APPENDIX 2 THREATENED FLORA

Categories and definitions of Threatened Flora species under the Environmental Protection and Biodiversity Act 1999.

Category Code	Category
CE	Critically Endangered Taxa at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as in accordance with the prescribed criteria.
E	Endangered Taxa which is facing a very high risk of extinction in the wild in the immediate or near future, as in accordance with the prescribed criteria.
V	Vulnerable Taxa which is not endangered and is facing a high risk of extinction in the wild in the medium-term future, as in accordance with the prescribed criteria.
Ex	Extinct Taxa which is known only to survive in cultivation, in captivity or as a naturalized population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

APPENDIX 3 TEC - DEFINITIONS

Definitions and criteria for presumed totally destroyed, critically endangered, endangered and vulnerable ecological communities. Based on the DPaW definitions.

Presumed Totally Destroyed (PD)
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

Critically Endangered (CR)
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

1: ENDANGERED (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

2: VULNERABLE (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

PRIORITY ECOLOGICAL COMMUNITY LIST (PEC)

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological

communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities
Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities
Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State Forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities
(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
(ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
(iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
(a) **Rare**. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(b) **Near Threatened**. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
(c) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX 4 EPA GUIDANCE 51 CRITERIA

Listed below are the criteria used to assess the level of assessment required for the Carosue Dam Project. These are based on the Environmental Protection Authority Guidance No. 51 "Guidance for the Assessment of Environmental Factors – Terrestrial flora and vegetation surveys for Environmental Impact Assessment in Western Australia" (2004).

Based on Guidance No 51 – Appendix 2.

- Bioregion - Coolgardie – Group 2
- Area Characteristics – based on the following:
    - Degree of degradation or clearing within region – low (more than 50% of native vegetation remaining);
    - Size of proposal – high (greater than 50ha);
    - Rarity of vegetation – low (areas naturally more widespread than 10% of local area);
    - Significant vegetation unit – low (no significant vegetation units known from the area);
    - Refugia – low (not known from the area);
    - Rare or Priority flora – low (no TF or PF species were found in the area);
    - Other Significant Flora – moderate (one potential significant flora was recorded);
    - Size of remnant and condition/intactness of vegetation - low (the vegetation is not in a fragmented environment);
    - Ecological linkages – not applicable - vegetation is continuous with isolated areas of clearing;
    - Heterogeneity or complexity of the vegetation – moderate (the area and/or its immediate surrounds have similar range of component units).

APPENDIX 5 DPAW RECORDED THREATENED FLORA

Listed below are the TF and PF recorded by DPaW, as at September 2016 as occurring within search area.

Taxon	Status	Rank	IUCNCriteria	EPBC
Acacia eremophila var. Numerous-nerved variant (A.S.George 11924)	3			
Caesia talingka	2			
Calandrinia sp. Goongarrie (F. Obbens, F. Hort & J. Hort FO 18/13)	1			
Caustis deserti	3			
Dicrastylis cundeeleensis	4			
Eleocharis papillosa	3			VU
Eremophila dendritica	2			
Eremophila mirabilis	2			
Eremophila praecox	1			
Eucalyptus jutsonii subsp. *jutsonii*	4			
Gunniopsis propinqua	3			
Homalocalyx grandiflorus	3			
Jacksonia lanicarpa	1			
Lechenaultia divaricata	1			
Olearia arida	4			
Persoonia leucopogon	1			
Philotheca coateana	3			
Ptilotus blackii	3			
Styphelia sp. Great Victoria Desert (N. Murdock 44)	2			
Thryptomene eremaea	2			
Trachymene pyrophila	2			
Vittadinia pustulata	3			

APPENDIX 6 THREATENED ECOLOGICAL COMMUNITIES

Listed below are the PEC's identified from the DPaW search of the Carosue Dam area. Descriptions, threats and status obtained from the currently DPaW PEC list (2016).

