# Clearing assessment report, extension of the Leeuwin Trail, Dead Finish to Cape Leeuwin Lighthouse

**File Reference:** ENV/93

**THE PROPOSAL**
It is proposed to construct the final 3.713 km section of the multi-use (walk/cycle) Leeuwin Trail, from Dead Finish Road to the Cape Leeuwin Lighthouse, which will result in the clearing of up to 0.62 ha of native vegetation.

**BACKGROUND**
The Shire of Augusta Margaret River has been progressively investigating and constructing a multi-use (walk/cycle) trail from Flinders Bay in Augusta to the Cape Leeuwin lighthouse since at least 2011. In 2015-2016 a concrete shared path was constructed between Flinders Bay and the Augusta boat harbour. A clearing permit was obtained in 2018 (CPS 8214-1) for the 800m section between the boat harbour and Dead Finish Road, and a compacted granite path of 2.5m width was constructed in 2019-2020.

At present, the trail finishes at Dead Finish Road, and pedestrians and cyclists wanting to continue travelling to the lighthouse are required to travel 2.7km along Leeuwin Road, which is a busy road with a 70 km/h speed limit and narrow shoulders carrying cars, four-wheel drives and caravans. This poses a significant safety risk for pedestrians and cyclists due to its reduced width and visibility. In addition, walkers finishing the Cape to Cape Track at Cape Leeuwin are not able to continue walking safely to the Augusta townsite to access accommodation or transport.

Construction of the remaining section of the Leeuwin Trail will provide a safe means of walking or cycling between Dead Finish and the Cape Leeuwin Lighthouse. It also allows for walkers finishing the Cape to Cape Track at Cape Leeuwin to continue walking safely to the Augusta townsite to access accommodation or transport.

The trail will be constructed to the same specifications as the completed section between Augusta boat harbor and Dead Finish, which is to a width of 2.5 metres, with a trail surface of compacted crushed granite.

This project is externally funded via a grant from Department of Transport, and is time dependent, with completion required by 30 June 2025. It has a significant amount of support from the local community, including the Augusta Interpretation Plan and Trails Community Reference Group.

This final section has significant environmental and Aboriginal Cultural Heritage values that have been considered in developing the preferred trail alignment. Flora and Fauna surveys were undertaken in 2019 by Litoria Ecoservices over the local area between Dead Finish Road and Cape Leeuwin, which identified a number of biodiversity values in the survey area, including significant ecological communities, Priority flora, and habitat for threatened fauna. A follow-up targeted survey and updated flora and fauna assessment was subsequently undertaken in Spring 2023 by Ecosystem Solutions.

The Shire commissioned the development of *The Taalinup Boya Healthy Country Plan*, by

Wadandi Traditional Custodians in 2022, which documents the heritage and cultural values of the area between Dead Finish and Cape Leeuwin, identifies threats and management recommendations, and recommends three alternative trail alignments to avoid impacts on culturally sensitive areas.

Based the above environmental and cultural investigations, trail designer and builder Common Ground Trails was engaged to evaluate trail alignment options and recommend a preferred alignment. Eight alignment options were identified and assessed, including the three identified in the Healthy Country Plan.

This clearing permit application is based on the Leeuwin Trail Detailed Design developed by trail designer and builder Common Ground Trails (2024), which is informed by the detailed environmental and Aboriginal Cultural Heritage investigations that have been undertaken over recent years. The alignment has been chosen to minimize clearing of native vegetation and avoid significant biodiversity and cultural values.

**SITE DESCRIPTION AND REGIONAL CONTEXT**

The trail alignment is located predominantly on Shire Reserve R25141 ('Recreation'), with small sections traversing R29219 ('Public Recreation and Landing Place'), Unnamed Road Reserves (Pin 11622190 & Pin 11622189), and a small portion of the Leeuwin Road Reserve (Pin 11607702). All of these land parcels are under the jurisdiction of the Shire of Augusta Margaret River, and are undeveloped, other than the formation of a number of informal pedestrian and vehicle beach tracks, lookouts and parking areas.

The project area comprises coastal vegetation communities intermixed with exposed coastal granites. Vegetation within the site ranges from primary sand dune communities through to dense heathland, open granite areas and low, closed peppermint forest. It is undulating, with predominantly south facing slope, with some steeper hillsides and vertical rock faces through the eastern portion of the site (Litoria, 2019b).

The project area is bound by Leeuwin Road to the north, and the coastline to the south, with Cape Leeuwin Lighthouse located at its western extent, and the existing walk/cycle trail at Dead Finish at its eastern extent. Leeuwin Naturaliste National Park is located adjacent to the project area on the north side of Leeuwin Road, which represents the largest and most continuous expanse of intact native vegetation in the Capes Region, covering approximately 21,000 ha.

**DESCRIPTION OF BIODIVERSITY VALUES**

**Flora and Vegetation**

A local-scale flora and vegetation survey was undertaken in the project area in Spring 2019 by Litoria (2019b). This survey described the flora and vegetation communities at the local scale within the Shire reserves between Cape Leeuwin lighthouse and the existing trail at Dead Finish.

A subsequent targeted survey and updated flora and fauna assessment was undertaken in Spring 2023 by Ecosystem Solutions (January 2024). This survey specifically covered a 10 metre wide corridor along the recommended trail alignment, with the aim of assessing and targeting the presence and distribution of threatened and priority flora, fauna and ecological communities within this corridor.

Since the 2023 survey, some minor design changes have been made to the alignment. It is considered however that the combination of the 2019 local-scale survey and the 2023 targeted survey provides adequate data to assess the impacts of the proposed clearing.

Broadscale vegetation complex mapping (Government of Western Australia, 2019. *2018 South West Vegetation Complex Statistics*. Current as of March 2019) identifies that vegetation within the clearing area is within three vegetation complexes:

- Wilyabrup (WE) – Mosaic of coastal heath and low woodland to woodland of *Corymbia calophylla, Eucalyptus marginata* subsp. *marginata-Banksia* spp. on westward slope in hyperhumid to humid zones. **84.01% pre-European extent remaining**.
- Wilyabrup (Wr) - Woodland of *Corymbia calophylla-Eucalyptus marginata* subsp. *marginata* with closed heath of Myrtaceae-Proteaceae-*Papilionaceae* spp. on steep rocky slopes in the hyperhumid zone. **70.04% pre-European extent remaining.**
- Gracetown (GE) - Closed heath of *Olearia axillaris-Rhagodia baccata-Agonis flexuosa* on seaward slopes in hyperhumid to humid zones. **94.61% pre-European extent remaining**.

Six vegetation communities were identified within the survey areas by Litoria (2019b) and Ecosystem Solutions (2024). They include the following:

| Vegetation Unit | Description | Total area (ha) mapped in local area by Litoria (2019b) | Approx area (ha) in clearing corridor (based on Litoria, 2019b mapping) * |
|---|---|---|---|
| 1 Low Closed Forest | *Agonis flexuosa* over open grassland/ sedgeland/herbland of *Lepidosperma gladiatum*, *Rhagodia baccata*, *Dichondra repens*, *Microlaena stipoides*, *Pteridium esculentum*, *Muehlenbeckia adpressa* and *Acanthocarpus preissii*. | 9.21 ha | 0.24ha |
| 2 Dense (Closed) Heath | *Spyridium globulosum, Olearia axillaris, Scaevola crassifolia, Agonis flexuosa* and *Leucopogon parviflorus* over a predominantly sedgeland/herbland of *Lepidosperma gladiatum, Rhagodia baccata, Muehlenbeckia adpressa, Acanthocarpus preissii, Senecio elegans, Phyllanthus calycinus, Ficinia nodosa, Lagurus ovatus* and *Carpobrotus viresecens.* | 7.56 ha | 0.27 ha |
| 3 (Tall) Closed Scrub | *Spyridium globulosum, Olearia axillaris,* and *Leucopogon parviflorus, Corymbia callophylla, Banksia sessilis var. cordata* with scattered *Agonis flexuosa,* over an open grassland/ sedgeland of *Lepidosperma gladiatum, Hibbertia grossularifolia, Dichondra repens, Clematis pubescen, Dianella revoluta* and *Hardenbergia comptoniana* | 4.69 ha | 0.05 ha |
| 4 Low Closed Heath/Granite | *Eutaxia myrtifolia, Pimelea ferrugineae, Agonis flexuosa, Acacia saligna, Dodonaea ceratophylla, Xanthorrea preissi, Hakea oliefolia, Acacia pulchella, Spyridium globulosum* and *Leucopogon parviflorus* over a sedgeland/grassland/herbland of *Lepidosperma gladiatum, Lepidosperma squamatum,* introduced annual grasses and *Carpobrotus virescens* interspersed with patches of exposed granite. | 3.12 ha | 0.05 ha |
| 5 Low Shrubland | *Dodonaea ceratophylla, Eutaxia myrtifolia, Pimelea ferrugineae* and *Agonis flexuosa,* over a grassland of introduced annual and perennial grasses. interspersed with patches of exposed granite. | 0.19 ha | 0 ha |
| 6 *Melaleuca lanceolata* | Low closed forest of *Melaleuca lanceolata* over sparse *Rhagodia baccata, Lepidosperma gladiatum, Spyridium globulosum.* | 0.46 ha | 0 ha |

The vegetation in the corridor surveyed in both 2019 and 2023 was found to be predominately in Very Good to Excellent condition. Some sections of trail alignment are in Completely Degraded Condition, which accounts for cleared vehicle tracks and parking areas. Much of this area is not included in the clearing application as the trail follows cleared areas that do not

contain native vegetation.

