

APPENDIX C THREATENED FLORA SURVEY REPORT



Threatened Flora Surveys - Australia-Asia PowerLink Adelaide River Deviation



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Acknowledgements

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1 INTRODUCTION

To inform the environmental approvals' process for the Australia-Asia PowerLink project, a survey for the threatened flora species *Helicteres macrothrix* and *Stylidium ensatum* was conducted within the proposed OHTL Utilities Corridor (northern section of the Adelaide River deviation) where it passes through Sections 189 and 190 Hundred of Howard and Portions 2851 and 3837 – henceforth referred to as the 'study area'.

Threatened surveys were undertaken using the methodology outlined in the *Northern Territory Guidelines for targeted surveys of threatened and significant plant species* (Cuff et al. 2020). Prior to undertaking the surveys, a visit to a suitable reference population was made to ensure the target species was readily detectable at the time of survey, and for surveyors to familiarise with the species morphology and habitat. Surveyors each used a handheld GPS to record tracks and species' presence. Background information, methods, and results are detailed below for each species.

The targeted meander approach was selected because of the linear nature of the study area (~60 m wide) and was conducted by two surveyors. For shrubs such as *Helicteres macrothrix*, the recommended separation of field traverses is 15 m apart in open habitats; for *Stylidium ensatum*, the recommended separation of field traverses is 10 m apart in open habitats.

Surveyors traversed through the study area to verify habitat modelling and undertake searches for the respective species. Surveys were undertaken by ecologists Anna Lemon, Isabel Anderson and Nicole Clark from 24 to 27 July and 3 August 2023.

2 HELICTERES MACROTHRIX

Helicteres macrothrix is listed as Endangered under the TPWC and EPBC Acts. It is a multi-stemmed sub-shrub, one of approximately 13 species of the genus *Helicteres* from the NT (Cowie 2011). The species grows to 50 cm tall with ascending to erect branches, pink to purple flowers, and fruits, leaves and branches that are green and woolly-hairy (NTG 2013a; DEPWS 2021). The aerial parts of the plant are annual, with perennial root stock. The plant is known to re-sprout from root stock, often vigorously, after fire. *Helicteres macrothrix* has been recorded from three populations – near Mt Bunday, near Batchelor and in the Lake Bennett area. *Helicteres macrothrix* flowers from September to November, and fruits from January to March (NTG 2013a). This species is associated with *Eucalyptus tectifica*, *E. miniata* and/or *E. tetradonta* woodland on clayey soils derived from siltstone or sandier soils derived from the granite-like rock syenite (NTG 2013a).

Coarse-scale government modelling indicates that the study area potentially supports ~ 40 ha of high-likelihood habitat for *Helicteres macrothrix* (Cuff and Green 2016a). Habitat modelling is mostly concentrated towards the east and west of Sections 189 and 190, respectively, with small patches occurring in the south-east of Portion 3837.

Visits to the reference site confirmed that *Helicteres macrothrix* was present and detectable during the survey times (Figure 2-1). The plants at the reference site were visible, although material had deteriorated over the course of the dry season.

Most of the study area was burnt in June/July, and regrowth and persistent material from ground cover species were present in sufficient amounts to identify species presence. Photographs showing habitat observed within the NTG modelled habitat is presented in Appendix A.

Within the study area, regrowth of one small plant that could be *Helicteres macrothrix* but was too immature to confirm species identity was observed near 'HM01' within the study area, approximately 500 m south of Chinner Road near Lake Bennett (see Figure 2-4). Characteristically, the unconfirmed plant was similar to *Helicteres macrothrix* and *Helicteres darwinensis*, however, the plant had an upright habit which is consistent

with *Helicteres macrothrix* (Figure 2-3). Because limited plant material was available to collect to identify the species, another site visit will be undertaken within 4 to 6 weeks to collect a specimen and/or identify the species present within the study area. No other similar plants were observed in the immediate area.

A similar species, *Helicteres darwinensis* was also detected at one site (HM02) within Section 190. This species has a prostrate form and grows close to the ground. Land units¹ observed throughout modelled *Helicteres macrothrix* habitat were consistent with those described within available land resource datasets (DEPWS 2010; Robinson et al. 1972) (see, e.g. Figure 2-2).