PEC	Description	Threats	Status
Emu Land System	-	Over grazing	Priority 3
Fraser Range Vegetation Complex	Plant assemblages of the Fraser Range Vegetation Complex: *Allocasuarina huegeliana* and *Pittosporum phylliraeoides* open woodland over *Beyeria lechenaultia* and *Dodonaea microzyga* Scrub and *Aristida contorta* bunch grasses (granite complex), on the slopes and summits of hills; *Acacia acuminata* Tall Shrubland dominated by *Melaleuca uncinata* and *Triodia scariosa* on uplands with shallow loamy sands; *Eucalyptus* aff. *uncinata* (KRN 7854) over *Senna artemisioides* subsp. *helmsii*, *Cryptandra miliaris*, *Dodonaea boroniifolia*, *D. stenozyga* and *Triodia scariosa* (*Eucalyptus effusa* Mallee) on colluvial flats with loamy clay sands, and; *E. oleosa*, *E. transcontinentalis*, *E. flocktoniae* Woodland on flat.	-	Priority 1
Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	Mining	Priority 1
Mount Belches Acacia quadrimarginea/Ptilotus	On Randall Timber Reserve. Has grazing coexistence	Mining	Priority 3

PEC	Description	Threats	Status
obovatus (banded ironstone formation)	with the reserve.		
Mount Jumbo Range vegetation complex (banded ironstone formation)	Laverton area, northeast goldfields	-	Priority 3
Mount Linden Range vegetation complex (banded ironstone formation)	-	-	Priority 3
Mount Morgan calcrete groundwater assemblage type on Carey palaeodrainage on Mt Weld Station	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	Mining	Priority 1
Yellow sandplain vegetation of the Great Victoria Desert with diverse vertebrate fauna	Undulating yellow sandplain with an open upper stratum of *Eucalyptus gongylocarpa*, with or without a diverse mallee stratum of *E. youngiana*, *E. mannensis*, *E. platycorys*, over a sparse, though diverse shrubs over hummock grasses, *Triodia desertorum* or *T. scariosa*. Very high vertebrate diversity and unusual combinations of species (mixture of south-western and arid inter zones).	Mining and exploration, extensive summer wildfire, feral predators	Priority 3

APPENDIX 7 MUIR VEGETATION CLASSIFICATION

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70-100%	MID-DENSE 30-70%	SPARSE 10-30%	VERY SPARSE 2-10%
T Trees >30m	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
M Trees 15-30m	Dense Forest	Forest	Woodland	Open Woodland
LA Trees 5-15m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB Trees<5m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KS Mallee shrub form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
KT Mallee tree form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S Shrubs >2m	Dense Thicket	Thicket	Scrub	Open Scrub
SA Shrubs 1.5-2.0m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SE Shrubs 1 0-1.5m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC Shrubs 0.5-1.0m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD Shrubs 0.0-0.5m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
P Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
H Hummock Grass	Dense Hummock Grass	Mid-Dense Hummock Grass	Hummock Grass	Open Hummock Grass
CT Bunch grass >0.5m	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
GL Bunch grass<0.5m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
I Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT Sedges >0.5m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL Sedges <0.5m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
X Ferns	Dense Ferns	Ferns	Open Ferns	Very Open Ferns
Mosses, liverwort	Dense Mosses	Mosses	Open Mosses	Very Open Mosses

Note: Muir, B.G. (1977). Biological Survey of the Western Australian Wheatbelt. Pt 2: Vegetation and Habitat of Bendering Reserve. Records of the Western Australian Museum. Suppl. No.3.

APPENDIX 8 KEIGHERY VEGETATION CONDITION SCALE

(extracted from Keighery 1994)

P = 'Pristine'
Pristine or nearly so, no obvious signs of disturbance.

E = Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
For example damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.

VG = Very Good
Vegetation structure altered, obvious signs of disturbance.
For example disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G = Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it.
For example disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D = Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
For example disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD = Completely Degraded
The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.
These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

APPENDIX 9 TAXA RECORDED FROM THE PROJECT AREA

The following list of plants was recorded from the Carosue Dam airstrip and nearby adjacent areas in September 2016.

Status Key:
RE – Range extension
PC – Poorly collected

FAMILY	Status	Taxa
ASPARAGACEAE		
		Thysanotus manglesianus
POACEAE		
		Aristida contorta
		Austrostipa elegantissima
		Eragrostis dielsii
		Triodia tomentosa
PROTEACEAE		
		Grevillea acuaria
		Grevillea nematophylla subsp. *nematophylla*
		Hakea preissii
FABACEAE		
		Acacia acuminata
		Acacia aneura
		Acacia colletioides
		Acacia craspedocarpa
		Acacia hemiteles
		Acacia murrayana
		Acacia oswaldii
		Acacia ramulosa
		Acacia tetragonophylla
		Cullen discolor
		Mirbelia microphylla
		Senna artemisioides subsp. *artemisioides*
		Senna artemisioides subsp. *filifolia*
CASUARINACEAE		
		Casuarina pauper