The 2023 survey identified 15 introduced flora species that were opportunistically observed within the site, which included two declared pests – Arum Lily and Bridal Creeper. Weeds have predominantly established along the edges of tracks and disturbed areas.

**Threatened and Priority Flora and Vegetation**

There are no threatened flora species recorded in the project area, however there is one Priority species, and a number of Threatened or Priority Ecological Communities that occur in the vicinity of the clearing area. Some of these potentially occur within the clearing area, and others occur nearby, but outside the clearing area. Details of these are included below.

- *Significant flora species and ecological communities within the clearing area.*

*Banksia sessilis* var. *cordata* P4
One Priority 4 species, *Banksia sessilis* var. *cordata* occurs in vegetation community 3 Closed Shrub, which is near the pull-over bay for the Matthew Flinders Lookout. The vegetation in this section is in Very Good to Excellent condition. Approximately 0.01 ha of this population occurs within the clearing area (Litoria, 2019b).

Coastal granitic shrublands and herblands PEC
The recently listed Priority 2 PEC 'Coastal granitic shrublands and herblands of the exposed western and southern sides of the Leeuwin Block major landform' occurs within the project area at both the western and eastern extents. This vegetation community grows on open granite outcrops and is highly vulnerable to disturbance. Approximately 0.12 ha of clearing area occurs within this PEC.

- *Significant flora species and ecological communities nearby, but outside the clearing area.*

Sedgelands of the Cape Leeuwin Spring PEC
DBCA's mapped buffer zone of the Priority 1 PEC 'Tall closed sedgeland on shallow soils derived from granite gneiss on the Leeuwin Naturaliste Ridge' 'covers part of the project area. The actual mapped occurrence of this community occurs on the north side of Leeuwin Road within Leeuwin Naturaliste National Park and will not be impacted by the proposal.

Augusta microbialites TEC
The mapped buffer zone of the Endangered TEC 'Rimstone Pools and Cave Structures formed by Microbial Activity on Marine Shorelines (Augusta microbialites)' also covers part of the project area. This TEC comprises microbialistes, which are structures produced through the growth and metabolic activity of a diverse variety of benthic microbial communities. The tufa structures that comprise the community are precipitated from freshwater springs and seeps, and form chemical sedimentary rock composed of calcium carbonate (DBCA, 2023).

There are mapped occurrences of this TEC on the north side of Leeuwin Road within the national park at Quarry Bay. These occurrences will not be impacted by the proposal.

Two new occurrences of the Augusta microbialites TEC were confirmed at a site visit with DBCA at the time of the 2019 survey by Litoria (2019b). These occurrences are within the open granites to the south of the trail alignment near Ringbolt Bay and represent previously unmapped occurrences not currently on DBCA's database. They have been detailed and informally mapped in the Litoria (2019b) report (Figure 2), and the *Taalinup Boya Healthy Country Plan* (2022).

*Melaleuca lanceolata*
*Melaleuca lanceolata* is a significant flora species that forms part of the PEC '*Melaleuca lanceolata* forests, Leeuwin Naturaliste Ridge'. It is not currently mapped as a PEC but is likely

to represent this community. This species was recorded at the most western portion of the project area in a population near the Cape Leeuwin Lighthouse. The clearing area is adjacent to this population but avoids direct disturbance.

**Fauna**

As with flora and vegetation, a local-scale fauna and habitat reconnaissance survey was undertaken in Spring 2019 by Litoria (2019a), which covered the Shire Reserves between Dead Finish Road and the Leeuwin lighthouse, bounded by Leeuwin Road and the coastline, which varies in width between 40m and 300m. A subsequent targeted survey and updated flora and fauna assessment was undertaken in Spring 2023 by Ecosystem Solutions (2024) within a 10 metre wide corridor along the trail alignment.

The following significant species were found in the above fauna assessments to have habitat that occurs in the vicinity of the proposed clearing area. Some of these species have habitat that could be potentially impacted by the clearing, and others have habitat nearby, but outside the clearing area.

- *Fauna species with habitat potentially within the clearing area.*

Western Ringtail Possum – Critically Endangered (WA)
The Augusta area is outside the Swan Coastal Plan management zone identified in Western Ringtail Possum (*Pseudocheirus ocidentalis*) Recovery Plan (2017). However, it is recognized in the recovery plan that there are occurrences of WRP around Augusta. Numerous records of WRP in DBCA's threatened fauna database are nearby in the Leeuwin Naturaliste National Park to the north, and one occurrence is close to the eastern extent of the trail alignment on Leeuwin Road.

Observations of WRP scats, dreys and individuals (including juveniles) were made by Litoria (2019a) in vegetation mapped as Low Closed Forest and Tall Closed Scrub. The Low Closed Forest of *Agonis flexuosa* is considered as having significant potential as WRP habitat, and the Dense Heath and *Melaleuca lanceolata* also has potential as habitat for WRP.

The survey by Ecosystem Solutions (2024) observed one drey outside of the survey area, adjacent to Leeuwin Road within the Dense Heath vegetation. It was noted in the report that most of the vegetation within the site represents potentially suitable foraging habitat for WRP, due to the presence of *Agonis flexuosa*.

Carnaby's Cockatoo – Endangered, Baudin's Cockatoo – Endangered, Forest Red-tailed Black Cockatoo - Vulnerable
DBCA's threatened fauna database have 165 observations of the three black cockatoo species within 15 km of the project area. Most of the observations are north of the site, however there are two records less than 100 metres from the site at Dead Finish (Ecosystem Solutions 2019a).

During the Litoria (2019a) survey, one Baudin's Black Cockatoo was observed in the survey area. The Ecosystems Solutions (2024) survey did not observe any direct or secondary signs of black cockatoos within the site.

The presence of species like *Banksia sessilis* var. *cordata* and *Hakea oleifolia* suggests that the site could support foraging habitat for black cockatoo species. The project area is absent of trees like marri, which is the primary food source for black cockatoos. There are no trees with a DBH over 30cm at the site, which indicates that it is unlikely to be a breeding site.

Both fauna reports recognize that the site does not contain habitat suitable for roosting or nesting by black cockatoos, and that the foraging habitat that is present for black cockatoo species is unlikely to represent a significant feeding source.

Quenda – Priority 4

Quenda is known to use habitat near the project area, with two records on the DBCA threatened fauna database located within 1km of the project area.

Evidence of quenda diggings were observed by Litoria (2019a) in all vegetation units of the site, except for the granite communities. The dense understorey of most vegetation units, especially areas of dense *Lepidosperma gladiatum* is considered very good habitat for this species. The survey by Ecosystem Solutions (2024) found two locations of quenda diggings along the proposed alignment within the Low Closed Forest vegetation community.

- *Fauna species with habitat nearby, but outside the clearing area.*

Leeuwin Freshwater Snail - Vulnerable
The Leeuwin Freshwater Snail (*Austroassiminea letha*) is a short-range endemic, listed as Vulnerable under the WA *Biodiversity Conservation Act 2016*. Its distribution is restricted to seven (known) isolated populations from Cape Naturaliste to Cape Leeuwin. All known occurrences are associated with freshwater seeps and springs draining from limestone formations near the coast.

