7th December 2016

Updated Report – Version 2
Targeted Threatened Flora Search
Proposed Demonstration Trail Mount Clarence Albany

Dear
On the 26th October 2016 Botanists/Ecologist, (Bio Diverse Solutions) undertook a targeted linear threatened flora search of 840m for a proposed mountain bike alignment at Mount Clarence, City of Albany (refer to Attachment A for the survey area). This survey was required as there was potential for threatened flora to be present within the subject area and there is proposed clearing of native vegetation as part of the proposed bike trail.

The scope of work included:

- Undertake Targeted Flora Survey across subject site through linear sampling (10m buffer) in vegetation types present and mapping of boundaries of vegetation;
- Undertake any identification of any flora species, including herbarium identification if required;
- GPS and map any populations of Threatened Species (if applicable); and
- Prepare brief report on findings as per appropriate government agency legislation and guidelines.

It is noted this survey was undertaken during the spring flowering period.

The threatened flora search of the linear bike trail found that the Mount Clarence reserve is a diverse habitat with four vegetation types mapped, being:

1. Granite outcrop and fringing *Taxandria* shrub land;
2. Tall Gastrolobium shrub land;
3. Open Jarrah/ Marri woodland; and
4. Coastal heath.

In November 2016 an occurrence of *Stylidium falcatum* (P1) was found (5 plants) on laterite soils associated with a cleared alignment for a powerline, on the edge of the jarrah/ marri ecotype. Refer to Figure 3 over the page. Re-survey and mapping of the plants and critical habitat occurred as a result of these findings.

The occupied habitat of the 5 plants of *S.falcatum* consisted of an overstorey of adjoining vegetation dominated by *Eucalyptus marginata* and/ or *Corymbia calophylla* and in some areas the overstorey is very sparse. Common midstorey species include: *Taxandria parviceps, Acacia myrtifolia, Bossiaea linophylla* and *Agonis flexuosa.* The understorey is dominated by *Xanthosia rotundifolia, Dasypogon bromeliifolius, Hibbertia furfuracea, Leucopogon obovatus, Leucopogon verticillatus, Acacia alata, Hovea elliptica, Patersonia sp., Olax phyllanthi, Billardiera fusiformis, Banksia formosa, Hakea amplexicaulis, Hakea*

trifurcata, Hakea varia, Petrophile diversifolia, Synaphea petiolaris and *Leptomeria squarrulosa.* The groundcover is dominated by *Anarthria prolifera, Anarthria scabra, Lepidosperma gracile, Tetraria octandra* and *Desmocladus fasciculatus.*

As an outcome of the re-survey, the proposed trail was realigned to the west and south of Critical (potential) habitat for this species, with a buffer of 5-10m from all individual mapped plants. Consultation occurred with Department of Parks and Wildlife on site to verify the new alignment of the track and buffers to the plants.

A summary of the findings is presented below and detailed survey outcomes, risk assessment and findings presented in Attachment B.

- Targeted surveys were undertaken for 18 species of Declared Rare, 95 Priority listed species (see Table 5), two threatened ecological communities and one priority listed ecological community (see Table 6).
- An occurrence of *Stylidium falcatum* (P1) was found on laterite soils associated with a cleared alignment for a powerline, on the edge of the jarrah/ marri ecotype. No other threatened flora or threatened ecological communities were found within the parameters of this search. See Figure 3 for locational details, and page 21 for a description of critical habitat and protection strategies.
- Two weeds of concern, *Acacia longifolia* and *Pelargonium capitatum* were noted during the survey and care should be taken not to spread these species during trail construction and subsequent use.
- There were also significant populations of *Banksias, Hakeas and Synapheas* in the Jarrah and Granite vegetation communities. These genera are known to have varying levels of susceptibility to dieback *Phytophthora cinnamomi.* While they are not threatened species, care should be taken to prevent disease spread and associated impacts on the biodiversity value and visual amenity of the area.

On the 11th of November 2016 (Bio Diverse Solutions) undertook site survey of the proposed new alignment and the associated 5m buffer, whereby no individual plants of *Stylidium falcatum* or other DRF/Priority flora were found in the realignment and associated buffer area. Please refer to Figure 3 showing the new alignment and buffer survey area.