FAMILY	Status	Taxa
EUPHORBIACEAE		
		Euphorbia australis
MYRTACEAE		
		Baeckea elderiana
	RE + PC	*Baeckea* sp. Comet Vale (A.S. George 8078)
		Calytrix depressa
		Enekbatus cryptandroides
		Eucalyptus concinna
		Eucalyptus leptopoda
		Eucalyptus lesouefii
		Eucalyptus oleosa subsp. *oleosa*
		Eucalyptus salmonophloia
		Eucalyptus salubris
		Eucalyptus stricklandii
		Eucalyptus torquata
		Eucalyptus transcontinentalis
		Eucalyptus yilgarnensis
		Homalocalyx thryptomenoides
		Melaleuca hamata
		Thryptomene urceolaris
SAPINDACEAE		
		Alectryon oleifolius subsp. *canescens*
		Dodonaea lobulata
		Dodonaea microzyga
		Dodonaea rigida
		Phebalium canaliculatum
MALVACEAE		
		Brachychiton gregorii
SANTALACEAE		
		Exocarpos aphyllus
		Santalum acuminatum
		Santalum spicatum
LORANTHACEAE		
		Amyema benthamii
		Amyema gibberula subsp. *gibberula*
		Amyema miquelii
FRANKENIACEAE		
		Frankenia aff. *fecunda*
		Frankenia fecunda
AMARANTHACEAE		
		Ptilotus gaudichaudii subsp. *gaudichaudii*
		Ptilotus obovatus

FAMILY	Status	Taxa
CHENOPODIACEAE		
		Atriplex nummularia
		Atriplex vesicaria
		Enchylaena tomentosa
		Maireana carnosa
		Maireana georgei
		Maireana pentatropis
		Maireana pyramidata
		Maireana sedifolia
		Maireana suaedifolia
		Maireana triptera
		Rhagodia eremaea
		Salsola australis
		Sclerolaena diacantha
		Sclerolaena drummondii
		Sclerolaena parviflora
AIZOACEAE		
		Gunniopsis septifraga
		Calandrinia eremaea
RUBIACEAE		
		Psydrax suaveolens
		Synaptantha tillaeacea var. *tillaeacea*
APOCYNACEAE		
		Alyxia buxifolia
		Marsdenia australis
SOLANACEAE		
		Duboisia hopwoodii
		Solanum lasiophyllum
		Solanum nummularium
SCROPHULARIACEAE		
		Eremophila alternifolia
		Eremophila caperata
		Eremophila clarkei
		Eremophila decipiens subsp. *decipiens*
		Eremophila eriocalyx
		Eremophila forrestii subsp. *forrestii*
		Eremophila georgei
		Eremophila glabra subsp. *glabra*
		Eremophila latrobei subsp. *latrobei*
		Eremophila oldfieldii subsp. *angustifolia*
		Eremophila oppositifolia
		Eremophila pustulata

FAMILY	Status	Taxa
		Eremophila scoparia
		Eremophila sp. (Paul Armstrong PA16/527)
LAMIACEAE		
		Prostanthera althoferi subsp. *althoferi*
		Prostanthera grylloana
		Spartothamnella teucriiflora
CAMPANULACEAE		
		Isotoma petraea
		Wahlenbergia tumidifructa
GOODENIACEAE		
		Scaevola spinescens
		Westringia cephalantha
		Westringia rigida
ASTERACEAE		
		Cratystylis microphylla
		Olearia muelleri
		Olearia pimeleoides
		Olearia subspicata
		Podolepis lessonii
		Waitzia aurea
PITTOSPORACEAE		
		Pittosporum angustifolium
ARALIACEAE		
		Trachymene ornata

APPENDIX 10 OTHER SIGNIFICANT FLORA LOCATIONS

Listed below are the records of the Other Significant Flora located in the Carosue Dam airstrip area during the September 2016 survey. For each location recorded the estimated percentage cover of plants recorded is given and the height recorded.

All locations are given in UTM in cell 51J using datum GDA '94

Way pt	mE	mN	% cover	height
433	435537	6662982	<1	0.3m
443	435831	6662261	<1	2m
472	434670	6661881	<1	1.5m
503	433382	6661151	1	1.5m
505	433439	6661114	1	2m
506	433472	6661077	<1	2m
GAS 01	435982	6663284	<1	0.3m
GAS 02	436676	6662750	<1	1.5m
GAS 15	434816	6662080	<1	1.0m