Figure 2-1. Photographs showing *Helicteres macrothrix* reference site and specimen at Lake Bennett

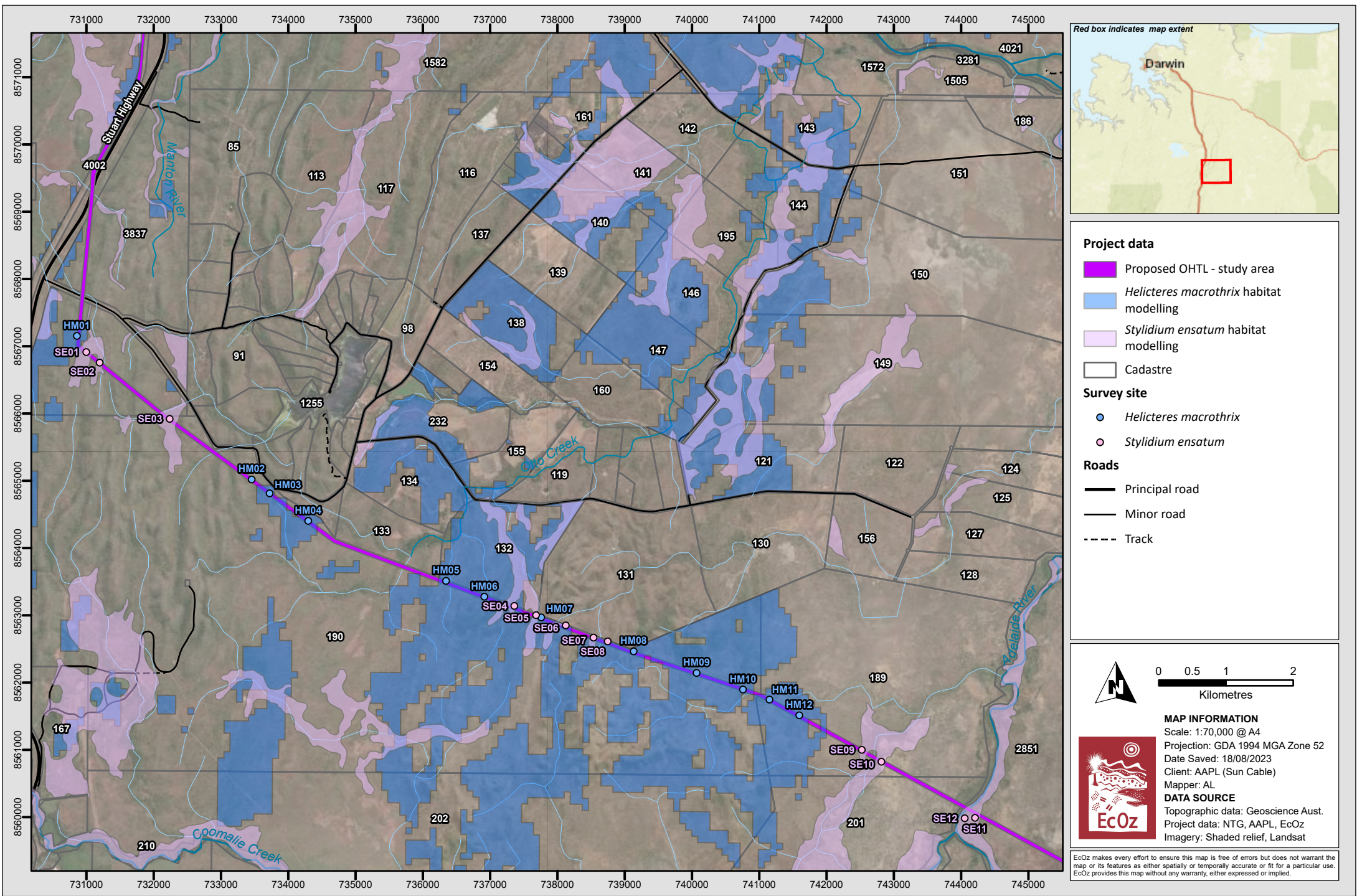


Figure 2-2. Photographs showing vegetation observed within *Helicteres macrothrix* modelled habitats

¹ 1a & 1b - *Eucalyptus miniata*, *Corymbia bleeseri* and *Eucalyptus tectifera* woodland to open forest with occasional *Eucalyptus oligantha* on low to very rugged sandstone and shale hills and ridges; 2a - *Eucalyptus miniata*, *Corymbia polysciada* and *Erythrophleum chlorostachys* woodland to open forest on colluvial wash slopes of the higher hills often terminating in small sharp incised drainage lines; 2b - *Erythrophleum chlorostachys*, *Corymbia grandifolia* and *Corymbia foelscheana* woodland to open woodland (sometimes scrubby) on gentle slopes developed on shale.