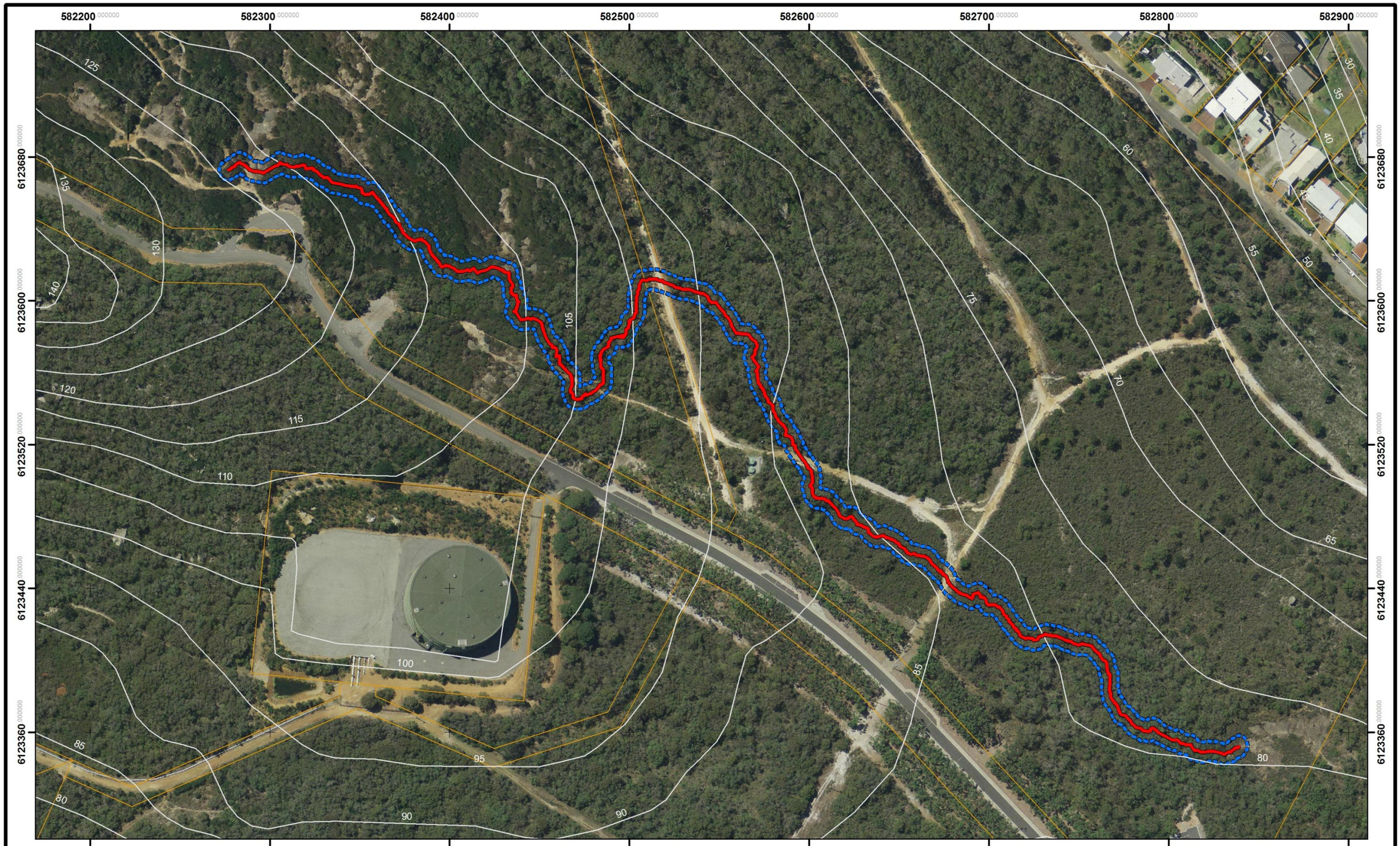
An assessment was undertaken by Bio Diverse Solutions of the Albany Regional Vegetation Survey (ARVS) Vegetation Unit 17 (Ccal/Emar/gran) where the proposed bike trail alignment crosses the vegetation unit and is shown in the Mapping Attachment C. An estimate of the clearing area of Vegetation unit 17 is 0.0042% which is based on 0.0512ha being cleared for the bike trail (in Vegetation unit 17) of the total area of 1,193.64ha of unit 17 (whole of ARVS dataset). This amount is not considered to be significant loss to the critical habitat.

Thank you for the opportunity to undertake this project. If you have any queries regarding this matter please feel free to contact me via email on or phone/fax on .

Kind regards,

Attachment A

Survey Area Mount Clarence



Legend

- Linear survey area
- 10m Buffer
- 5m Contours
- Cadastre

Scale
1:2,000@ A3

0 25 50 75 100 Meters

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Proposed Mountain Bike Trail

STATUS	FILE	DATE
FINAL	COA011	26/10/2016

Attachment B

Targeted Flora Survey

Field report and findings

Job Description: Targeted Threatened Flora and Significant flora/ vegetation survey along proposed mountain bike trail, field demarcated by City of Albany

Date: 27 May 2016, 18 Oct 2016, 11 Nov 2016

Ecologist:

Broad vegetation types within the survey area:

1. Granite outcrop and fringing *Taxandria* shrub land

Borya sphaerocephala is the dominant species on the granite outcrops, occupying shallow pockets of sand on the rock. Species such as *Verticordia plumosa, Andersonia sprengelioides, Pimelea imbricata var imbricata* and *Drosera huegelii* occupy the shallow fringes of the rock in skeletal brown gravely soils, giving way to a dense shrub land dominated by *Taxandria marginata*, *Hakea drupacea* and *Acacia sulcata*, with an understorey of *Lepidosperma squamatum*. See Figure 1 for images of this vegetation type.

Table 1: Flora species list for Granite outcrop and fringing *Taxandria* shrub land

Family	Species	Vernacular	Status
Asparagaceae	*Chamaescilla corymbosa var. corymbosa*	Blue Squill	
Boryaceae	*Borya sphaerocephala*	Pincushions	
Cyperaceae	*Lepidosperma drummondii*		
Cyperaceae	*Lepidosperma gladiatum*	Coast Sword-sedge, Kerbin	
Cyperaceae	*Lepidosperma squamatum*		
Dilleniaceae	*Hibbertia furfuracea*		
Droseraceae	*Drosera erythrorhiza*		
Droseraceae	*Drosera huegelii*	Bold Sundew	
Ericaceae	*Andersonia caerulea*	Foxtails	
Ericaceae	*Andersonia sprengelioides*		
Ericaceae	*Leucopogon pendulus*		
Fabaceae	*Acacia sulcata*		
Fabaceae	*Gastrolobium bilobum*	Heart Leaf Poison	
Hemerocallidaceae	*Agrostocrinum scabrum*	Blue Grass Lily	
Hemerocallidaceae	*Stypandra glauca*	Blind Grass	
Myrtaceae	*Taxandria marginata*		
Myrtaceae	*Verticordia plumosa*		
Poaceae	*Cynodon dactylon*	Couch	Weed
Proteaceae	*Hakea drupacea*		
Stylidiaceae	*Stylidium spathulatum*	Creamy Triggerplant	
Thymelaeaceae	*Pimelea imbricata var imbricata*		

2. Tall *Gastrolobium* shrub land

The tall *Gastrolobium* shrub land occurs upslope from the granite outcrops and is associated with brown sandy loam soils. Occasional granite boulders also occur in the shrub land, creating small open areas. The shrub land is dominated by thickets of *Gastrolobium bilobum.* Sub-dominant species that are also common in this vegetation type include: *Hakea drupacea*, *Hakea varia*, *Hakea trifurcata* and *Taxandria marginata* as well as the occasional occurrence of *Acacia longifolia.* The understorey contains a mix of species, the most dominant of which include*: Acacia myrtifolia, Hovea elliptica, Hibbertia furfuracea, Bossiaea linophylla* and *Spyridium majoranifolium.* Groundcover is dominated by *Lepidosperma squamatum, Lepidosperma gracile, Anarthria prolifera,* and *Desmocladus fasciculatus.*

