

**Alcoa of Australia
Limited**

Appendix 23

**Threatened and Priority
Ecological Communities
Assessment**

**Environmental Review
Document**

Assessment No. 2384 & 2385



06 February 2025

Assessment for Presence of TECs within the Mine DEs

Empodisma peatlands of southwestern Australia (listed as Endangered under the EPBC Act)
(Department of Climate Change, Energy, the Environment and Water, 2023)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
1 Key diagnostic characteristics	<p>The <i>Empodisma</i> peatland of southwestern Australia (<i>Empodisma</i> peatlands) is defined as the assemblage of native species inhabiting a particular area in nature that meet the following four key diagnostic characteristics as listed in the Approved Conservation Advice.:</p> <p>Location Occurs in south-west Australia, mainly within the Warren IBRA bioregion and Southern Jarrah Forest subregion of the Jarrah Forest IBRA bioregion2. Discrete occurrences may also be present in the Perth (SWA02) (Swan Coastal Plain), Northern Jarrah Forest (JAF01) (Jarrah Forest) and Fitzgerald (ESP01) (Esperance) IBRA subregions.</p> <p>AND</p> <p>Soil Occurs on an organosol that is typically saturated for at least a month during the year. Peat layers are typically evident below the vegetation litter layer. The approved conservation advice gives two definitions; <ul style="list-style-type: none"> - Soils that have more than 0.4m of organic materials within the upper 0.8m, with a required thickness either extending down from the surface or taken cumulatively within the upper 0.8m; or - Soils that have organic materials extending from the surface to a minimum depth of 0.1m, which either overlie the unconsolidated material no thicker than the organic materials above, or directly overlie rock or other hard layers. </p> <p>AND</p> <p>Flora Ground layer almost always contains evidence of <i>Empodisma gracillimum</i> unless recently disturbed, for example by fire within 12-24 months. Other sedge species from the families Cyperaceae and Restionaceae also are typically present.</p> <p>AND</p> <p>Other indicator species Include one or more of the following: <i>Acacia hastulata</i>, <i>Callistemon glaucus</i>, <i>Gymnoschoenus aenops</i>, <i>Leptocarpus tenax</i> and <i>Schoenus multiglumis</i>.</p>	<p>Location The Proposal DE is located within the NJF IBRA subregion and discrete occurrences of the TEC are known to occur within this subregion.</p> <p>WLD: known occurrence of <i>Empodisma</i> peatland (2.289 ha)</p> <p>HUN: potential to occur as per approved conservation advice and Mattiske (2024).</p> <p>AND</p> <p>Soil The Proposal DE occurs within two Soil-Landscape systems, which are mapped at a broad scale: <ul style="list-style-type: none"> o Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) o Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland). Whilst these soil types do not describe that of the <i>Empodisma</i> peatland organosol, the <i>Empodisma</i> peatland is restricted to very small areas and soil types are not mapped at this scale.</p> <p>The <i>Empodisma</i> peatland is likely associated with the Swamp vegetation complex and the swamps and broad valleys SVTs (those dominated by A and D, E, J and WA).</p> <p>The occurrence of the <i>Empodisma</i> peatlands at Willowdale, confirmed organosol with more than 0.4m of organic matter and being saturated for at least one month during the year.</p> <p>AND</p> <p>Flora There are no database records of <i>Empodisma gracillimum</i> within the Proposal DE (Department of Biodiversity, Conservation and Attractions, 1998-); however, the Conservation Advice (DBCA, 2023) notes that use of location records for <i>E. gracillimum</i> is “a useful dataset [for finding occurrences of the ecological community] but requires on-ground verification in most instances.”</p> <p>Based on field collections from Willowdale, <i>Empodisma gracillimum</i> is present.</p> <p>Huntly potential likelihood requires further on-ground assessments to denote <i>Empodisma gracillimum</i> presence (Mattiske Consulting</p>	<p>Willowdale: Known to occur</p> <p>Hunty: Potential to occur</p>