Figure 2-3. Photographs showing *Helicteres* sp. plant (unconfirmed) and habitat



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Figure 2-4. Map showing NTG habitat modelling and survey effort for *Helicteres macrothrix* and *Styliidium ensatum* surveys

3 STYLIDIUM ENSATUM

The trigger plant, *Stylidium ensatum*, is endemic to the NT and is listed as Endangered under the TPWC and EPBC Acts. *Stylidium ensatum* inhabits margins of drainage areas in damp, heavy clay or peaty soil (Cowie and Westaway 2012), although it may prefer sandier or loamy soils (Ian Cowie, NT Herbarium, pers. comm. 2017). Suitable areas for *Stylidium ensatum* tend to be adjacent to *Lophostemon* swamps, where surface moisture is maintained into the early to mid-dry season (Nick Cuff, NT Herbarium, pers. comm. 2017). The preferred habitat for *Stylidium ensatum* generally supports *Melaleuca viridiflora*, *Eucalyptus alba* and *Lophostemon lactifluus*, but also perennial grasses such as *Eriachne burkittii*, *Pandanus spiralis*, *Osbeckia australiana* and scattered *Banksia dentata* (Donna Lewis, NT Herbarium, pers. comm. 2020) (Figure 3-1).

The NT Government has modelled potential high-likelihood habitat for the species (Cuff and Green 2016a). The modelling is at a coarser scale compared with the *Typhonium praetermissum* modelling – meaning that surveys of such areas less often result in records of the species. This habitat modelling indicates that the study area potentially supports ~9.4 ha of moderate-likelihood habitat for the species *Stylidium ensatum*.

All patches of modelled *Stylidium ensatum* habitat were verified as unsuitable for supporting the species because key habitat indicators were not present. Field observations confirmed the presence of plains or drainage systems supporting *Corymbia* spp. dominated open woodlands to open forest (Figure 3-2). These observations are consistent with land unit descriptions presented within available land resource datasets (DEPWS 2000; Robinson et al. 1972). Given the absence of suitable habitat and that no plants were observed during the surveys, it is unlikely that *Stylidium ensatum* occurs within the study area.

Photographs showing habitat observed within the NTG modelled habitat is presented in Appendix A.



Figure 3-1. Photographs showing *Stylidium ensatum* preferred habitat and specimen at the Gunn Point Road reference site



Figure 3-2. Photographs showing examples of vegetation observed within *Stylidium ensatum* modelled habitats

4 REFERENCES

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APPENDIX A HABITAT ASSESSMENT

Photo/Check site	NT Portion 3837	HM01
Land unit	Not specified – likely 1b	
Site notes	<i>Eucalyptus tetradonta</i> , <i>Corymbia bleeseri</i> , <i>Eucalyptus miniata</i> , and <i>Corymbia polysciada</i> open woodland on rises. Soils light grey sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of grasses and shrubs observed.	



Photo/Check site	Section 190	HM02
Land unit	Not specified – likely 1b	
Site notes	<i>Eucalyptus miniata</i> , <i>Corymbia polysciada</i> and <i>Erythrophleum chlorostachys</i> open woodland on rises. Soils light grey sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of grasses and shrubs observed.	



Photo/Check site	Section 190	HM03
Land unit	Not specified – likely 1b	
Site notes	<p><i>Eucalyptus miniata</i> and <i>Corymbia polysciada</i> open woodland on rises. Soils light grey sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of <i>Heteropogon triticeus</i> and <i>Petalostigma quadriloculare</i> observed. Small sprouting <i>Helicteres darwinensis</i> observed at check/photo site location – prostrate habit with one small stem.</p>	



Photo/Check site	Section 190	HM04
Land unit	Not specified – likely 1b	
Site notes	Drainage systems within upland terrains with sparse open woodland of <i>Erythrophleum chlorostachys</i> and <i>Corymbia polysciada</i> over <i>Livistona humilis</i> open shrubland. Soils light grey sandy clay with debil-debils. Recently burnt, with early regrowth of mixed grasses.	