Table 2: Flora species list for tall *Gastrolobium* shrub land

Family	Species	Vernacular	Status
Anarthriaceae	*Anarthria prolifera*		
Casuarinaceae	*Allocasuarina sp.*		
Cyperaceae	*Lepidosperma gracile*	Slender Sword Sedge	
Cyperaceae	*Lepidosperma squamatum*		
Cyperaceae	*Tetraria octandra*		
Dilleniaceae	*Hibbertia furfuracea*		
Ericaceae	*Leucopogon obovatus*		
Ericaceae	*Leucopogon verticillatus*	Tassel Flower	
Euphorbiaceae	*Ricinocarpos glaucus*		
Fabaceae	*Acacia alata*	Winged Wattle	
Fabaceae	*Acacia longifolia*		Weed
Fabaceae	*Acacia myrtifolia*		
Fabaceae	*Acacia pulchella*	Prickly Moses	
Fabaceae	*Bossiaea linophylla*		
Fabaceae	*Gastrolobium bilobum*	Heart Leaf Poison	
Fabaceae	*Hovea elliptica*	Tree Hovea	
Haemodoraceae	*Conostylis setigera subsp. setigera*		
Iridaceae	*Patersonia sp.*		
Myrtaceae	*Taxandria marginata*		
Pittosporaceae	*Billardiera coriacea*		
Pittosporaceae	*Billardiera fusiformis*	Australian Bluebell	
Poaceae	*Neurachne alopecuroidea*	Foxtail Mulga Grass	
Poaceae	*Tetrarrhena laevis*	Forrest Ricegrass	
Proteaceae	*Banksia armata var armata*	Prickly Dryandra	
Proteaceae	*Hakea drupacea*		
Proteaceae	*Hakea trifurcata*	Two-leaf Hakea	
Proteaceae	*Hakea varia*	Variable-leaved Hakea	
Proteaceae	*Synaphea petiolaris*	Synaphea	
Ranunculaceae	*Clematis pubescens*	Common Clematis	
Restionaceae	*Desmocladus fasciculatus*		
Rhamnaceae	*Spyridium majoranifolium*		
Solanaceae	*Anthocercis viscosa*	Sticky Tailflower	
Xanthorrhoeaceae	*Xanthorrhoea gracilis*	Graceful Grass Tree, Mimidi	

3. Open Jarrah/ Marri woodland

The open *Eucalyptus/ Corymbia* woodland is found on grey sand on the mid slopes. The overstorey is dominated by *Eucalyptus marginata* and/ or *Corymbia calophylla* and in some areas the overstorey is very sparse. Common midstorey species include: *Taxandria parviceps, Acacia myrtifolia, Bossiaea linophylla* and *Agonis flexuosa* with occasional scattered plants of *Acacia longifolia.* The understorey is dominated by *Xanthosia rotundifolia, Dasypogon bromeliifolius, Hibbertia furfuracea, Leucopogon obovatus, Leucopogon verticillatus, Acacia alata, Hovea elliptica, Patersonia sp., Olax phyllanthi, Billardiera fusiformis, Banksia formosa, Hakea amplexicaulis, Hakea trifurcata, Hakea varia, Petrophile diversifolia, Synaphea petiolaris* and *Leptomeria squarrulosa.* The groundcover is dominated by *Anarthria prolifera, Anarthria scabra, Lepidosperma gracile, Tetraria octandra* and *Desmocladus fasciculatus.*

Table 3: Flora species list for the open Jarrah/ Marri woodland

Family	Species	Vernacular	Status
Anarthriaceae	*Anarthria prolifera*		
Anarthriaceae	*Anarthria scabra*		
Apiaceae	*Xanthosia rotundifolia*	Southern Cross	
Cyperaceae	*Lepidosperma gracile*	Slender Sword Sedge	
Cyperaceae	*Mesomelaena tetragona*	Semaphore Sedge	
Cyperaceae	*Tetraria octandra*		
Dasypogonaceae	*Dasypogon bromeliifolius*	Pineapple Bush	
Dilleniaceae	*Hibbertia furfuracea*		
Ericaceae	*Leucopogon obovatus*		
Ericaceae	*Leucopogon verticillatus*	Tassel Flower	
Ericaceae	*Sphenotoma gracilis*	Swamp Paper-heath	
Fabaceae	*Acacia longifolia*		Weed
Fabaceae	*Acacia myrtifolia*		
Fabaceae	*Bossiaea linophylla*		
Fabaceae	*Hovea elliptica*	Tree Hovea	
Goodeniaceae	*Scaevola striata var striata*		
Hemerocallidaceae	*Johnsonia lupulina*	Hooded Lily	
Iridaceae	*Patersonia sp.*		
Lauraceae	*Cassytha sp*		
Myrtaceae	*Agonis flexuosa*	Peppermint, Wonil	
Myrtaceae	*Corymbia calophylla*	Marri	
Myrtaceae	*Eucalyptus marginata*	Jarrah, Djara	
Myrtaceae	*Taxandria parviceps*		
Olacaceae	*Olax phyllanthi*		
Pittosporaceae	*Billardiera fusiformis*	Australian Bluebell	
Proteaceae	*Banksia formosa*		
Proteaceae	*Hakea amplexicaulis*	Prickly Hakea	
Proteaceae	*Hakea trifurcata*	Two-leaf Hakea	
Proteaceae	*Hakea varia*	Variable-leaved Hakea	
Proteaceae	*Petrophile diversifolia*		
Proteaceae	*Synaphea petiolaris*	Synaphea	

Table 3 (continued): Flora species list for the open Jarrah/ Marri woodland

Family	Species	Vernacular	Status
Restionaceae	*Desmocladus fasciculatus*		
Santalaceae	*Leptomeria squarrulosa*		
Rubiaceae	*Opercularia hispidula*	Hispid Stinkweed	
Stylidiaceae	*Stylidium falcatum*	Slender Beaked Triggerplant	P1
Stylidiaceae	*Stylidium schoenoides*	Cow Kicks	
Xanthorrhoeaceae	*Xanthorrhoea preissii*	Grass tree, Palga	

4. Coastal heath

The coastal heath occurs on grey sand in the lower slopes of the proposed trail alignment and includes areas of closed heath where the shrubs are 1-2 m in height as well as open low heath where the shrubs are less than 1 m in height. Taller shrubs include: *Allocasuarina humilis, Jacksonia horrida, Taxandria marginata, Taxandria parviceps, Adenanthos cuneatus, Adenanthos obovatus, Hakea varia* and *Spyridium globulosum.* Smaller species include: *Xanthosia rotundifolia, Dasypogon bromeliifolius, Andersonia caerulea, Leucopogon obovatus, Acacia hastulata* and *Boronia spathulata.* Dominant groundcover species include: *Anarthria prolifera, Anarthria scabra, Lepidosperma gracile, Johnsonia lupulina* and *Hypolaena exsulca.* A single occurrence of *Pelargonium capitatum* also occurs on the existing trail. Care should be taken not to spread this along the new alignment.

