and the stockpiled vegetative material will be placed back in situ. It is expected that all but the recalcitrant species will regenerate from the seed (and other propagules) stored in the topsoil and on the vegetative material and this will accelerate rehabilitation.

The rehabilitation is to be incremental and is proposed to occur following excavation disturbance, having regard for storage timeframes mentioned above. The overburden, topsoil and plant material is to be returned to the excavated area as soon as possible to avoid erosion and wind drift. Rehabilitation and subsequent species regeneration will be monitored at increments, refer to Table 4. If the rehabilitation is evaluated as not providing a functional level of plant coverage and species diversity, the contingency plan will be enacted and implemented, see section 3.5. The two tables in the contingency plan lists species occurring in the areas to be rehabilitated, and the quantity of seed required for Site Two. Seed could be collected from the surrounding remnant vegetation, by an experienced and licenced seed collector, and or purchased from a seed supplier such as Nindethana. Seed is to be treated and broadcast during the first autumn rains (usually after three continuous rain days is recommended).

3.2. Aim of Rehabilitation

The aim of rehabilitation is to stabilise the sites and replace with similar species.

The aim of this plan is to:

- Reduce further accretion of sand and expansion of the blowout as much as is reasonably practicable;
- Minimise the area of exposed surfaces;
- Reinststate the biodiversity of the area by rehabilitation of excavated areas with local endemic species; and
- To re-establish a functional sustainable landscape and thereby reduce the need for future weed management under the BAM Act.

3.3. Methodology

The rehabilitation success will be determined by the clearing and stockpiling methods utilised. Where feasible; topsoil and vegetation should be separated as this is known to increase the success of the rehabilitation.

The topsoil and vegetation will be stockpiled in piles no greater than 3 metres, for a maximum of three years within the areas demarcated as approved for clearing, under the development application. No additional areas are to be disturbed without approval, and no plant or material can be laid down in unapproved areas. The sites are to be progressively rehabilitated and the topsoil and plant material are to be returned to the excavated areas as soon as possible to avoid erosion and wind drift.

Completed sections of rehabilitation are to be incrementally monitored, recorded and assessed as per Table 4. However, if the sites are not stabilised, or approaching a functional landscape in due course, the contingency plan will be required to be enacted, refer to section 3.5.

3.4. Pre- Treatment – Access Route to Site One

It is recommended that a weed treatment program be implemented, specifically on the access road on route to Site One, and that agricultural weeds be treated with herbicide prior to further excavation. This is to ensure that weeds are not further dispersed by the machinery and activity on site. Avoid herbicide drift or overspray as this will impact the health, vigour and fecundity of the native vegetation and potentially impact the rehabilitation success.

3.5. Site One

The following methodologies will be implemented in Site One; overburden will be reinstated to the excavated area and contoured, the topsoil that contains seed from the geo-sporous (soil dispersing seed) species will be ripped, and the vegetation will be used to cover the topsoil, providing potential plant niches at Site one.

This site is constrained by a mobile sand dune, and therefore sand is likely to cover any seedlings or vegetation succession. Some of the cleared vegetation could be piled on the southwest side of the area designated for rehabilitation to act as a wind buffer/break, having regard to the strong south-westerlies that can be experienced in summer, to mitigate further accretion of sand onto the areas to be rehabilitated protect seeds as they germinate and successive plant growth.

3.6 Site Two

The following methodologies will be implemented in Site two; the overburden will be reinstated to the excavated area and contoured; the topsoil will be returned where feasible, noting, there is minimal topsoil present at Site Two given the limestone rock is close to the surface. The stockpiled vegetation will be returned to the area.

The species at Site Two are predominately serotinous (hold seeds in their persistent woody fruits), therefore, the vegetation will be a source of seed for this site. It is likely the process of excavation of the vegetation will abrade and scarify some of the seed and therefore act as a treatment (allow water to imbibe the seed coat). It is anticipated that sufficient seed will be retained to facilitate rehabilitation.

3.6. Contingency Plan / Broadcast Seeding

The contingency plan will only be enacted if the stabilisation of the area cannot be achieved within 12 months after re-placing the overburden, topsoil and vegetative material.

Seed for Site One and Site Two are listed in table one and two respectively, and may be suitably collected from the species within the local area in December to March and or be purchased through Nindethana.