		<p>Pty Ltd, 2024). Matiske (2024) noted that <i>E. gracillimum</i> “has been recorded in a swamp” in the Myara-O’Neil portion of the Huntly Mine DE.</p> <p>AND</p> <p>Other indicator species Based on field collections from Willowdale selected Jarrah Forest indicator species were recorded, these being: <i>Homalospermum firmum</i> shrublands/sedgelands and <i>Taxandria linearifolia</i>, <i>Gahnia decomposita</i> shrublands. Other sedge species from the families Cyperaceae and Restionaceae were also dominant in the vegetation complex.</p> <p>Huntly potential likelihood requires further on-ground assessments to denote presence of other indicator species</p>	
2 Condition Thresholds	<ul style="list-style-type: none"> • Pristine to Excellent Condition; a patch of any size • Very Good Condition: a patch of any size • Good condition: a patch of any size • Degraded to Completely Degraded Condition: not part of the TEC 	<p>Based on condition class rating from the approved conservation advice, the Willowdale, <i>Empodisma</i> peatland is in Very Good Condition.</p> <p>Huntly potential likelihood requires further on-ground assessments.</p>	

Banksia Woodlands of the Swan Coastal Plain ecological community (listed as Endangered under the EPBC Act and P3 under the BC Act)
(Department of the Environment and Energy, 2016)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
<p>1 Key diagnostic characteristics</p>	<p>Location and Physical Environment</p> <ul style="list-style-type: none"> The Banksia Woodlands ecological community primarily occurs in the Swan Coastal Plain IBRA bioregion. <ul style="list-style-type: none"> This covers the coastal plain from around Jurien Bay south, through Perth, to around Dunsborough. It also includes the Dandaragan Plateau. Pockets of the Banksia Woodlands ecological community also extend into the adjacent lower parts of the Darling and Whicher escarpments that lie within the Jarrah Forest IBRA bioregion to the immediate east and south of the Swan Coastal Plain. <p>AND</p> <p>Soils and Landform</p> <ul style="list-style-type: none"> The Banksia Woodlands ecological community: <ul style="list-style-type: none"> typically occurs on well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean and Spearwood sands and occasionally on Quindalup sands; is also common on sandy colluvium and aeolian sands of the Ridge Hill Shelf, Whicher Scarp and Dandaragan Plateau; and in other less common scenarios (e.g. transitional substrates, sandflats) <p>AND</p> <p>Structure</p> <ul style="list-style-type: none"> The structure of the ecological community is a low woodland to forest (see footnote with these features: <ul style="list-style-type: none"> - A distinctive upper sclerophyllous layer of low trees (occasionally large shrubs more than 2 m tall), typically dominated or codominated by one or more of the Banksia species identified below; AND - Emergent trees of medium or tall (>10 m) height Eucalyptus or Allocasuarina species may sometimes be present above the Banksia canopy; AND - An often highly species-rich understorey that consists of: <ul style="list-style-type: none"> a layer of sclerophyllous shrubs of various heights; and, an herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs, that sometimes includes grasses. The development of a ground layer may vary depending on the density of the shrub layer and disturbance history. <p>AND</p> <p>Composition</p> <ul style="list-style-type: none"> The canopy is most commonly dominated or co-dominated by <i>Banksia attenuata</i> (candlestick banksia, slender banksia) and/or <i>B. menziesii</i> (firewood banksia). Other Banksia species that dominate in some examples of the ecological community are <i>B. prionotes</i> (acorn banksia) or <i>B. ilicifolia</i> (holly-leaved banksia); AND The patch must include at least one of the following diagnostic species: - <i>Banksia attenuata</i> (candlestick banksia) - <i>Banksia menziesii</i> (firewood banksia) - <i>Banksia prionotes</i> (acorn banksia) - <i>Banksia ilicifolia</i> (holly-leaved banksia); AND If present, the emergent tree layer often includes <i>Corymbia calophylla</i> (marri), <i>E. marginata</i> (jarrah), or less commonly <i>Eucalyptus gomphocephala</i> (tuart); AND 	<p>Location and Physical Environment</p> <ul style="list-style-type: none"> The Proposal DE occurs entirely within the Jarrah Forest IBRA bioregion. <ul style="list-style-type: none"> The Conveyor at the western edge of the Del Park-Huntly portion of the Huntly Mine DE extends into the lower part of the Darling escarpment (within 400 m of a mapped occurrence buffer for the TEC). The majority of the Proposal DE is located on top of the scarp, on the Darling Plateau. Whilst most of the Proposal DE does <u>not</u> meet the criteria for Location and Physical Environment, a small portion of the Conveyor at the western edge of the Del Park-Huntly portion of the Huntly Mine DE that extends into the lower part of the Darling escarpment <u>may</u> meet these criteria. <p>Soils and Landform</p> <ul style="list-style-type: none"> The Proposal DE occurs within two Soil-Landscape systems: <ul style="list-style-type: none"> Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland) Outside and west of the DE at the base of the scarp (i.e. at the western end of the Conveyor at the western end of the Del Park-Huntly portion of the Huntly Mine DE) is the Forrestfield system (sandy gravels, pale deep sands and grey deep sandy duplexes supporting woodland of jarrah, marri and wandoo and some bull banksia). The soils and landforms of the Proposal DE do <u>not</u> meet the soils and landform criteria for the TEC. <p>Structure</p> <ul style="list-style-type: none"> Vegetation Complexes within the Proposal DE all comprise open forests. Vegetation Types mapped within the Proposal DE mostly comprise open forests or woodlands. The structure of the vegetation within the Proposal DE may very broadly align with that of the TEC, but whilst the TEC comprises a low woodland to forest, the Proposal DE is mostly medium woodland to forest. <p>Composition</p> <ul style="list-style-type: none"> Vegetation Complexes within the Proposal DE are all dominated by jarrah-marri. 	<p>Does Not occur</p>