Photo/Check site	Section 190	HM05
Land unit	2b	
Site notes	Drainage systems within upland terrains with open woodland of <i>Eucalyptus tectifica</i> and <i>Corymbia</i> spp. over sparse open grassland. Soils light grey-brown sandy clay with some debil-debils present. Recently burnt, with early regrowth of grasses.	



Photo/Check site	Section 190	HM06
Land unit	2b	
Site notes	<i>Corymbia polysciada</i> and <i>Eucalyptus tectifica</i> open woodland on rises. Soils light brown sandy clay with high gravel and sparse surface rock. Recently burnt, with early stage grass and shrub regrowth observed.	



Photo/Check site	Section 190	HM07
Land unit	1b	
Site notes	<p><i>Corymbia polysciada</i>, <i>Eucalyptus miniata</i> and <i>Eucalyptus tintinnans</i> open woodland on steeper rises. Soils light grey-brown sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of <i>Heteropogon triticeus</i> and <i>Petalostigma quadriloculare</i> observed.</p>	



Photo/Check site	Section 190	HM08
Land unit	1a	
Site notes	Steep rises with <i>Eucalyptus miniata</i> and <i>Corymbia polysciada</i> open woodland over <i>Erythrophleum chlorostachys</i> regrowth and mixed grasses. Soils light brown sandy clay with high gravel and surface rock. Unburnt section with <i>Heteropogon triticeus</i> , <i>Chrysopogon</i> sp. and <i>Petalostigma quadriloculare</i> .	



Photo/Check site	Section 190	HM09
Land unit	1a	
Site notes	Steep rises with <i>Eucalyptus tintinnans</i> and <i>Eucalyptus miniata</i> open woodland over <i>Terminalia</i> sp. and <i>Livistona humilis</i> open shrubland. Soils light grey sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of grasses and shrubs.	



Photo/Check site	Section 190	HM10
Land unit	2a	
Site notes	Drainage systems (supporting riparian channel) with open woodland of <i>Erythrophleum chlorostachys</i> and <i>Corymbia polysciada</i> over <i>Helicteres isora</i> shrubland. Soils light brown-grey sandy clay. Recently burnt, with regrowth of <i>Helicteres isora</i> observed.	



Photo/Check site	Section 189	HM11
Land unit	4b	
Site notes	Drainage systems (supporting riparian channel) supporting woodland of <i>Corymbia</i> spp. and mixed riparian species over <i>Helicteres isora</i> shrubland. Soils light brown sandy clay. Recently burnt, with regrowth of <i>Helicteres isora</i> observed.	



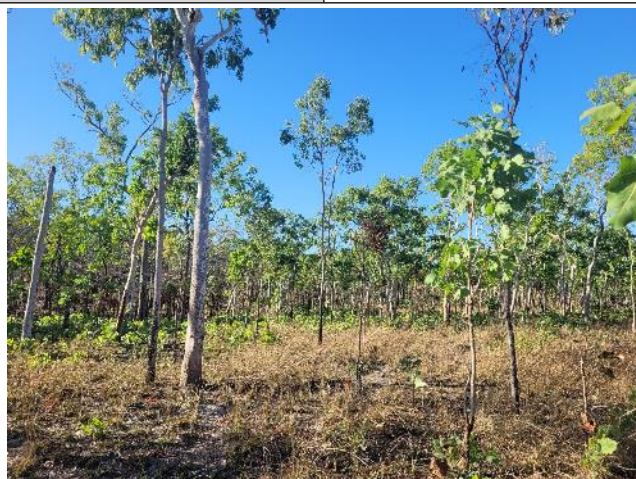
Photo/Check site	Section 189	HM12
Land unit	1a	
Site notes	<i>Eucalyptus tintinnans</i> and <i>E. miniata</i> open woodland on steeper hills. Soils light red-brown sandy clay with high gravel and surface rock. Recently burnt, with early regrowth of grasses and shrubs observed.	



Photo/Check site	NT Portion 3837	SE01
Land unit	10a	
Other site notes	<i>Corymbia bella</i> open woodland with mixed species sparse shrubland over parse, open grassland. Recently burnt with early resprouting of grasses and shrubs. Light grey sandy clay soils, minor surface gravel present.	



Photo/Check site	NT Portion 3837	SE02
Land unit	10a	
Other site notes	<i>Corymbia bella</i> open woodland with mixed species sparse shrubland over parse, open grassland. Recently burnt with early resprouting of grasses and shrubs. Light grey sandy clay soils, minor surface gravel present.	