Table 4: Flora species list for the health land

Family	Species	Vernacular	Status
Anarthriaceae	*Anarthria prolifera*		
Anarthriaceae	*Anarthria scabra*		
Apiaceae	*Xanthosia rotundifolia*	Southern Cross	
Casuarinaceae	*Allocasuarina humilis*		
Colchicaceae	*Burchardia congesta*	Milkmaids	
Cyperaceae	*Lepidosperma gracile*	Slender Sword Sedge	
Dasypogonaceae	*Dasypogon bromeliifolius*	Pineapple Bush	
Ericaceae	*Andersonia caerulea*	Foxtails	
Ericaceae	*Leucopogon obovatus*		
Fabaceae	*Acacia hastulata*		
Fabaceae	*Jacksonia horrida*		
Geraniaceae	*Pelargonium capitatum*	Rose Pelargonium	Weed
Hemerocallidaceae	*Johnsonia lupulina*	Hooded Lily	
Myrtaceae	*Taxandria marginata*		
Myrtaceae	*Taxandria parviceps*		
Orchidaceae	*Caladenia flava*	Cowslip Orchid	
Pittosporaceae	*Billardiera fusiformis*	Australian Bluebell	
Poaceae	*Neurachne alopecuroidea*	Foxtail Mulga Grass	
Polygalaceae	*Comesperma confertum*		
Proteaceae	*Adenanthos cuneatus*	Coastal Jugflower	
Proteaceae	*Adenanthos obovatus*	Basket Flower	
Proteaceae	*Hakea varia*	Variable-leaved Hakea	
Rhamnaceae	*Spyridium globulosum*	Basket Bush	
Restionaceae	*Hypolaena exsulca*		
Rutaceae	*Boronia spathulata*	Boronia	

1. Granite outcrop and fringing *Taxandria* shrub land

2. Tall *Gastrolobium* shrub land

Figure 1: Broad vegetation types within the survey area (continued over page)