	<ul style="list-style-type: none"> • Other trees of a medium height that may be present, and may be codominant with the Banksia species across a patch, include <i>Eucalyptus tottiana</i> (blackbutt, pricklybark), <i>Nuytsia floribunda</i> (Western Australian Christmas tree), <i>Allocasuarina fraseriana</i> (western sheoak), <i>Callitris arenaria</i> (sandplain cypress), <i>Callitris pyramidalis</i> (swamp cypress) and <i>Xylomelum occidentale</i> (woody pear); AND • The understorey typically contains a high to very high diversity of shrub and herb species that often vary from patch to patch. Some of the more widespread and potentially characteristic species present in the ecological community are outlined above in Section 1 – Description, and in descriptions of vegetation types that relate to the Banksia Woodlands (e.g. Gibson et al., 1994). <p>Contra-indicators</p> <ul style="list-style-type: none"> • Patches clearly dominated by <i>Banksia littoralis</i> are not part of the Banksia Woodlands ecological community but indicates a different, dampland community is present. • Patches clearly dominated by <i>Bankia burdettii</i> are not part of the Banksia Woodlands ecological community but indicates a tall shrubland and not the Banksia Woodlands ecological community. • FCT 20c – Eastern shrublands and woodlands, corresponds with a separate EPBC ecological community listing, Shrublands and Woodlands of the eastern Swan Coastal Plain. Occurrences of this FCT should be considered under that separate listing. 	<ul style="list-style-type: none"> • The canopy of the Vegetation Types mapped within the Proposal DE is dominated by <i>Eucalyptus marginata</i> or <i>Corymbia calophylla</i>. Exceptions include forests or woodlands of <i>Allocasuarina huegeliana</i>, <i>E. wandoo</i>, <i>E. megacarpa</i>, <i>E. patens</i> or <i>E. rudis</i>. • The vegetation of the Proposal DE <u>does not</u> meet the criteria for composition. 	
2 Condition Thresholds	To be considered as part of the ecological community for EPBC Act referral, assessment and compliance purposes, a patch should meet at least the Good Condition category (Table 3).	N/A as vegetation within Proposal DE failed Step 1.	
3 Minimum patch size	<p>Minimum patch sizes apply for consideration of a patch as part of the listed ecological community for EPBC Act referral, assessment and compliance purposes.</p> <p>Where patches meet different levels of condition, different minimum patch sizes apply:</p> <ul style="list-style-type: none"> • 'Pristine' – no minimum patch size applies • 'Excellent' – 0.5 ha or 5,000 m² (e.g. 50 m x 100 m) • 'Very Good' – 1 ha or 10,000 m² (e.g. 100 m x 100 m) • 'Good' – 2 ha or 20,000 m² (e.g. 200 m x 100 m) 	N/A as vegetation within Proposal DE failed Step 1.	