One of the closest locations of *A. letha* includes the wetland on the north side of Leeuwin Road near the Skippy Rock Road intersection. The Shire commissioned a targeted survey for the species in 2020 when planning reconstruction of a section of Leeuwin Road (CPS 9210-1 and IBSA-2021-0040), which confirmed the presence of dead shells of *A. letha* in this wetland system north of the road (noting that there had recently been a fire that impacted the area). This wetland habitat, which comprises the Sedgelands of the Cape Leeuwin Spring PEC, was not impacted by the Leeuwin Road reconstruction.

It is noted in Litoria (2019a) that a new population of *A. letha* was discovered just east of Ringbolt Bay within a small area of dampland coastal vegetation, adjacent to one of the occurrences of the Augusta microbialites TEC. This population has since been confirmed by a WA museum identification and is now included in DBCA's threatened fauna database. This occurrence is located approximately 48 metres to the south of the proposed clearing area for the trail.

Hooded Plover - Vulnerable
The Hooded Plover is listed as Priority 4 under the WA *Biodiversity Conservation Act 2016*. It is regularly sighted on the beaches to the south of the trail alignment, from Dead Finish at the eastern extent, through to the western extent of Sarge Bay near Cape Leeuwin Lighthouse. Hooded Plovers are beach-nesting birds, that inhabit broad, flat, open sandy beaches and also may migrate to inland salt lakes. They feed on invertebrates near the water's edge and lay their eggs in shallow scrapes in the sand.

Anecdotally, the western extent of Sarge Bay has been observed by locals as being an important feeding habitat for Hooded Plovers, which could be attributed to the rich ilmenite sands found at this site (Jenny Kikeros, pers comms 2024).

## ASSESSMENT OF POTENTIAL IMPACTS

### Overall impacts to vegetation

The clearing of up to 0.62 ha of native vegetation to complete the construction of the final section of the Leeuwin walk/cycle trail will have some impacts to flora and vegetation values at the local scale. These impacts are how they will be managed are discussed below in relation to the EPA's mitigation hierarch of 1) Avoid, 2) Minimise, 3) Rehabilitate, and 4) Offset. Overall impacts to vegetation are discussed first, followed by specific biodiversity values identified within the project area that are of conservation significance.

A table summarizing all proposed avoidance, mitigation and offset measures is included in Appendix 1.

Two vegetation complexes, based on broadscale mapping, occur in the project area, with two of these being impacted by the proposal, as shown in the table below.

| Vegetation Complex | % pre-European extent remaining (SW / Shire) | % remaining within conservation reserves | Area (ha) within the clearing area |
|---|---|---|---|
| Wilyabrup (WE) | 84.01% / 82.16% | 61.31% | 0.24 ha |
| Wilyarbrup (Wr) | 70.04% / 67.65% | 8.96% | 0.01 ha |
| Gracetown (GE) | 94.61% / 94.78% | 82.49% | 0.38 ha |

All three vegetation complexes are well represented, both across the south-west and in the Shire, with over 70% of the pre-European extents remaining. The very small areas of clearing proposed will not have an impact on their regional percentages remaining.

The loss of 0.62 ha of native vegetation will directly impact four vegetation units mapped at the local scale by Litoria (2019b):

| Vegetation Unit | Approx area (ha) to be cleared (Litoria, 2019b)* | % of area to be cleared within Litoria (2019b) survey area* |
|---|---|---|
| 1. Low Closed Forest | 0.24 ha | 2.56% |
| 2. Dense (Closed) Heath | 0.27 ha | 3.64% |
| 3. (Tall) Closed Scrub | 0.05 ha | 1.08% |
| 4. Low Closed Heath/Granite | 0.05 ha | 1.69% |

* Note that slight discrepancies exist in the area and percentage calculations above, which is attributed to minor design changes in in the trail alignment and clearing corridor following the surveys (Litoria, 2019b and Ecosystem Solutions, 2024)

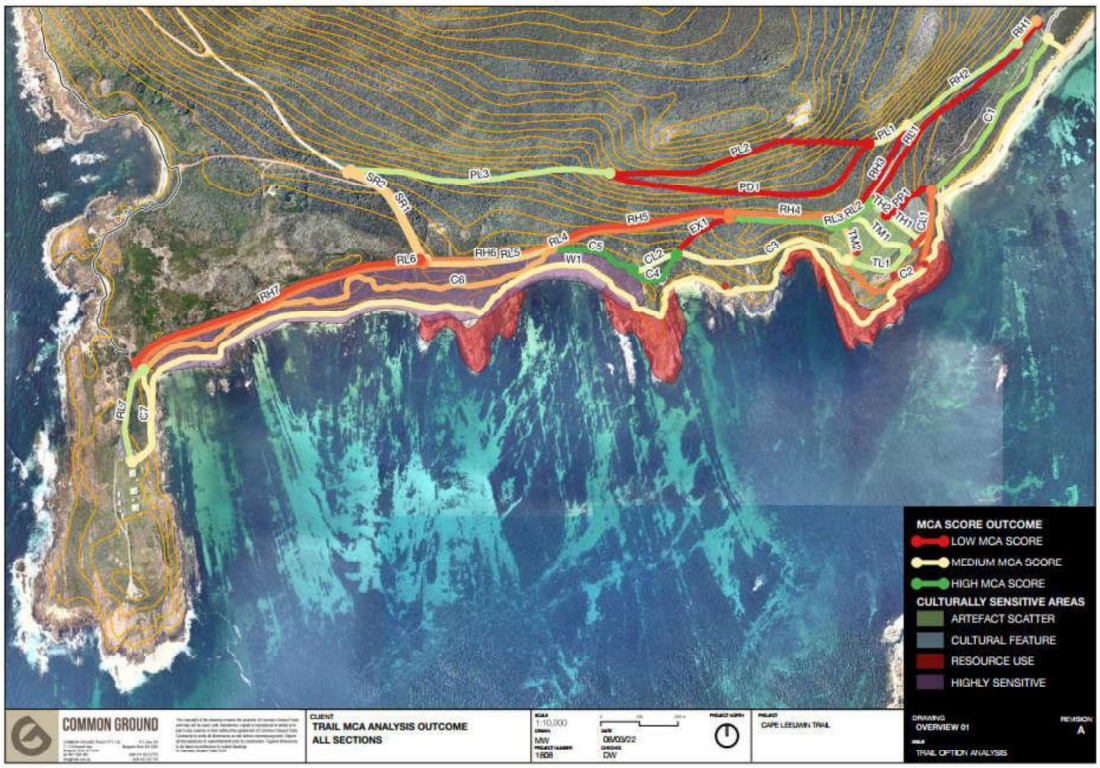
The remaining two vegetation units mapped in the local area – 5. Low Shrubland, and 6. Low Closed Forest of *Melaleuca lanceolata* – have been avoided from clearing and will not be directly impacted by the proposal.

Indirect impacts to vegetation include fragmentation of vegetation types due to construction of the linear trail corridor. The impacts of fragmentation are difficult to quantify, but it has the potential to increase the risk of threats to vegetation such as weed invasion, soil pathogens, changes in drainage, erosion, and public access into undisturbed areas. These threats will be addressed through the avoidance, minimization and mitigation/rehabilitation measures detailed below.

Avoidance

The basis of the trails options analysis undertaken by Common Ground was to ensure that an alignment was identified that best protects both environmental and cultural values by avoiding significant impacts. This involved a complex process of assessing each discrete section of each option against evaluation criteria, which included flora and fauna values, cultural features, vegetation clearing, hygiene, land tenure, cut/fill requirements, gradient, user experience, user risk, and constructability. Data collected in the flora and fauna surveys and the Healthy Country Plan were used to inform the analysis.

The outcome of the options assessment is shown in the image below. The higher rated sections are shown in shades of green, moderately ranked sections in beige, and the lowest rated sections in orange/red.




As it was not possible to select a continuous route from Dead Finish to Cape Leeuwin that is comprised entirely of sections that are high rated and completely avoid impacts on areas of high cultural and/or environmental value, further field analysis and consultation was undertaken, including a site visit with Traditional Custodians and other stakeholders. A preferred alignment was identified through this process, which is demonstrated by the final alignment for this project. Some minor alignment variations have been made since Common Ground's initial Concept Plan (2023) to ensure better outcomes for trail integrity and biodiversity protection.