3. Jarrah/ Marri woodland


4. Coastal Heath

Figure 1 (continued): Broad vegetation types within the survey area

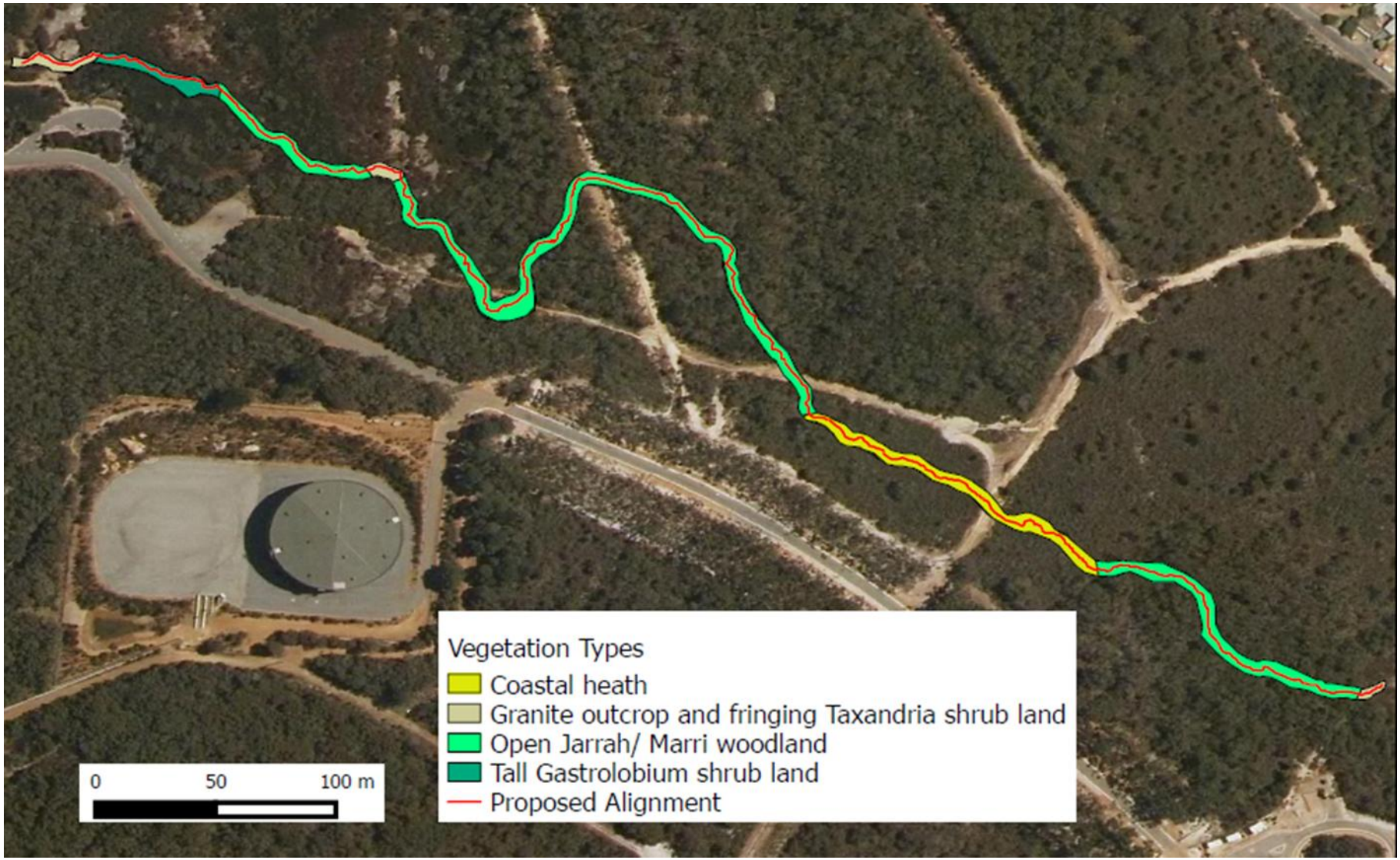

Figure 2: Vegetation Units within survey area

Table 5: Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Asparagaceae	*Laxmannia jamesii*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Asparagaceae	*Thysanotus gageoides*	P3	Y	N	Species not found. Genus identifiable. No *Thysanotus* found during survey.	H
Asparagaceae	*Thysanotus isantherus*	P4	Y	N	Species not found. Genus identifiable. No *Thysanotus* found during survey.	H
Aspleniaceae	*Asplenium obtusatum subsp northlandicum*	DRF	N	Y	No suitable habitat present. Granite outcrops present did not contain fissures or pockets suitable for this species.	H
Asteraceae	*Angianthus drummondii*	P3	N	N	No suitable habitat present. This species prefers brown clay soils, ironstone and is usually associated with seasonally wet flats.	H
Asteraceae	*Cymbonotus preissianus*	P3	Y	N	Species not found. Genus identifiable. No *Cymbonotus* found during survey	H
Brassicaceae	*Lepidium pseudotasmanicum*	P4	N	N	No suitable habitat present. This species prefers bare loamy sand in grassland and grassy woodland.	H
Celastraceae	*Psammomoya ephedroides*	P3	N	N	No suitable habitat present. This species prefers deep yellow or red sandy loams.	H
Centrolepidaceae	*Centrolepis caespitosa*	P4	N	N	No suitable habitat present. This species prefers salt flats and wet areas.	H
Cyperaceae	*Gahnia sclerioides*	P4	Y	Y	Species not found. High likelihood of detection if present	H
Dasypogonaceae	*Calectasia cyanea*	DRF	Y	Y	Species not found. High likelihood of detection if present	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Dilleniaceae	*Hibbertia argentea*	P3	Y	N	Species not found. Genus identifiable. No unidentifiable *Hibbertia* found	H
Dilleniaceae	*Hibbertia montana*	P4	Y	N	Species not found. Genus identifiable. No unidentifiable *Hibbertia* found	H
Droseraceae	*Drosera fimbriata*	P4	Y	Y	Species not found. High likelihood of detection if present	H
Ericaceae	*Andersonia auriculata*	P3	Y	Y	Species not found. High likelihood of detection if present	H
Ericaceae	*Andersonia barbata*	P2	N	Y	No suitable habitat present. This species prefers swampy areas.	H
Ericaceae	*Andersonia grandiflora*	P4	N	Y	Species not found. High likelihood of detection if present	H
Ericaceae	*Andersonia pinaster*	DRF	Y	N	Species not found. Genus identifiable. No unidentifiable *Andersonia* found	H
Ericaceae	*Andersonia setifolia*	P3	Y	Y	Species not found. High likelihood of detection if present	H
Ericaceae	*Coleanthera coelophylla*	P1	Y	N	Species not found. Genus identifiable. No *Coleanthe*ra found during survey	H
Ericaceae	*Leucopogon alternifolius*	P3	N	Y	No suitable habitat present. This species prefers swampy or seasonally wet areas.	H
Ericaceae	*Leucopogon apiculatus*	P3	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Leucopogon* found	H
Ericaceae	*Leucopogon bracteolaris*	P2	Y	Y	Species not found. High likelihood of detection if present	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Ericaceae	*Leucopogon cymbiformis*	P2	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Leucopogon* found.	H
Ericaceae	*Leucopogon interruptus*	P3	Y	Y	Species not found. High likelihood of detection if present.	H
Ericaceae	*Leucopogon lasiophyllus*	P4	N	N	No suitable habitat present. This species prefers quartzite and sandstone hillsides.	H
Ericaceae	*Leucopogon ozothamnoides*	P1	N	N	No suitable habitat present. This species prefers clay based soils.	H
Ericaceae	*Lysinema lasianthum*	P4	N	N	No suitable habitat present. This species prefers swampy or seasonally wet areas.	H
Ericaceae	*Sphenotoma sp. Stirling Range*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Fabaceae	*Acacia ataxiphylla subsp ataxiphylla*	P3	Y	Y	Species not found. High likelihood of detection if present.	H
Fabaceae	*Acacia filifolia*	P3	N	Y	No suitable habitat present. This species prefers sandplains characterised by yellow sand.	H
Fabaceae	*Acacia horridula*	P3	Y	Y	Species not found. High likelihood of detection if present.	H
Fabaceae	*Bossiaea divaricata*	P4	Y	N	Species not found. Genus identifiable. There were no unidentifiable Bossiaea found.	H
Fabaceae	*Chorizema carinatum*	P3	N	N	No suitable habitat present. This species prefers clay based soils.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Fabaceae	*Gastrolobium leakeanum*	P2	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Gastrolobium* found.	H
Fabaceae	*Gastrolobium stenophyllum*	P3	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Gastrolobium* found	H
Fabaceae	*Kennedia beckxiana*	P4	Y	N	Species not found. Genus identifiable. There were no *Kennedia* found	H
Goodeniaceae	*Goodenia sp South Coast*	P3	Y	N	Species not found. Genus identifiable. There were no *Goodenia* found	H
Goodeniaceae	*Scaevola brookeana*	P2	Y	Y	Species not found. High likelihood of detection if present	H
Gyrostemonaceae	*Gyrostemon thesioides*	P2	N	N	No suitable habitat present. This species prefers limestone dunes.	H
Haemodoraceae	*Conostylis drummondii*	DRF	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Conostylis* found	H
Haloragaceae	*Gonocarpus pusillus*	P4	N	N	No suitable habitat present. This species prefers clay based soils in winter wet swamps.	H
Haloragaceae	*Gonocarpus simplex*	P4	N	N	No suitable habitat present. This species prefers peaty sand in swamps and seasonally inundated areas.	H
Haloragaceae	*Myriophyllum trifidum*	DRF	N	N	No suitable habitat present. This species prefers clay based soils in winter wet flats.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Hemerocallidaceae	*Agrostocrinum scabrum subsp littorale*	P2	Y	N	Species not found. Genus identifiable.	H
Juncaceae	*Juncus meianthus*	P2	N	N	No suitable habitat present. This species prefers creeks and seepage areas.	H
Lamiaceae	*Pityrodia obliqua*	P3	N	Y	No suitable habitat present. This species prefers sandstone or quartzite rocky hillsides.	H