Photo/Check site	Section 190	SE03
Land unit	Not specified	
Other site notes	<i>Corymbia bella</i> and <i>Eucalyptus miniata</i> open woodland with <i>Livistona humilis</i> sparse shrubland. Sparse, open grassland. Recently burnt with early resprouting of grasses and shrubs. Light brown sandy clay soils, high surface gravel present, occasional rock.	



Photo/Check site	Section 190	SE04
Land unit	2b	
Other site notes	Mixed eucalypt open woodland with <i>Livistona humilis</i> open shrubland. Sparse open grassland, recently burnt south of track. Grassland north of track indicates grassland with Annual Sorghum sp., <i>Heteropogon triticeus</i> and Eriachne sp. Light brown sandy clay soils, dry with debil-debils present.	



Photo/Check site	Section 190	SE05
Land unit	2b	
Other site notes	Sparse open woodland with mixed eucalypt occurring along edges of drainage habitat. Sparse open grassland, recently burnt with early resprouting of grasses and shrubs. Light brown-grey sandy clay soils, dry with debil-debils present.	



Photo/Check site	Section 190	SE06
Land unit	2b	
Other site notes	Open woodlands of <i>Eucalyptus tintinnans</i> on steep, undulating rises. Light grey sandy clay soils with high surface gravel. Recently burnt.	



Photo/Check site	Section 190	SE07
Land unit	2b	
Site notes	Drainage systems within upland terrain, supporting sparse open woodland habitat with mixed eucalypt species. Sparse open grassland, recently burnt with early stage resprouting of grasses and shrubs. Light brown-grey sandy clay soils, dry with debil-debils present.	



Photo/Check site	Section 190	SE08
Land unit	2b	
Other site notes	Narrow drainage systems within upland terrain, supporting sparse open woodland habitat with mixed eucalypt species. Sparse open grassland, recently burnt south of access track with early stage resprouting of grasses and shrubs. Light brown-grey sandy clay soils, dry with minor debil-debils present.	



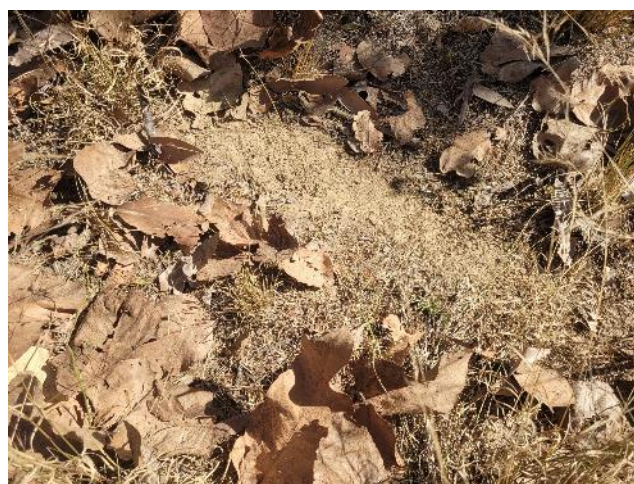
Photo/Check site	Section 189	SE09
Land unit	4b	
Site notes	Gently sloping plains supporting sparse open woodland with <i>Erythrophleum chlorostachys</i> , <i>Corymbia confertiflora</i> and <i>Eucalyptus tectifera</i> . Recent fire with early stages of grass regrowth observed. Soils light brown sandy clay, dry during surveys.	



Photo/Check site	Section 189	SE10
Land unit	4b	
Site notes	Gently sloping plains supporting sparse open woodland with <i>Erythrophleum chlorostachys</i> , <i>Eucalyptus tectifica</i> and <i>Corymbia</i> species. Recent fire with grass and shrub regrowth observed. Soils light brown sandy clay with minor surface gravel, dry during surveys.	



Photo/Check site	NT Portion 2851	SE11
Land unit	6a	
Other site notes	Outer edges of riparian channel (Adelaide River), with Eucalypt open woodland over open shrubland. Soils light brown sandy clay. Some waterholes observed near this location. Feral animals present – buffalo, pigs, cattle.	



Photo/Check site	NT Portion 2851	SE12
Land unit	6a	
Other site notes	Edge of riparian channel (Adelaide River), with more riparian species present. Open woodland – woodland with shrubland understorey. Soils light brown-grey sandy clay. Feral animals present – buffalo, pigs, cattle.	





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