Collected and or purchased seeds will require some pre-treatment prior to broad cast seeding. Generally, a smoke treatment will be required to increase germination rates of the *Banksia* sp., *Calothamnus* sp., *Consostylis* sp., and *Melaleuca* species (Ralph, 2003). Some species require scarification (nicking the seed coat), and or heat treatment (placing seed in hot water) to increase the germination, such as *Acacia* sp., *Jacksonia* sp., and *Templetonia* species (Ralph, 2003). The Western Australian, Botanic Gardens and Parks Authority website has some additional information of seed treatment or alternatively ask the supplier.

Table 2: Species for Site One

Genus species	Common name	Species Identified on site
<i>Acacia cyclops</i>	red eyed wattle	*
<i>Acacia rostellifera</i>	summer- scented wattle	*
<i>Acacia saligna</i>	golden wreath wattle	*
<i>Melaleuca teretifolia</i>	bankar	*

The number of species occurring in the Site One area is limited. The species in the above table were identified on site (marked with an asterisk*) and are typical of forests / thicket species known to grow in Quindalup soils. Seed may be collected from the *Acacia* species within the vicinity in December to March or be purchased.

Table 3: Species for Site Two

Genus species	Common Name	Seed quantity in grams for seedbank establishment	Species Identified on site
<i>Acacia lasiocarpa</i>	dune moses	116	
<i>Banksia sessilis</i>	parrot bush	366	*
<i>Banksia nivea</i>	couch honeypot	214	*
<i>Conostylis cardigans</i>	grey cottonhead	78	*
<i>Jacksonia furcellata</i>	grey sinkwood	250	*
<i>Templetonia retusa</i>	cookies' tongues	610	*
<i>Calothamnus quadrifolius</i>	one sided bottlebrush	21	*
<i>Thomasia triphylla</i>	coastal thomasia	793	*
<i>Melaleuca systema</i>	coastal honeymyrtle	6	*
<i>Melaleuca cardiophylla</i>	tangling melaleuca	55	*

The species in the above table were identified on Site Two (marked with an asterisk*) and/or are typical of Quindalup soils. The seed quantities were estimated using viability per gram and estimated to average for seed per square metre in seed banks sand rehabilitation (Bellairs, 1993).

4. Weed and Rehabilitation Monitoring and Recording Schedule

The following table depicts a monitoring schedule whereby the success of the herbicide treatment and rehabilitation progress can be incrementally assessed and recorded. Records, such as a diary note and photo can be used depict the progress of the rehabilitation and to ascertain if intervention is required. These records will help measure weeds, vegetation cover and vegetation diversity, and establish if the contingency plan will need to be enacted.

Table 4: Implementation and Monitoring Schedule

Monitoring Schedule	Weed Treatment	Rehabilitation	Recording/ Reporting
6 months	√	√	√
12 months	√	√	√
18 months	√	√	√

Appendix E. Sources of information

E.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)

- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

E.2. References

Bio Diverse Solutions (2020) *Application form and supporting documents CPS 9140/1*, received 08 December 2020 (DWER Ref: DWERDT 388338).

Bio Diverse Solutions (2021a) *Reconnaissance Floristic report, Supporting information for clearing permit application CPS 9140/1*, received 16 March 2021 (DWER Ref: DWERDT 428553).

Bio Diverse Solutions (2021b) *Dust management Plan, Supporting information for clearing permit application CPS 9140/1*, received 16 March 2021 (DWER Ref: DWERDT 428553).

Bio Diverse Solutions (2021c) *Rehabilitation Plan, Supporting information for clearing permit application CPS 9140/1*, received 16 March 2021 (DWER Ref: DWERDT 428553).

Department of Water and Environmental Regulation (DWER) (Regulatory Services – Water) (2021) *Rights in Water and Irrigation Act 1914 advice for clearing permit application CPS 9041/x1* received 10 March 2021 (DWER Ref: A2018790).

Government of Western Australia (2019) *South West Vegetation Complex Statistics. Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth, <https://catalogue.data.wa.gov.au/dataset/dbca>

Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Shire of Gingin (2020) *Comments for clearing permit application CPS 9041/1*, received 04 February 2021 (DWER Ref: DWERDT409550).