Malvaceae	*Lasiopetalum monticola*	P3	Y	N	Species not found. Genus identifiable. There were no *Lasiopetalum* found.	H
Malvaceae	*Thomasia multiflora*	P1	Y	N	Species not found. Genus identifiable. There were no *Thomasia* found.	H
Malvaceae	*Thomasia purpurea x solanacea*	P1	N	N	No suitable habitat present. This species prefers creek sides.	H
Malvaceae	*Thomasia quercifolia*	P4	Y	N	Species not found. Genus identifiable. There were no *Thomasia* found.	H
Malvaceae	*Thomasia solanacea*	P4	Y	N	Species not found. Genus identifiable. There were no *Thomasia* found.	H
Malvaceae	*Thomasia sp Toolbrunup*	P4	N	N	No suitable habitat present. This species prefers peaty sand over quartzite, shallow loam over schist or siltstones.	H
Myrtaceae	*Astartea transversa*	P2	Y	Y	Species not found. High likelihood of detection if present.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Myrtaceae	*Darwinia leiostyla*	P4	N	Y	No suitable habitat present. This species prefers black peaty sand, yellow sand, quartzite or sandstone in rocky sites and gullies.	H
Myrtaceae	*Eucalyptus arborella*	P3	N	Y	No suitable habitat present. This species prefers stony soils on rocky slopes, breakaways and in creek lines.	H
Myrtaceae	*Hypocalymma phillipsii*	P4	N	N	No suitable habitat present. This species prefers black peaty sand.	H
Myrtaceae	*Melaleuca ringens*	P3	N	N	No suitable habitat present. This species prefers limestone ridges and clifftops.	H
Myrtaceae	*Verticordia endlicheriana var angustifolia*	P3	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Verticordia* found.	H
Myrtaceae	*Verticordia fimbrilepis subsp australis*	DRF	Y	N	Species not found. Genus identifiable. There were no unidentifiable *Verticordia* found	H
Myrtaceae	*Verticordia huegelii var. tridens*	P3	N	N	No suitable habitat present. This species prefers gravelly loam in winter-wet areas.	H
Myrtaceae	*Verticordia lehmannii*	P4	N	Y	No suitable habitat present. This species prefers clay based soils in winter-wet flats.	H
Orchidaceae	*Caladenia evanescens*	P1	N	N	No suitable habitat present. This species prefers consolidated sand dunes.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Orchidaceae	*Caladenia granitora*	DRF	Y	N	Species not found. Basal leaf for this genus likely to have been detectable, given their preference for shallow soil crevices on granite. No *Caladenia* basal leaves found.	H
Orchidaceae	*Caladenia harringtoniae*	DRF	Y	N	Species not found. High likelihood of detection if present.	H
Orchidaceae	*Caladenia huegelii*	DRF	Y	N	Species not found. High likelihood of detection if present.	H
Orchidaceae	*Caladenia winfieldii*	DRF	N	N	No suitable habitat present. This species prefers wet depressions and swamps.	H
Orchidaceae	*Corybas abditus*	P3	N	N	No suitable habitat present. This species prefers black peaty soils in winter-wet swamps.	H
Orchidaceae	*Corybas limpidus*	P4	N	N	No suitable habitat present. This species prefers consolidated sand dunes.	H
Orchidaceae	*Diuris drummondii*	DRF	N	N	No suitable habitat present. This species prefers wet depressions and swamps.	H
Orchidaceae	*Diuris heberlei*	P2	N	N	No suitable habitat present. This species prefers clay based soils in winter-wet flats.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Orchidaceae	*Drakaea micrantha*	DRF	Y	N	Species not found. Basal leaf for this genus likely to have been detectable, given the tendency of this species to grow in more exposed soils. No *Drakaea* basal leaves found.	H
Orchidaceae	*Microtis globula*	DRF	N	N	No suitable habitat present. This species prefers peaty soils in winter-wet swamps.	H
Orchidaceae	*Microtis pulchella*	P4	N	N	No suitable habitat present. This species prefers peaty soils in winter-wet swamps.	H
Orchidaceae	*Microtis quadrata*	P4	N	N	No suitable habitat present. This species prefers sandy and peaty soils in winter-wet swamps.	H
Orchidaceae	*Prasophyllum paulineae*	P1	N	N	No suitable habitat present. This species prefers peaty soils in winter-wet swamps.	H
Orchidaceae	*Thelymitra variegata*	P2	Y	N	Species not found. Basal leaf for this genus likely to have been detectable. No *Thelymitra* basal leaves found.	H
Poaceae	*Austrostipa mundula*	P2	N	N	No suitable habitat present. This species prefers sandy soils in mallee-scrub.	H
Poaceae	*Poa billardierei*	P3	N	N	No suitable habitat present. This species prefers consolidated sand dunes.	H
Proteaceae	*Adenanthos x cunninghamii*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Banksia acuminata*	P4	N	Y	No suitable habitat present. This species prefers gravelly soils.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Proteaceae	*Banksia brownii*	DRF	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Banksia concinna*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Banksia foliolata*	P4	N	Y	No suitable habitat present. This species prefers rocky quartzitic slopes.	H
Proteaceae	*Banksia goodii*	DRF	N	Y	No suitable habitat present. This species prefers sand over laterite.	H
Proteaceae	*Banksia seneciifolia*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Banksia serra*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Banksia solandri*	P4	N	Y	No suitable habitat present. This species prefers sandstone or quartzite rocky slopes.	H
Proteaceae	*Banksia verticillata*	DRF	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Conospermum coerulescens subsp coerulescens*	P1	Y	N	Species not found. There were no unidentifiable Proteaceae found.	H
Proteaceae	*Conospermum quadripetalum*	P2	Y	N	Species not found. There were no unidentifiable Proteaceae found.	H
Proteaceae	*Conospermum spectabile*	P2	Y	N	Species not found. There were no unidentifiable Proteaceae found.	H
Proteaceae	*Grevillea baxteri*	P4	Y	Y	Species not found. High likelihood of detection if present.	H
Proteaceae	*Hakea lasiocarpha*	P3	Y	Y	Species not found. High likelihood of detection if present.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment (continued over page)