Wherever possible, the alignment utilizes existing informal vehicle/walk tracks or degraded/disturbed areas. Approximately 1.2km of the 3.7km trail (nearly one-third of the total alignment) will follow existing tracks or disturbed areas and will not require clearing of native vegetation.

The original trail proposal involved removing an additional 0.11 ha of vegetation at the eastern extent, which impacted more of the Wilyabrup (Wr) vegetation complex that has 70% of its pre-European extent remaining, but only 8.96% protected in conservation reserves. The reason for clearing in this area was originally to construct the trail in parallel to the existing Dead Finish informal road to separate walkers/cyclists from vehicular traffic. To minimise the clearing footprint and avoid unnecessary impacts to this vegetation, it was later determined that the preferred outcome is to utilize the pre-existing cleared area by aligning the trail along the existing informal road and managing the public safety risk. This reduced the clearing footprint from 0.77ha to 0.62 ha and avoided a much higher loss of vegetation from the Wilyabrup (Wr) complex.

The proposed alignment has been part of detailed community consultation, and is supported by Undalup Association's Wadandi Cultural Custodians, and the Augusta Interpretation Plan and Trails Community Reference Group.

<u>Minimisation</u>

Measures have been taken during the design phase that will minimize clearing and fragmentation of vegetation. The utilization of existing informal trails and cleared areas for nearly one-third of the total distance has reduced the clearing area considerably. The width of most of the clearing corridor has also been minimized to 2.5 metres, which is the minimum width

required to undertake the work. Post-construction, the canopy cover of the surrounding vegetation will be allowed to grow over (to the extent of not impacting public safety) to maintain habitat connectivity.

The alignment and profiling of the trail has been designed to minimize the overall clearing footprint. For example, the western portion of the preferred trail alignment from Skippy Rock Road to Cape Leeuwin passes through coastal dunes that are identified in the Healthy Country Plan as “highly sensitive”. The proposed alignment minimizes the amount of vegetation clearing required, visual impact, and construction footprint compared to constructing the trail along the verge of nearby Leeuwin Road, where there are steep sand dunes and a large batter or extensive retailing wall would be required

Trail profiling has also been specifically designed to work in with the natural landforms and minimize cut and fill requirements. The design incorporates natural drainage patterns and allows for natural cross slope drainage, which will help to maintain surface water flows and prevent erosion. Trail profiling features have been identified for each segment of the trail according to the terrain, and include partial benches, lifts, a boardwalk, rock retaining, and upgraded tracks. Erosion and drainage features will be installed within the clearing boundary to avoid soil degradation and water channeling down trail. Trail profiling is identified in the Leeuwin Trail Detailed Design Plan (Common Ground, 2024).

There is requirement for a switchback on the eastern approach to Ringbolt Bay due to steep gradients, which will require clearing up to 7.5 metres wide in two locations to allow adequate space for trail profiling and drainage works. However, for the most part, the clearing corridor will be 2.5m wide, and in some locations, it may be minimized to 2 metres due to the terrain or to avoid environmentally and culturally sensitive areas.

A boardwalk will be constructed in one 10 metre section on the coastal granite community, which is for the purpose of preserving hydrological flows supporting significant habitats, while also restricting trail user movement to protect this fragile area.

Mitigation and Rehabilitation

A Construction Environmental Management Plan (CEMP) will be developed prior to trail construction works (including clearing), which will identify environmental risks during trail construction, and document the control measures that will be implemented to manage these risks in order to ensure the environment is protected. A site visit is planned with local DBCA staff to discuss some of the mitigation strategies for inclusion in the CEMP, which is likely to include (but not be limited to) the following:

- Site demarcation and access – temporary onground demarcation with flagging/bunting of the approved clearing area and work areas, including the trail footprint and approved parking and laydown areas.
- Weed hygiene and management – all machines, vehicles, personnel are to be free of soil and weed material prior to entering the site.
- Dieback management – all imported materials are to be derived from crushed granite that is low risk for harbouring *Phytophthora* dieback.
- Topsoil and vegetation management – to either be collected and used for direct on-site rehabilitation where possible (if weed-free) or otherwise removed from the site.
- Fauna management – a fauna specialist will be present to inspect the site prior to and during clearing to minimise risks to fauna.
- Surface water management – there will be no modifications or impediments to natural surface water flows during or after construction.
- Dust emissions – dust generated during construction will be managed so that there are no impacts to surrounding vegetation, communities or fauna habitats.
- Noise and vibration – construction works are temporary and will be undertaken during daylight hours only.

- Environmental and cultural inductions for construction personnel.

Additional complementary works will be undertaken during and post construction to mitigate the environmental impacts of the clearing, which include the following:

- *Closure of informal pedestrian and vehicle tracks*
  Existing informal vehicle and pedestrian tracks in the project area will be closed and rehabilitated, with the aim of rationalizing access and reducing the ongoing risk posed by vehicle access to sensitive environments – including the coastal granites and sandy beaches. This will have significantly improved outcomes for the long-term protection of the fragile environments that are currently at risk from uncontrolled vehicle access.

  The works will include closing the vehicle track from Matthew Flinders lookout on Leeuwin Rd and converting this to a narrow timber staircase, as well as other nearby vehicle tracks at this location. The existing vehicle track to Ringbolt Bay will be formalized and a turnaround provided, with large granite rocks used to block off-road access. An adjoining area used as an informal coastal lookout will also be rehabilitated. Where the trail passes close to Leeuwin Road and there are informal verge parking areas, these will be separated from the trail with large rocks.

- *Rehabilitation*
  A total of 0.23 ha of informal tracks and disturbed areas within the project area will be rehabilitated using locally collected seed for either direct seeding, or propagation and infill planting, which aims to enhance and improve the condition of native vegetation.

- *Erosion restoration*
  Erosion restoration works will be undertaken, including conversion of the existing informal and very degraded track from the Matthew Flinders lookout, to a timber staircase to provide a formal link from the Leeuwin Road car park to the trail. These works will formalize pedestrian access down the slope, while slowing down soil and water movement in this section of vegetation that is highly susceptible to erosion. Revegetation will be undertaken along the length of the staircase to help restore and remediate areas previously impacted by erosion.

- *Signage*
  Directional signage will be installed along the trail to identify formal beach access locations in order to prevent any off-trail access in the project area. Interpretive signage will also be investigated for strategic locations to educate trail users about significant biodiversity values and how they are being protected, including keeping on the trail.

- *Ongoing monitoring and environmental management*
  Ongoing visual monitoring of biodiversity significant areas (e.g. Tufa formations, *B. sessilis* var*. cordata* population, M*. lanceolata* population, coastal granite PEC) will be undertaken by AMR Shire during and post-construction of the trail. Where required, measures will be undertaken to mitigate any impacts, including ongoing weed control along the trail, erosion control, access management, and community education (via signage, media releases etc). The Shire will continue working with its Friends of Reserve volunteers based in Augusta to undertake ongoing monitoring, mitigation and rehabilitation works.

<u>Offset</u>
To help counterbalance the overall impacts of the proposed clearing of 0.62ha within the project area, the Shire will liaise with DPLH to convert the purpose of the Shire Reserve that is traversed by the trail (R25141) from 'Recreation' to 'Conservation and Recreation' in order to reflect how the future management of the reserve and ensure ongoing protection of vegetation and habitats.

***Banksia sessilis* var*. cordata* P4**
A small area of 0.01 ha of the Priority 4 *Banksia sessilis* var*. cordata* population occurs within the clearing area (based on mapping by Litoria, 2019b), which comprises approximately 0.54% of the population mapped by Litoria (2019b). This is in the eastern extent of the clearing area

adjacent to the Matthew Flinders lookout.

Most of the trail that traverses through the population manages to avoid disturbance by utilizing existing trails and cleared areas, however there is a section of about 75m where avoidance is not possible. To minimize impacts, the clearing envelope in this community will be temporarily marked in the field with flagging tape or bunting for the duration of clearing and construction works to ensure that there is no inadvertent disturbance to this PEC outside the approved clearing area.

To help mitigate and offset the impact of clearing 0.01 ha of the *B. sessilis* var. *cordata* population, rehabilitation works will be undertaken in approximately 0.13 ha of informal tracks and disturbed areas within the mapped population, with the aim of enhancing the size, condition and resilience of this Priority 4 population. The rehabilitation works will involve collection and propagation of *B. sessilis* var. *cordata* seed sourced from this site, for direct planting in disturbed areas, along with other species representative of the Closed Scrub vegetation unit. These works will be included in a Revegetation Plan for the site, in accordance with DWER's 'A guide to Preparing Revegetation Plans for Clearing Permits', and submitted to DWER for approval.