Clay Pans of the Swan Coastal Plain (listed as Critically Endangered under the EPBC Act and P1 by DBCA)
(Department of Sustainability, Environment, Water, Population and Communities, 2012)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
1	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • Location is restricted to the Swan Coastal Plain IBRA bioregion, except for six small clay pans in the Jarrah Forest bioregion (location not available) • The clay pans are found on clay substrates that rely solely on rainfall to fill, and then dry to impervious pans in summer. • The ecology of the ecological community is entirely dependent on the hydrological functioning of the clay pan. • Generally occurs as a shrubland (less commonly as a low, open woodland) over a ground layer of geophytes, herbs and sedges which are characteristic of the wetter parts of the sites. • The clay pan flora is both rich and highly variable and appears to have recruited from a widespread cosmopolitan wetland element (e.g. <i>Isoetes</i>, <i>Myriophyllum</i>, <i>Cotula</i>, <i>Eryngium</i>) and a generally southern Australian seasonal wetland element (e.g. <i>Stylidium</i>, <i>Tribonanthes</i>, <i>Drosera</i> and <i>Centrolepis</i>) as well as many typical upland taxa. 	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • The Proposal DE occurs entirely within the Jarrah Forest IBRA bioregion; most occurrences of the TEC are within the Swan Coastal Plain bioregion; however, there are limited known occurrences within the Jarrah Forest bioregion. • At a broad scale (vegetation complexes), vegetation within the Proposal DE comprises jarrah-marri forest; however, the extent of the claypans is very limited (i.e. a much smaller scale than the vegetation complexes) and hence "ground-truthing is required to verify the presence of the ecological community for site-based projects, planning or investment decisions (Department of Sustainability, Environment, Water, Population and Communities, 2012). • Vegetation complexes and SVTs associated with this TEC are not known • The TEC is considered unlikely to occur within the Proposal DE. 	Unlikely to occur
2	<p>Distribution and Habitat</p> <ul style="list-style-type: none"> • The ecological community occurs across the Bassendean dunes, the Pinjarra Plain and the Ridge Hill shelf, predominantly on the Pinjarra Plain. • Critical habitat is the clay substrate and lack of connection to groundwater • To be considered as part of the ecological community a patch should have a functioning hydrologic regime and meet at least the Good Condition category. • Given that the ecological community occurs in very localised locations that can be very small, no minimum patch size is recommended. 	<p>Distribution and Habitat</p> <ul style="list-style-type: none"> • The Proposal DE occurs within two Soil-Landscape systems, which are mapped at a broad scale: <ul style="list-style-type: none"> ○ Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) ○ Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland) • The Proposal DE is not located within the soil types listed for the ecological community; however, the extent of the claypans is very limited (i.e. a much smaller scale than the soil-landscape mapping) and hence "ground-truthing is required to verify the presence of the ecological community for site-based projects, planning or investment decisions (Department of Sustainability, Environment, Water, Population and Communities, 2012) • The TEC is considered unlikely to occur within the Proposal DE. 	

Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain (listed as Endangered under the EPBC Act and Critically Endangered under the BC Act)
(Department of the Environment and Energy, 2017)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
1	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • Located on heavy soils of the eastern side of the Swan Coastal Plain between Ruabon and Guildford • Woodland community dominated by Marri • Typical and common native plant taxa in the community are: <i>Corymbia calophylla</i> (marri); the shrubs <i>Banksia dallanneyi</i>, <i>Philotheca spicata</i>, <i>Kingia australis</i> and <i>Xanthorrhoea preissii</i>; herbs, rushes and sedges, <i>Cyathochaeta avenacea</i>, <i>Dampiera linearis</i>, <i>Haemodorum laxum</i>, <i>Desmocladius fasciculatus</i>, <i>Mesomelaena tetragona</i> and <i>Tetraria octandra</i> (Gibson, Keighery, Keighery, Burbidge, & Lyons, 1994) (English & Blyth, 2000). The introduced grass <i>Briza maxima</i> is also common in the community, although weed cover in most occurrences is currently quite low. A list of taxa that commonly occur in the community is at Appendix 1 of the Western Australia Interim Recovery Plan (English & Blyth, 2000). 	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • The Proposal DE occurs entirely within the Jarrah Forest IBRA bioregion; all known occurrences of the TEC are within the Swan Coastal Plain bioregion. • Vegetation mapped at a broad scale (i.e. vegetation complexes) within the Proposal DE all comprise open forests, which are variously dominated by jarrah or marri. • Vegetation mapped at a local scale (i.e. VTs) within the Proposal DE consist of open forests or woodlands. The canopy of the VTs is dominated by <i>Eucalyptus marginata</i> and/or <i>Corymbia calophylla</i>. Exceptions include forests or woodlands of <i>Allocasuarina huegeliana</i>, <i>E. wandoo</i>, <i>E. megacarpa</i>, <i>E. patens</i> or <i>E. rudis</i>. Plants in lower strata are not listed. • Where VTs are dominated by <i>C. calophylla</i>, it is possible the vegetation of those VTs could align with that of the ecological community. • On the basis of vegetation structure and composition, the TEC cannot be discounted as having Potential to occur within the Proposal DE. 	Does Not occur
2	<p>Distribution and Habitat</p> <p>The critical habitat for the ecological community is the heavy soils on which it occurs, the fresh superficial groundwater, and/or surface water that helps sustain flora species in this wetland community, and the catchment for this groundwater and surface water (English & Blyth, 2000). Because of its very restricted distribution, no condition thresholds have been applied to the nationally-listed ecological community and hence all areas meeting the description of the ecological community are habitat areas critical to its survival.</p>	<p>Distribution and Habitat</p> <ul style="list-style-type: none"> • The Proposal DE occurs within two Soil-Landscape systems, which are mapped at a broad scale: <ul style="list-style-type: none"> ○ Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) ○ Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland) • The Proposal DE is not located within the soil type listed for the ecological community. • The Proposal DE is located outside the very limited, known distribution of the TEC. 	

***Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain (listed as Endangered under both the EPBC Act and the BC Act)**
(Department of the Environment and Energy, 2017)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
1	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • Located on heavy soils of the eastern side of the Swan Coastal Plain between Bullsbrook, and Capel. • Woodland community dominated by Marri • Dominant species in the community are the trees <i>Corymbia calophylla</i> (marri), and occasionally <i>Eucalyptus wandoo</i> (wandoo); the shrubs <i>Xanthorrhoea preissii</i>, <i>Acacia pulchella</i>, <i>Banksia dallanneyi</i>, <i>Gompholobium marginatum</i>, and <i>Hypocalymma angustifolium</i> and the herbs <i>Burchardia congesta</i>, <i>Cyathochaeta avenacea</i> and <i>Neurachne alopecuroidea</i>. The introduced species <i>Briza maxima</i> and <i>Hypochaeris glabra</i> are also common but weed levels in most occurrences are generally quite low (Gibson, Keighery, Keighery, Burbidge, & Lyons, 1994). A full list of taxa that occur in at least 50% of the plots in the community is at Appendix 1. 	<p>Description of the Ecological Community</p> <ul style="list-style-type: none"> • The Proposal DE occurs entirely within the Jarrah Forest IBRA bioregion; all known occurrences of the TEC are within the Swan Coastal Plain bioregion. • Vegetation mapped at a broad scale (i.e. vegetation complexes) within the Proposal DE all comprise open forests of jarrah-marri, which are variously dominated by jarrah or marri. • Vegetation mapped at a local scale (i.e. VTs) within the Proposal DE consist of open forests or woodlands. The canopy of the VTs is dominated by <i>Eucalyptus marginata</i> and/or <i>Corymbia calophylla</i>. Exceptions include forests or woodlands of <i>Allocasuarina huegeliana</i>, <i>E. wandoo</i>, <i>E. megacarpa</i>, <i>E. patens</i> or <i>E. rudis</i>. Plants in lower strata are not listed. • Where VTs are dominated by <i>C. calophylla</i>, it is possible the vegetation of those VTs could align with that of the ecological community. • On the basis of vegetation structure and composition, the TEC cannot be discounted as having Potential to occur within the Proposal DE. 	Does Not occur
2	<p>Distribution and habitat</p> <p>The critical habitat for the ecological community is the heavy soils on which it occurs, the fresh superficial groundwater, and/ or surface water that may help sustain flora species in this community, and the catchment for this groundwater and surface water. Because of its very restricted distribution, no condition thresholds have been applied to the nationally-listed ecological community and hence all areas meeting the description of the ecological community are habitat areas critical to its survival.</p>	<p>Distribution and Habitat</p> <ul style="list-style-type: none"> • The Proposal DE occurs within two Soil-Landscape systems, which are mapped at a broad scale: <ul style="list-style-type: none"> ○ Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) ○ Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland) • The Proposal DE is not located within the soil type listed for the ecological community. • The Proposal DE is located outside the very limited, known distribution of the TEC. 	

Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Ecological Community (listed as Critically Endangered under the EPBC Act and P3 under the BC Act)
(Department of the Environment and Energy, 2019)

Step	Aspect	Assessment of Mine DEs against the criteria	Likelihood of Occurrence within Mine DEs
1 Key diagnostic characteristics	<p>The ecological community is limited to patches of vegetation (with their associated biota) that meet all of the following key diagnostic characteristics:</p> <ul style="list-style-type: none"> Occurs in the Swan Coastal Plain Bioregion, Western Australia Primarily occurs on the Spearwood and Quindalup dune systems, but can also occur on the Bassendean dunes and Pinjarra Plain. It can occur on the banks of rivers and wetlands. The primary defining feature is the presence of at least two living established <i>Eucalyptus gomphocephala</i> (Tuart) trees in the uppermost canopy layer, although they may co-occur with trees of other species. There is a gap of no more than 60 m between the outer edges of the canopies of adjacent Tuart trees (refer to Section 3.2.2, and Figures 3 and 4). These trees may occur either as single stemmed trees or as a mallee growth form. Most often occurs as a woodland but can occur in other structural forms, For example, forest, open forest, woodland, open woodland, and various mallee forms (NVIS Technical Working Group 2017). Other tree species may be present in the canopy or sub-canopy. They commonly include: <i>Agonis flexuosa</i> (Peppermint) and <i>Banksia grandis</i> (Bull Banksia) (both in the southern part of the range), <i>Banksia attenuata</i> (Candlestick Banksia), <i>Eucalyptus marginata</i> (Jarrah); and less commonly, <i>Corymbia calophylla</i> (Marri), <i>Banksia menziesii</i> (Firewood Banksia) and <i>Banksia prionotes</i> (Acorn Banksia). An understorey of native plants is typically present, which may include grasses, herbs and shrubs, although this is often modified by disturbance. Some understorey plant species that are most commonly present are listed in Section 2.3.3. Native fauna species that are most commonly present are noted in Section 2.4. 	<ul style="list-style-type: none"> The Proposal DE occurs entirely within the Jarrah Forest IBRA bioregion; all known occurrences of the TEC are within the Swan Coastal Plain bioregion. The Proposal DE occurs within two Soil-Landscape systems, which are mapped at a broad scale: <ul style="list-style-type: none"> Predominantly Darling Plateau (mostly sandy gravels and deep grey sandy duplex (mostly deep), supporting wandoo-jarrah-marri woodland) Some Murray Valleys in the west (deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and jarrah-marri-wandoo forest and woodland with mixed shrubland) The Proposal DE is not located within the soil type listed for the ecological community. Tuart trees have not been recorded within the Proposal DE. Vegetation mapped at a broad scale (i.e. vegetation complexes) within the Proposal DE all comprise open forests of jarrah-marri. Vegetation mapped at a local scale (i.e. VTs) within the Proposal DE consists of open forests or woodlands. The canopy of the VTs is dominated by <i>Eucalyptus marginata</i> and/or <i>Corymbia calophylla</i>. Exceptions include forests or woodlands of <i>Allocasuarina huegeliana</i>, <i>E. wandoo</i>, <i>E. megacarpa</i>, <i>E. patens</i> or <i>E. rudis</i>. Plants in lower strata are not listed. The vegetation of the Proposal DE <u>does not</u> meet the criteria for composition. 	Does Not occur
2 Condition thresholds and categories	<p>For confirmed patches of the ecological community:</p> <ul style="list-style-type: none"> If the patch is smaller than 0.5 ha it is not part of the nationally protected ecological community. If the patch is at least 0.5 ha and up to 5 ha in size, conduct on ground surveys (see Section 3.4.3) to determine which condition category applies, referring to Section 3.3.1. <p>Patches in this size range are presumed to be part of the nationally protected ecological community unless surveys indicate they do not meet the minimum condition required for national protection. For patches in this size range inclusion in the nationally protected ecological community is determined by surveyed characteristics such as native plant species richness and contribution to cover, habitat values, evidence of regeneration and landscape characteristics.</p> <ul style="list-style-type: none"> All patches of 5 ha or greater that meet the key diagnostic characteristics are part of the nationally protected ecological community. It is not necessary to conduct additional surveys to confirm that they meet biotic condition thresholds (Table 2) and that they are protected. However more detailed survey may assist in environment impact assessment, planning and monitoring management, or in determining relative biodiversity value between and within different large patches (e.g. to be used in prioritising conservation works etc.). Patches of this size that meet the key diagnostic characteristics provide important contributions to local biodiversity, habitat features and contribute to ecological connectivity of the ecological community and other surrounding ecological communities. Larger patches are likely to be more resilient to some kinds of disturbance and native species loss associated with fragmentation. These characteristics are all important for the long term resilience of the ecological community across its range. 	N/A as vegetation within Proposal DE failed Step 1.	Does Not occur