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Proteaceae	*Hakea oldfieldii*	P3	N	Y	No suitable habitat present. This species prefers clay based soils in winter-wet flats.	H
Proteaceae	*Isopogon buxifolius var buxifolius*	P2	N	N	No suitable habitat present. This species prefers swampy areas.	H
Proteaceae	*Isopogon formosus subsp dasylepis*	P3	N	Y	No suitable habitat present. This species prefers swampy areas.	H
Proteaceae	*Isopogon latifolius*	P4	N	Y	No suitable habitat present. This species prefers sandstone, quartzite or schistose rocky slopes and summits.	H
Proteaceae	*Isopogon uncinatus*	DRF	Y	N	Species not found. Genus identifiable. There was one species of *Isopogon* found during the survey, but this species had linear-ovate leaves and was most considered most likely to be *I.longifolia.*	H
Proteaceae	*Synaphea incurva*	P1	Y	N	Species not found. Genus identifiable. There were no unidentifiable species of *Synaphea* found.	H
Proteaceae	*Synaphea preissii*	P3	Y	N	Species not found. Genus identifiable. There were no unidentifiable species of *Synaphea* found.	H
Restionaceae	*Chordifex abortivus*	DRF	Y	N	Species not found. High likelihood of detection if present.	H
Restionaceae	*Lepyrodia heleocharoides*	P3	N	N	No suitable habitat present. This species prefers peaty sand in swamps and seasonally inundated areas.	H
Rhamnaceae	*Cryptandra glabriflora*	P2	Y	Y	Species not found. High likelihood of detection if present.	H

Table 5 (continued): Threatened flora survey outcomes and risk assessment

Family	Species	Status (WA)	Suitable Habitat Present	Within Flowering Period Or identifiable	Survey Outcome	Likelihood the species detected if present
Rhamnaceae	*Spyridium spadiceum*	P4	Y	Y	Species not found. High likelihood of detection is present.	H
Rutaceae	*Boronia anceps*	P3	N	N	No suitable habitat present. This species prefers seasonally swampy heaths.	H
Rutaceae	*Boronia crassipes*	P3	N	N	No suitable habitat present. This species prefers peaty sand in swamps and seasonally inundated areas.	H
Rutaceae	*Boronia westringioides*	P2	Y	N	Species not found. Genus identifiable. There were no unidentifiable species of *Boronia* found.	H
Stylidiaceae	*Stylidium articulatum*	P2	Y	N	Species not found. Basal rosette for this species is quite distinctive and was not found.	H
Stylidiaceae	*Stylidium beaugleholei*	P3	N	N	No suitable habitat present. This species prefers shallow seasonal swamps.	H
Stylidiaceae	*Stylidium falcatum*	P1	Y	N	Species found in laterite soils on edge of jarrah/ marri. 5 plants	H
Stylidiaceae	*Stylidium gloeophyllum*	P4	Y	N	Species not found. High likelihood of detection if present.	H
Stylidiaceae	*Stylidium rhipidium*	P3	Y	N	Species not found. High likelihood of detection if present.	H

Table 6: Significant Ecological Community (TECs and PECs) survey outcomes and risk assessment

Community Name	Status	Description	Survey Outcome
Banksia coccinea shrub land/ Eucalyptus staeri/ Sheoak open woodland	P1	Typically *Allocasuarina fraseriana*, *Eucalyptus staeri*, *Banksia attenuata* and *Banksia ilicifolia* are present as emergents or as low open woodland above a *Banksia coccinea* tall open scrub, mixed open/closed heath, mixed low open heath, mixed sedge land and open herb land. *Jacksonia spinosa* often forms a distinct stratum above the heathland, dominant heath species are *Melaleuca thymoides, Adenanthos cuneatus, Leucopogon rubricaulis, Phyllota barbata* and *Hypocalymma strictum*. Found on deep white/light grey sand on the lower slopes and valleys, usually occurring just upslope of seasonally wet drainage lines.	Not Present within the survey area
Proteaceae dominated Kwongkan shrub lands of the southeast coastal floristic province of WA	EN	Dominated by flowering shrub species from the Proteaceae family esp. *Adenanthos, Banksia, Grevillea, Hakea, Isopogon* and *Lambertia*. Occurs on sandplains, occupying lower and upper slopes and ridges. Occurs on duplex soils and deep to shallow soils on the sandplains; sandy soils to clay loam, gravelly loam and loam on quartzite and greenstone ranges.	Not Present within the survey area
Subtropical and Temperate Coastal Saltmarsh	VU	Occurs on sandy or muddy substrate on the coast in areas with at least some tidal connection, including coastal clay pans, estuaries and embayments. Dominated by salt-tolerant vegetation (halophytes). Succulent herbs, shrubs and grasses generally dominate and vegetation is < 0.5 m height (with the exception of some reeds and sedges). Species characteristic of the community include: *Austrostipa stipoides*, *Gahnia trifida*, *Juncus kraussii, Samolus repens*. In the south-west of WA there is a high diversity of *Tecticornia, Triglochin, Samolus* and *Puccinellia*. Proportional cover by tree canopy such as mangroves, Melaleucas or Casuarinas is not greater than 50%, nor is proportional ground cover by seagrass greater than 50%.	Not Present within the survey area

Management of *Stylidium falcatum* (P1)

Description of habitat (occurrence)

An occurrence of *Stylidium falcatum* (P1) was found (5 plants) on laterite soils associated with a cleared alignment for a powerline, on the edge of the jarrah/ marri ecotype. Refer to Figure 3 over the page. The overstorey of adjoining vegetation is dominated by *Eucalyptus marginata* and/ or *Corymbia calophylla* and in some areas the overstorey is very sparse. Common midstorey species include: *Taxandria parviceps, Acacia myrtifolia, Bossiaea linophylla* and *Agonis flexuosa.* The understorey is dominated by *Xanthosia rotundifolia, Dasypogon bromeliifolius, Hibbertia furfuracea, Leucopogon obovatus, Leucopogon verticillatus, Acacia alata, Hovea elliptica, Patersonia sp., Olax phyllanthi, Billardiera fusiformis, Banksia formosa, Hakea amplexicaulis, Hakea trifurcata, Hakea varia, Petrophile diversifolia, Synaphea petiolaris* and *Leptomeria squarrulosa.* The groundcover is dominated by *Anarthria prolifera, Anarthria scabra, Lepidosperma gracile, Tetraria octandra* and *Desmocladus fasciculatus.*

The proposed trail was realigned to the west and south of Critical (potential) habitat for this species, with a buffer of 5-10m from all individual mapped plants. Consultation occurred with Department of Parks and Wildlife on site to verify the new alignment of the track and buffers to the plants.