Complementary work will also be undertaken to improve access management and reduce erosion in the *B. sessilis* var. *cordata* population. Existing vehicle tracks will be closed, and an existing degraded track from the Matthew Flinders lookout will be converted to a timber staircase to provide a link to walk from the carpark to the trail. This will have the additional benefit of slowing down and distributing water flows and minimizing erosion and loss of soil, allowing for rehabilitation of surrounding areas.

The condition of the *B. sessilis* var. *cordata* vegetation will be monitored by the Shire post-construction, and threat abatement work such as weed or erosion control will be undertaken where required.

Offset

DWER's offset metric was used to determine whether there are offsets required to counterbalance the impact of clearing of 0.01 ha of the *B. sessilis* var. *cordata* population. It was found that the proposed closure and revegetation of 0.13 ha of informal tracks within the mapped population, and subsequent change in purpose of Reserve No. 25141 to 'Conservation and Recreation' will adequately counterbalance the impact.

**Coastal granitic shrublands and herblands PEC**

The recently listed Priority 2 PEC 'Coastal granitic shrublands and herblands of the exposed western and southern sides of the Leeuwin Block major landform' grows on open granite outcrops and is highly vulnerable to disturbance. Approximately 0.12 ha of clearing area occurs within this PEC at both the western and eastern extents, which comprises approximately 0.46% of the total mapped area of this PEC.

Impacts to the granite community will be minimized where possible, with a 10 metre boardwalk constructed in one location to avoid disturbance to granite outcrops and preserve hydrological flows, with particular attention to protecting the eastern occurrence of the Augusta microbialites TEC, near Dead Finish.

The boardwalk will be 2.5 metres wide, with concrete footings installed every 1.8 metres, as per the specifications in the Leeuwin Trail Detailed Design (Common Ground Trails, 2024). A handrail will be installed at the height of one metre, which will help to restrict trail user movement in this fragile area and protect the granite ecosystem.

Other sections of trail have been designed to avoid direct impacts to the granite communities by staying low in the soil profile to avoid granite outcrops, or by raising and retaining the trail to limit incursion onto granite rocks and to allow rehabilitation.

For the duration of the construction phase, the trail alignment and clearing corridor will be marked temporarily in the field to ensure there is no inadvertent disturbance to the PEC outside

of the clearing area.

Closure and rehabilitation of informal tracks and disturbed areas will be undertaken as part of the project, which will cover 0.18 ha within the mapped coastal granite PEC area. Seed will be collected locally from this PEC occurrence, and either propagated for planting, or used for direct seeding in disturbed areas. Rehabilitation works will have the added benefit of protecting the coastal granites by reducing informal access on the granites by both people and vehicles.

As the granites are also highly significant from a cultural perspective, the Shire will further consult with Traditional Custodians about how work will be undertaken in these areas to minimize impacts. Preparation of an Aboriginal Heritage Management Plan is likely to be required, as well as having Aboriginal Monitors on site during construction.

Offset

To offset the residual impacts of clearing 0.12 ha of this PEC, the Shire will undertake rehabilitation works of a minimum of 0.36 ha of granite vegetation community of corresponding conservation significance, in a Shire reserve that is currently under threat, as agreed to by DBCA.

Rehabilitation works will be detailed in a Revegetation Plan for the site, in accordance with DWER's 'A guide to Preparing Revegetation Plans for Clearing Permits', and will include:

- Access management
- Weed control
- Local seed collection
- Revegetation by direct seeding and/or infill planting
- Rabbit control
- Ongoing monitoring and mitigation works.

Potential Shire Reserves with known communities include:

- Wadandi Trail Reserve immediately south of Margaret River townsite (R39689).
- 'Parklands and Recreation' Reserve on Albany Tce in Augusta (R11533).

The Shire will investigate the above reserves and will provide advice to DWER during the assessment of the clearing application to confirm the details of the preferred offset site.

The Shire will engage with DPLH to change the corresponding reserve purpose to include 'Conservation', to reflect the ongoing management of the site and ensure ongoing vegetation protection.

**Sedgelands of the Cape Leeuwin Spring PEC**

While the mapped buffer zone of the Priority 1 PEC 'Tall closed sedgeland on shallow soils derived from granite gneiss on the Leeuwin Naturaliste Ridge' covers part of the project area, the boundaries of the PEC itself occurs on the north side of Leeuwin Road within Leeuwin Naturaliste National Park. There will be no direct impacts to this community from trail construction, and unlikely to be any indirect impacts due to its distance from the project area (minimum 34 metres) and separation by Leeuwin Road. As the trail is located down slope from this PEC, there will be no indirect impacts to surface or groundwater flows that the PEC is dependent on.

A Construction EMP will be prepared to ensure that potential environmental risks to biodiversity values are appropriately managed during construction. This will include restricting work areas (such as parking and laydown areas) to approved sites on already disturbed land, and not within or adjacent to the National Park where this PEC is located.

**Augusta microbialites TEC**

The two mapped Augusta microbialites TEC occurrences are on the north side of Leeuwin Road at Quarry Bay within the National Park. These occurrences are not in the vicinity of the project area (approximately 400m and 600m away respectively) and will not be impacted by the

proposal.

Two new occurrences of the Augusta microbialites TEC were confirmed by DBCA at the time of the 2019 survey by Litoria (2019b). These occurrences are located on the open coastal granite, approximately 57m and 75m south of the trail alignment respectively and will not be directly impacted by construction of the trail. However, as they are located downslope of the trail, the potential for indirect impacts needs to be considered and mitigated.

DBCA's fact sheet on the Augusta microbialites advises that the growth of this TEC is dependent upon a supply of freshwater from springs and seeps, and that the major threats are declining water quality and groundwater discharge, and physical disturbances resulting in the crushing of rimstone pools and tufa formations.

The 10 metre boardwalk proposed near Dead Finish will raise the trail above ground in order to protect the hydrological flows that the more eastern occurrence of the TEC is dependent on.

The trail alignment does not encounter any obvious seepages, streams or springs in the vicinity of the more western occurrence of the TEC, and therefore it is not expected to have any indirect impacts on its hydrology. An additional boardwalk has therefore not been designed for this section.

To protect the two TEC occurrences from direct impacts and physical disturbance, a minimum buffer zone of 25 metres will be marked temporarily in the field around the sites, and all access restricted.

Dust suppression measures will be in place during construction, with particular care taken on the coastal granites in the vicinity of the tufa communities, to ensure that there is no risk of dust emissions impacting the growth and condition of the tufa formations.

While the Augusta microbialite TEC is not known to be surface water dependent, the design of the trail has taken into account the two nearby occurrences and put measures in place to ensure existing surface water flows are maintained. Boardwalks will be constructed at two locations on the coastal granites in order to preserve the long-term hydrological flow regime, and therefore protect the tufa communities, and population of *A. letha*.

The closure and rehabilitation of informal tracks in the coastal granites is a key mitigation strategy that will be implemented by the Shire to help protect the Tufa TEC. At present, vehicles are able to access the granites and beach areas via informal tracks around Ringbolt Bay and Sarge Bay. This poses an ongoing threat to the fragile Tufa formations and the surrounding coastal granites. Closure of the tracks will prevent future vehicle and informal public access to these areas, and improves the protection of this TEC.

In order to help mitigate the residual risks to the two occurrences of the Augusta Microbial TEC in the project area, in consultation with DBCA, the Shire will commission surveys to formally map the two TEC occurrences, with the aim of preparation a submission to Species and Communities Unit for inclusion on the State TEC list.

***Melaleuca lanceolata* forests PEC**

The *Melaleuca lanceolata* population at the western extent of the alignment potentially part of the PEC '*Melaleuca lanceolata* forests, Leeuwin Naturaliste Ridge'. The trail has been specifically designed in this section to avoid disturbance to this population, by running the alignment outside its eastern extent. The *M. lanceolata* trees in this location are large, old individuals, and there will be not removal of any plants and potentially minor pruning of branches where necessary.

For the duration of the construction phase, the outer extent of the *M. lanceolata* population will be temporarily marked in the field with flagging tape or bunting. This will restrict any access within the PEC, and avoid any inadvertent disturbance caused by construction activities. There will be no parking or laydown areas located adjacent to the *M. lanceolata* population.