Assessment for Presence of PECs within 10 km of the Proposal DE and Not Restricted to the Swan Coastal Plain

EPBC Act Status	BC Act Status	Ecological Community	Description	Location and Occurrence within the Proposal DE	Likelihood of occurrence within Mine DE	Total Area within total Proposal DE in which PEC may occur (ha)
-	P1	Mount Saddleback heath communities	<p>Mount Saddleback (including Tunnell Road) heath communities are variants of site-vegetation type G (as defined by Havel (1975a) (1975b)) and areas associated with shallow soils and granite outcrops (Mattiske Consulting Pty Ltd 2019 Assessment of Flora and Vegetation within Expansion Survey Areas. Unpublished report prepared for South32 Worsley Alumina, 2018).</p> <p>The heath types include (but are not limited to):</p> <ul style="list-style-type: none"> • "Site-vegetation Type G: Open Heath of <i>Grevillea bipinnatifida</i>, <i>Hakea undulata</i>, <i>Banksia squarrosa</i> subsp. <i>squarrosa</i>, <i>Hakea incrassata</i>, <i>Hakea undulata</i>, and <i>Petrophile serruriae</i> over <i>Borya sphaerocephala</i> on shallow soils and outcrops; • Site-vegetation Type G1: Mosaic of open heath of Proteaceae – Myrtaceae species, with emergent patches of <i>Eucalyptus drummondii</i> on shallow soils on slopes; • Site-vegetation Type G3: Open heath of <i>Banksia squarrosa</i> subsp. <i>squarrosa</i>, <i>Hakea incrassata</i>, <i>Hakea undulata</i>, <i>Petrophile heterophylla</i> and <i>Petrophile serruriae</i> on shallow soils over granite outcrops on slopes with occasional emergent <i>Eucalyptus drummondii</i>. • Site-vegetation Type G4 (not part of this PEC): Open scrub and tall shrubland of <i>Hakea trifurcata</i> and <i>Hakea undulata</i> with admixtures of mallee species including <i>Eucalyptus latens</i> and <i>Eucalyptus aspersa</i> on clay to clay-loam soils over outcrops on slopes" (from Mattiske Consulting Pty Ltd 2019) is a separate conservation significant community and requires consideration of regional distribution and threats. 	Known distribution is restricted to Mt Saddleback, with the nearest mapped occurrence approximately 4 km east of the Huntly Mine DE (Myara-O'Neil portion)	Does Not occur	0
-	P2	Litter Dependent Invertebrate Community of the northern Jarrah Forest	Chandler Block, NJF, insufficient evidence that this is a discrete community type.	<p>DBCA mapped occurrence 10 km north of the Huntly Mine DE (Myara-O'Neil portion).</p> <p>This ecological community is not a botanical community. Refer to Section 6.3.5.3 for an assessment of the PEC.</p>	<p>N/A</p> <p>This community has no further defining characteristics and as such, it is not possible to define potential extent within the Huntly and Willowdale Mine DEs.</p>	N/A
-	P3	Granite communities of the northern Jarrah Forest	Jarrahdale area - Monadnocks, Blue Rock; insufficient information to distinguish discrete community type/s.	<p>There are two DBCA mapped occurrences approximately 7-8 km north of the Huntly Mine DE (Myara-O'Neil portion).</p> <p>Vegetation complexes Cooke (Ce), Darling Scarp (DS2) and Helena 1 (He1) are associated with granite outcrops.</p> <p>SVTs dominated by G and R (i.e. G, G1, R) are likely associated with this PEC (Mattiske 2021a, 2021b).</p>	<p>Potential</p> <p>Whilst there are no mapped occurrences of this PEC within the Proposal DE, the presence of granite-associated vegetation complexes and VTs within the DE indicate that this PEC has Potential to occur.</p>	1,008 (from G- and R-dominated VTs) 2,868 (from vegetation complexes Ce, DS2, He1)