Summary of outcomes

- Targeted surveys were undertaken for 18 species of Declared Rare, 95 Priority listed species (see Table 5), two threatened ecological communities and one priority listed ecological community (see Table 6).
- An occurrence of *Stylidium falcatum* (P1) was found on laterite soils associated with a cleared alignment for a powerline, on the edge of the jarrah/ marri ecotype. No other threatened flora or threatened ecological communities were found within the parameters of this search. See Figure 3 for locational details, and page 21 for a description of critical habitat and protection strategies.
- Two weeds of concern, *Acacia longifolia* and *Pelargonium capitatum* were noted during the survey and care should be taken not to spread these species during trail construction and subsequent use.
- There were also significant populations of *Banksias, Hakeas and Synapheas* in the Jarrah and Granite vegetation communities. These genera are known to have varying levels of susceptibility to dieback *Phytophthora cinnamomi.* While they are not threatened species, care should be taken to prevent disease spread and associated impacts on the biodiversity value and visual amenity of the area.

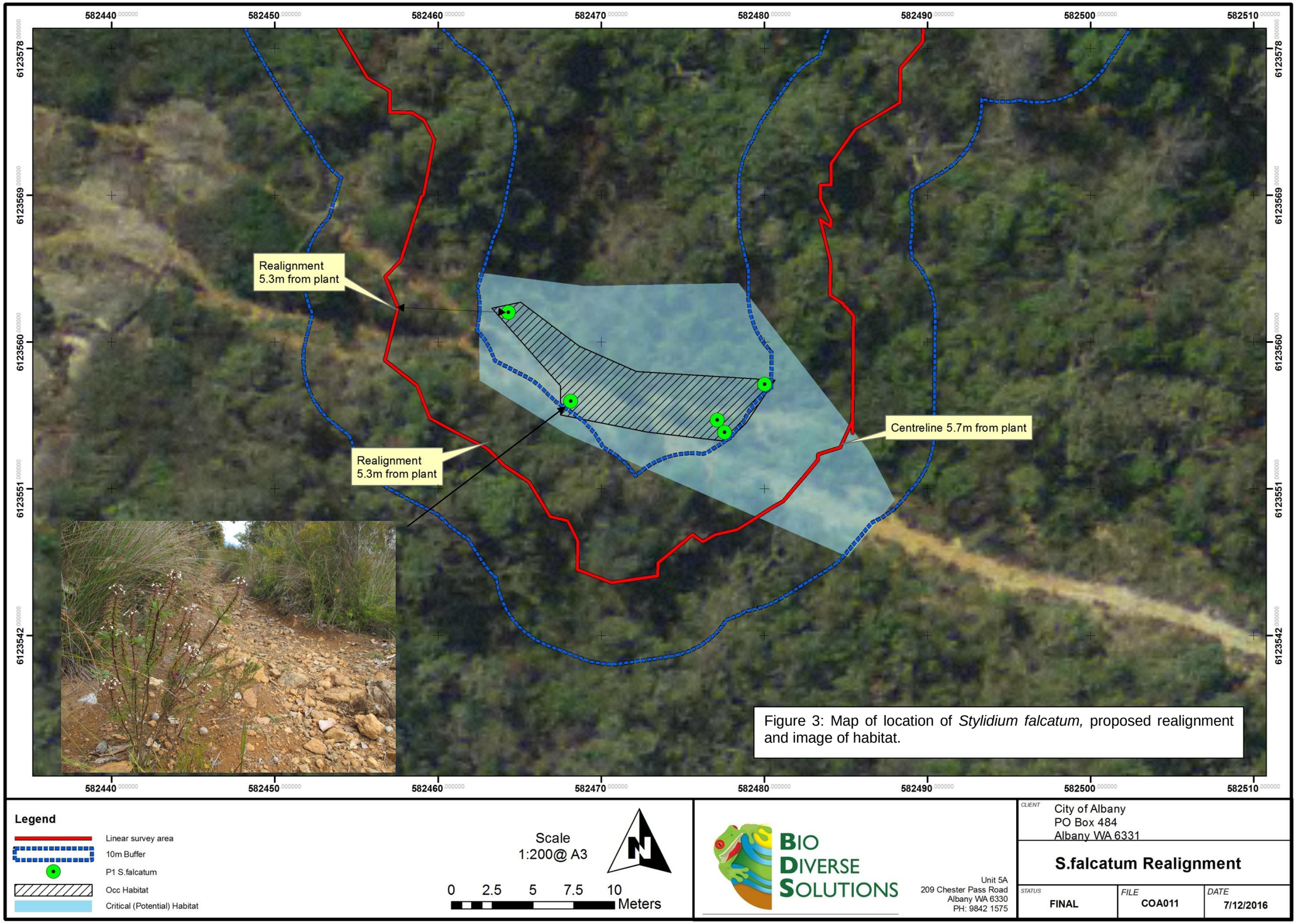

Figure 3: Map of location of *Stylidium falcatum,* proposed realignment and image of habitat.

Attachment C

ARVS Vegetation Unit 17 &

Proposed Bike Trail Alignment

582500 000000 582600 000000 582700 000000 582800 000000

6123600 000000

6123520 000000

6123440 000000

6123360 000000

new alignment

Legend

- Linear survey area; Realignment
- former section of Linear survey area
- Vegetation to be cleared for bike trail
- Veg unit 17 - Ccal/Emar/gran

Scale
1:250@ A3

0 20 40 60 80 Meters

Unit 5A
209 Chester Pass Road
Albany WA 6330
PH: 9842 1575

CLIENT
City of Albany
PO Box 484
Albany WA 6331

Vegetation Unit 17 (ARVS units)

STATUS	FILE	DATE
FINAL	COA011	14/11/2016