The project will involve improving the informal and degraded verge parking area adjacent to the *M. lanceolata* population by reducing its size and placing large rocks to reduce the edge effects of vehicles parking up into the vegetation. Rehabilitation will be undertaken in degraded areas within and adjacent to the M. lanceolata population, using seed collected from the site and propagated for infill planting.

The condition of the *M. lanceolata* vegetation will be monitored by the Shire post-construction, and threat abatement work, such as weed or erosion control, will be undertaken where required.

Part of the project will involve development and installation of interpretive signage along the alignment to educate trail users about the environmental and cultural values of the area. This may include interpretive signage at this location about protecting *M. lanceolata* population.

**Western Ringtail Possum (WRP)**
Both fauna survey reports observed evidence of WRP in the local area, including scats, dreys and individuals. The targeted survey by Ecosystem Solutions (2024) did not report any evidence of WRP along the trail alignment itself, but it did note the presence of a drey outside of the survey area adjacent to Leeuwin Road within the Dense Heath vegetation.

Most of the vegetation within the site represents potentially suitable foraging habitat for WRP, due to the large areas of wind pruned *Agonis flexuosa*.

Impacts to WRP habitat have been minimized through the trail design process, with the trail following existing informal tracks and disturbed areas where possible.

In order to mitigate direct impacts to WRP during trail construction, the Shire will engage a fauna specialist to inspect the clearing area prior to and during clearing. Any WRP encountered will be appropriately handled and relocated in local area by the fauna specialist, and reported on where necessary, as per DBCA requirements.

Additional mitigation of impacts to WRP will include rehabilitation of approximately 0.23 ha of informal tracks and disturbed areas within the project area, with the aim of enhancing the size, condition and resilience of the vegetation and fauna habitat. The rehabilitation works will involve collection and propagation of local seed sourced from the site, including *Agonis flexuosa*, for direct planting in disturbed areas, along with other species representative of the corresponding vegetation units.

**Black cockatoo species**
Ecosystem Solutions (2024) mapped the approximate black cockatoo foraging habitat in the project area. Based on this mapping, the proposed clearing area for the trail will directly impact 0.09 ha of potential foraging habitat. When compared to the vegetation mapping of the local area by Litoria (2019b), black cockatoo habitat corresponds closely to the Tall Closed Scrub and Granite vegetation communities. The proposed loss foraging habitat represents approximately 1.08% of the corresponding vegetation units in the immediate area mapped by Litoria (2019b).

Both fauna reports recognize that the site does not contain habitat suitable for roosting or nesting by black cockatoos, and that the foraging habitat that is present for black cockatoo species is unlikely to represent a significant feeding source. It is recognized that the large, continuous extent of intact native vegetation in the National Park immediately north of the project area would likely contain large, representative areas of black cockatoo habitat,

Impacts to black cockatoo foraging habitat have been minimized through the trail design process, with the trail following existing informal tracks and disturbed areas where possible.

It is unlikely that black cockatoos will be encountered or directly impacted during clearing or trail construction. The vegetation in the project area represents foraging habitat, but not breeding or roosting habitat. Any feeding birds are likely to move away themselves from construction noise

and activity. The Shire will, however, engage a fauna specialist to be on site to inspect the alignment prior to and during trail construction in order to appropriately manage any native fauna encounters, as per DBCA requirements.

To help mitigate the impact of clearing 0.09 ha of black cockatoo foraging habitat, rehabilitation works will be undertaken in approximately 0.13 ha of informal tracks and disturbed areas within the mapped population of the Priority 4 species *B. sessilis* var. *cordata*, which is also representative of the foraging habitat for 3 black cockatoo species at the site. Rehabilitation will have the aim of enhancing the size, condition and resilience of foraging habitat. The rehabilitation works will include collection and propagation of *B. sessilis* var. *cordata* and *Hakea oleifolia* seed sourced from the site, for direct planting in disturbed areas.

Offset

To offset the residual impacts of clearing 0.09 ha of foraging habitat for black cockatoo species, the Shire will undertake rehabilitation works of a minimum of 0.3 ha of a degraded section of the Wadandi Trail Reserve (R47049) south of Witchcliffe that is known to provide foraging, roosting and potentially nesting habitat for black cockatoo species.

Rehabilitation strategies will be included in a Revegetation Plan, in accordance with DWER's 'A guide to Preparing Revegetation Plans for Clearing Permits', and will include:

- Access management
- Weed control
- Local seed collection
- Revegetation by direct seeding and/or infill planting
- Rabbit control
- Ongoing monitoring and mitigation works.

The Shire will engage with DPLH to change the corresponding reserve purpose to include 'Conservation', in order to reflect the ongoing management of the site and ensure ongoing protection of habitat values.

**Quenda**

Both fauna surveys reported evidence of quenda diggings in dense understorey vegetation. The areas of dense *Lepidosperma gladiatum,* in particular, are considered very good habitat for the species.

Impacts to quenda habitat have been minimized through the trail design process, with the trail following existing informal tracks and disturbed areas where possible. Revegetation of informal tracks will assist in protecting and enhancing habitat for this species.

To mitigate direct impacts to quenda during trail construction, the Shire will engage a fauna specialist to inspect the clearing area prior to and during clearing. Any native fauna, including quenda, encountered will be appropriately handled and relocated in local area by the fauna specialist, and reported on where necessary, as per DBCA requirements.

**Leeuwin Freshwater Snail**

Leeuwin Freshwater Snail is known to occur in the wetland on the north side of Leeuwin Road, and in a small area of dampland coastal vegetation near Ringbolt Bay, with dead shells observed in both locations. No alive animals have been recently observed at either site by Otelia Ecology (2021), or in DBCA site inspections (Litoria, 2019a).

There will be no impacts to the population of *A. letha* on the north side of Leeuwin Road. This is due to its distance from the trail alignment, location up-slope from the trail, and separation from the trail by Leeuwin Road.

The more recently discovered population of *A. letha* that occurs near Ringbolt Bay is located approximately 48 metres to the south of the proposed clearing area and will not be directly

impacted during trail construction.

It is noted that this population is located near one of the occurrences of the Augusta microbialites TEC, suggesting that it may be associated with the freshwater seep or spring that is also supplying water to the tufa formations. For this reason, similar minimization and mitigation strategies that will be implemented for the TEC will be adopted for this *A. letha* population, as outlined below.

In order to protect the *A. letha* population from trampling and direct disturbance, a minimum buffer zone of 25 metres will be marked temporarily in the field around the population, and all access restricted.

Construction of the trail will not involve any alterations to groundwater. Water required during trail construction will be sourced off site and stored in a sealed container or tank. There will be no requirements to store chemicals on site.

Dust suppression measures will be in place during construction, with particular care taken on the coastal granites in the vicinity of the *A. letha* and Augusta microbialite occurrences to ensure that there is no risk of dust emissions impacting these significant biodiversity areas.

The design of the trail has taken into account the occurrence of *A. letha* near Ringbolt Bay and put measures in place to ensure existing surface water flows are maintained. Boardwalks will be constructed at one of the locations on the coastal granites to preserve the long-term hydrological flow regime, and therefore protect both the tufa communities, and population of *A. letha*.

**Hooded Plover**

The Hooded Plover is a beach nesting bird, and feeds and nests on open sandy beaches. It is known to feed and nest along the beaches from Dead Finish to the Cape Leeuwin lighthouse. The most western beach in Sarge Bay is known to be particularly important for feeding by Hooded Plovers.

The construction of the Leeuwin Trail will not have any direct impacts to Hooded Plovers or their feeding or nesting habitat, as it has been designed to avoid sandy beach areas. Disturbance to shorebirds like Hooded Plovers have been minimized through the trail design phase by co-locating the trail along the existing vehicle track along the beach at Dead Finish.

There may be some temporary disturbance to shorebirds along the Sarge Bay beaches caused by noise and vibration during construction. The works are temporary and short-lived, and therefore are not expected to have any significant or permanent impacts on Hooded Plovers.

Some sections of the trail occur near sandy beaches where Hooded Plovers have been previously recorded as feeding and/or nesting. Developing a walk/cycle trail could potentially increase disturbance to birds that are feeding and/or nesting on the adjacent Sarge Bay due to passing by pedestrians and cyclists. There is also potential that opening a new trail in this location could increase the risk of informal tracks being formed to access the beach.

To manage these risks, the Shire will install directional signage along the trail advising users on the location of formal beach access points, and that users are to stay on the path at all times. Interpretive signage on Hooded Plovers will be installed at strategic locations along the trail to provide education to users on the Code of Conduct near Hooded Plover habitat, as recommended by BirdLife and DBCA (e.g. dogs on leads, observe from a distance etc).

The Shire will also close and rehabilitate an informal lookout and track to the beach at the eastern extent of Sarge Bay, which will reduce informal access to the beach, including by vehicles which have been known to gain beach access at this location. In addition, improvements will be made to the informal verge parking area on Leeuwin Rd at the western extent of the trail by reducing its size and placing large rocks to contain vehicles to the parking area and restrict beach access. Both actions of preventing vehicle beach access will

significantly reduce risks to Hooded Plover beach nesting activity at Sarge Bay.

The Shire is part of a close partnership project with DBCA and BirdLife Australia to protect Hooded Plovers. Local DBCA volunteers regularly monitor the beaches along Sarge Bay for Hooded Plover activity, and observations are logged on an interactive portal that is visible for all project partners. Any breeding or nesting behaviours are reported, and action is taken to protect nests and chicks with fencing and signage, according to BirdLife and DBCA protocols.

As the Shire is responsible for managing several beaches where Hooded Plovers feed and nest between Gracetown and Augusta, it will remain a key project partner in protecting this species in the long term, and this will continue with a strong emphasis on monitoring the Sarge Bay Beaches adjacent to the Leeuwin Trail.

**References**

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Ecosystem Solutions (2024). *Targeted Survey and updated Flora and Fauna Assessment. Leeuwin Trail, from Dead Finish to the Cape Leeuwin Lighthouse, Augusta.* Unpublished report prepared for the Shire of Augusta Margaret River.

Litoria Ecoservices (2019a). *Fauna and Habitat Assessment. Cape Leeuwin Trail, Dead Finish to Cape Leeuwin*. Unpublished report prepared for the Shire of Augusta Margaret River.

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*Taalinup Boya Healthy Country Plan* (2022). Report prepared by Wadandi Traditional Owners.
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## Appendix 1: Leeuwin Trail Clearing Permit Application – Mitigation Hierarchy Table

| Biodiversity Value | Impact | Avoid | Minimise | Mitigate | Offset |
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| Native vegetation - overall | Clearing of 0.62 ha of native vegetation across 3 vegetation complexes (Wilyabrup WE, Wilyabrub Wr, Gracetown GE), and 4 locally mapped vegetation units. | - Detailed trail alignment options analysis undertaken by Common Ground Trails, which was informed by flora and fauna surveys, and a Healthy Country Plan, with the aim of avoiding impacts to significant environmental and cultural values.<br>- Key biodiversity values that informed the trail options analysis included locations of the Augusta microbial TEC, Leeuwin Freshwater Snail (Vulnerable), *Banksia sessilis* var. *cordata* P4 population, and *Melaleuca lanceolata* population.<br>- Eight potential alignments were identified and investigated, resulting in the proposed trail alignment. | - The trail has been designed to minimise clearing wherever possible, by utilising existing trails and cleared areas, and by aligning around significant features such as dunes and granite outcrops to avoid unnecessary disturbance to habitat.<br>- A 500 m section originally identified for trail construction at the eastern extent was subsequently realigned to the existing vehicle track, resulting in the reduction of 0.11 ha of clearing.<br>- The trail width will be between to 2m to 2.5m in order to minimise impacts to vegetation and habitat.<br>- A boardwalk with handrail will be constructed on one 10m section of trail on the coastal granites to restrict trail user movement in fragile areas, and protect the granite ecosystem in the long term.<br>- Trail design incorporates surface water flows and allows for natural cross slope drainage, which will maintain natural flows and prevent erosion. | - Closure of informal tracks will prevent future vehicle and informal public access to sensitive areas, specifically at Ringbolt Bay and Sarge Bay, which will improve the overall protection of biodiversity in the project area that is currently at risk from uncontrolled vehicle access.<br>- A total of 0.23 ha of informal tracks and disturbed areas within the project area will be rehabilitated using locally collected seed for either direct seeding, or propagation and infill planting.<br>- Erosion restoration works including repair of a steep, degraded track, and stair installation to reduce the continued risk of erosion.<br>- Directional signage will be installed along the trail to identify formal beach access locations and about keeping to the trail, and interpretive signage at strategic locations to educate trail users about significant biodiversity values.<br>- Ongoing visual monitoring of vegetation condition in the project area will be undertaken by AMR Shire, and follow up control measures undertaken where required, with particular focus on controlling weeds.<br>- A Construction EMP will be developed to identify environmental risks and mitigation strategies to be implemented during construction. This includes: | The Shire will include 'Conservation' in the purpose of Shire 'Recreation' Reserve No. 25141 to reflect the future management of the reserve and ensure ongoing protection of vegetation and habitats. The Shire will also engage in discussions with Traditional Wadandi Custodians regarding implementation of recommendations in the Taalinup Boya Healthy Country Plan (2020), including options for joint management. |

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| | | | | • Demarcation with flagging/bunting of the trail footprint and work areas, including approved parking and laydown areas.<br>• Nearby occurrences of significant species and ecological communities will be temporarily demarcated with flagging/bunting or similar to prevent any access during construction, e.g. Augusta microbial TEC, Leeuwin Freshwater Snail, *M. lanceolata* population.<br>• Weed hygiene and management<br>• Dieback management<br>• Topsoil and vegetation management<br>• Fauna management (including presence of Fauna Specialist during clearing)<br>• Surface water management.<br>• Dust suppression.<br>• Noise and vibration.<br>• Access management<br>• Environmental and cultural inductions | |
| *Banksia sessilis* var. *cordata* – Priority 4 | Clearing of 0.01 ha (0.54% of local mapped extent) | Design of trail avoids disturbance in some sections of the *B. sessilis* var. *cordata* population by utilising existing trails and cleared areas. | Clearing is minimised to a 75 metre section of trail where there are no other options to avoid clearing. | - 0.13 ha of informal tracks and disturbed areas within the mapped population will be rehabilitated using locally collected seed.<br>- Erosion restoration works including repair of a steep, degraded track, and stair installation to reduce the continued risk of erosion.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |

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| Coastal granitic shrublands and herblands – PEC P2 | Clearing of 0.12 ha (0.46% of local mapped extent) | Design of trail avoids sensitive components of the coastal granites (significant outcrops, cultural sites, Tufa, *A. letha*). Healthy Country Plan informed trail design to avoid disturbance to Aboriginal Cultural Heritage Sites on granites. | Trail has been designed to minimise clearing in the granite community through construction of a boardwalk section, aligning the trail around significant granite outcrops, and profiling of trail to limit incursion onto granite rocks | - Existing informal vehicle access tracks in this PEC will be closed to restrict future vehicle and informal public access, which will improve the overall protection of this PEC that is currently at risk from uncontrolled vehicle access.<br>- 0.18 ha of informal tracks and disturbed areas within the mapped occurrence of this PEC will be closed rehabilitated using locally collected seed. This will restrict informal access to the coastal granites in the future by both people and vehicles.<br>- Weed control will be undertaken where required.<br>- Boardwalk sections will restrict trail user movement in fragile areas, and protect the granite ecosystem in the long term.<br>- Clearing corridor within granite community will be marked temporarily in the field during construction to avoid indirect disturbance.<br>- Approvals will be sought for works near Aboriginal Cultural Heritage sites, and necessary mitigation strategies implemented (e.g. Aboriginal Heritage Management Plan, Monitors during construction).<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | - Rehabilitation of a minimum of 0.36 ha of granite vegetation community of corresponding conservation significance, in a Shire reserve that is currently under threat, as agreed to by DBCA.<br>- Rehabilitation works will include:<br>• Access management<br>• Weed control<br>• Local seed collection and revegetation<br>• Ongoing monitoring and mitigation works.<br>- Potential reserves with known communities include:<br>• Wadandi Track Reserve immediately south of Margaret River townsite (R39689).<br>• 'Parklands and Recreation' Reserve on Albany Tce in Augusta (R11533).<br>- Corresponding change to reserve purpose to include 'Conservation' in order to reflect and ensure ongoing vegetation protection. |
| Sedgelands of Cape Leeuwin Spring - PEC P1 | No direct impacts. Potential indirect impacts from nearby trail construction – dust, drainage, weeds, dieback, | The trail does not traverse this PEC, which is located within LNNP to the north, and separated from the trail by Leeuwin Road. As the trail is located down slope from this | | - Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |

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| | access management. | PEC, there will be no impacts to surface or groundwater flows that the PEC is dependent on. | | - There will be no parking or laydown areas located adjacent to the PEC in the National Park. | |
| Augusta microbialites - TEC | No direct impacts. Potential for indirect impacts to two occurrences near Ringbolt Bay from nearby trail construction – dust, drainage, weeds, dieback access management. | The trail has been designed to avoid direct and indirect disturbance to the Tufa formations, and is located >50 m from the closest location. | | - A minimum 25 m buffer zone will be marked around Tufa locations during construction, and all access restricted.<br>- The trail has been designed to protect surface water flows at two locations on the coastal granites, for the purpose of ensuring the long-term protection of the Tufa communities.<br>- Boardwalks will have handrails installed, and signage erected, to restrict movement of users off the trail.<br>- Closure and rehabilitation of informal tracks will prevent future access to the coastal granites and fragile Tufa TEC by both people and vehicles.<br>- There will be no use of or alterations to local groundwater supply during construction.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction.<br>- In consultation with DBCA, the Shire will commission surveys to formally map the two Augusta microbialite TEC occurrences, with the aim of preparing a submission to Species and Communities Unit for inclusion on the State TEC list. | |
| *Melaleuca lanceolata* forests - PEC | No direct impacts. Potential for indirect impacts *to M. lanceolata* population at western extent from | The trail has been designed to avoid any clearing within the *Melaleuca lanceolata* population. | | - The outer extent of the *M. lanceolata* population will be temporarily marked in the field and all access within this area restricted. | |

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| | nearby trail construction – dust, drainage, weeds, dieback, access management. | | | - There will be no parking or laydown areas located adjacent to the population.<br>- The informal and degraded verge parking area adjacent to the *M. lanceolata* population will be improved by reducing its size and placing large rocks to reduce the edge effects of vehicles parking up into the vegetation.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |
| Western Ringtail Possum – Critically Endangered | Clearing of up to 0.62 ha of native vegetation that potentially provides habitat for WRP. | - The trail has been designed to avoid clearing where possible, by utilising existing trails and cleared areas, and by aligning around significant features such as dunes and granite outcrops to avoid unnecessary disturbance to habitat.<br>- The significant expanse of intact and continuous native vegetation in the adjoining National Park, which provides habitat for native fauna including WRP, will not be impacted. | - A 500 m section originally identified for trail construction at the eastern extent was subsequently realigned to the existing vehicle track, resulting in the reduction of 0.11 ha of clearing within potential WRP habitat.<br>- The trail will be reduced in width to 2m to 2.5m to minimise impacts to vegetation and habitat. | - 0.23 ha of informal tracks and disturbed areas within the project area will be rehabilitated using locally collected seed (including *A. flexuosa*, which is a key foraging and nesting species for WRP) for either direct seeding, or propagation and infill planting. This will assist in enhancing habitat for WRP in the project area<br>- A fauna specialist will be engaged to inspect the clearing area prior to and during clearing, and to appropriately handle and relocate any animals in the local area, as per DBCA requirements, including reporting.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |
| 3 x Black Cockatoo species | Clearing of 0.099 ha of potential foraging habitat (approx. 1.08% of mapped local extent south of Leeuwin Rd). | - Design of trail avoids disturbance in some sections representing habitat for black cockatoos (specifically the *B. sessilis* var. *cordata* | - Clearing is minimised to a 75 metre section of trail where there are no other options to avoid clearing.<br>- The trail width will be between to 2m to 2.5m in | - 0.13 ha of informal tracks and disturbed areas within the mapped *B. sessilis* var. *cordata* population will be rehabilitated using locally collected seed that represents foraging habitat, including *B.* | - Revegetation of a minimum of 0.3 ha of a degraded section of the Wadandi Trail Reserve (R47049) south of Witchcliffe that is known to |

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| | | population) by utilising existing trails and cleared areas.<br>- There is no nesting or roosting habitat in the project area that will be impacted.<br>- The significant expanse of intact and continuous native vegetation in the adjoining National Park, which provides habitat for native fauna including Black Cockatoo species, will not be impacted. | order to minimise impacts to vegetation and habitat. | *sessilis* var. *cordata*, and *Hakea oleifolia*.<br>- Repair of a steep, degraded track and stair installation to reduce the continued risk of erosion.<br>- A Fauna Specialist will be engaged to inspect the clearing area prior to and during clearing, to minimise risks to native fauna during clearing, as per DBCA requirements, including reporting.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | provide foraging, roosting and potentially nesting habitat for black cockatoo species.<br>- Rehabilitation strategies will be included in a Revegetation Plan, and will include:<br>• Weed management<br>• Local seed collection<br>• Direct seeding and/or infill planting<br>• Ongoing monitoring and mitigation works.<br>- Corresponding change to reserve purpose to include 'Conservation' to reflect and ensure ongoing vegetation protection. |
| Quenda – Priority 4 | Clearing of 0.62 ha of native vegetation that potentially provides habitat for WRP. | - The trail has been designed to avoid clearing where possible, by utilising existing trails and cleared areas, and by aligning around significant features such as dunes and granite outcrops to avoid unnecessary disturbance to habitat.<br>- The significant expanse of intact and continuous native vegetation in the adjoining National Park, which provides habitat for native fauna including quenda, will not be impacted. | - A 500 m section originally identified for trail construction at the eastern extent was subsequently realigned to the existing vehicle track, resulting in the reduction of 0.11 ha of clearing within potential WRP habitat.<br>- The trail width will be between to 2m to 2.5m in order to minimise impacts to vegetation and habitat. | - 0.23 ha of informal tracks and disturbed areas within potential quenda habitat will be rehabilitated using locally collected seed for either direct seeding, or propagation and infill planting.<br>- A Fauna Specialist will be engaged to inspect the clearing area prior to and during clearing, to minimise risks to native fauna during clearing, as per DBCA requirements, including reporting.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |
| Leeuwin Freshwater Snail – Vulnerable | No direct impacts. Potential for indirect impacts to occurrence near Ringbolt Bay from nearby trail construction – dust, drainage, weeds, | - The trail has been designed to avoid direct and indirect disturbance to the *A. letha* population near Ringbolt Bay, and is located approx. 48m away.<br>- The known population of *A. letha* on the north side of | | - A minimum 25 m buffer zone will be marked around the extent of the *A. letha* population during construction, and all access restricted.<br>- The trail has been designed to protect surface water flows at two locations on the coastal granites, | |

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| | dieback, access management. | Leeuwin Road in the National Park will not be impacted. | | for the purpose of ensuring the long-term protection of both the *A. letha* population, and the Tufa communities.<br>- Closure and rehabilitation of informal tracks will prevent future access to the coastal granites and *A. letha* population at Ringbolt Bay by both people and vehicles. Groundwater will not be impacted, and there will be no use of or alterations to local groundwater supply during construction.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction, and ongoing monitoring of vegetation condition post-trail construction. | |
| Hooded Plover – Vulnerable | No direct impacts. Potential for indirect impacts during construction from noise and vibration. Potential for disturbance to feeding and breeding activity along Sarge Bay due to increased visitation to area by trail users. | The trail has been designed to avoid any direct disturbance to sandy beaches or foredunes, which represent feeding and breeding habitat for Hooded Plover. | | - A Fauna Specialist will be engaged prior to and during clearing, to minimise risks to native fauna during clearing, as per DBCA requirements.<br>- Closure and rehabilitation of informal lookout and track to beach at Sarge Bay, and improvements to verge parking will prevent vehicle access to the beach and reduce ongoing risks to Hooded Plover nesting activity.<br>- Preparation and implementation of a CEMP to manage environmental risks during construction.<br>Installation of directional signage along trail advising users on location of formal beach access points and to “stay on the trail at all times”.<br>- Installation of interpretive signage to educate trail users on code of conduct near Hooded Plover habitat. | |

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| | | | | AMR Shire will continue its partnership with DBCA and BirdLife to protect local population of Hooded Plovers, including ongoing monitoring of beaches, community education, and installation of signage and fencing to protect nests and chicks. | |