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APPENDIX A: CONSERVATION CODES



Appendix A1: Definitions of Conservation Categories under the EPBC Act 1999.

Category	Definition
Extinct	The last member of the species has died.
Extinct in the Wild	Species known to survive only in cultivation or in captivity, or as a naturalised population well outside its past range.
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	Species facing a very high risk of extinction in the wild in the near future.
Vulnerable	Species facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	Species the focus of a specific conservation program without which the species would become vulnerable, endangered, or critically endangered within five years.
Migratory	<p>The EPBC Act provides for protection of migratory species as a matter of national environmental significance. Migratory species are those animals that migrate to Australia and its external territories or pass through or over Australian waters during their annual migrations (DotE 2013). Migratory species are listed under the following international conventions:</p> <ul style="list-style-type: none"> • Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention); • China-Australia Migratory Bird Agreement (CAMBA); • Japan-Australia Migratory Bird Agreement (JAMBA); and, • Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Appendix A2: Definitions of Conservation Categories Under the BC Act 2016

Category (Code)	Definition
Threatened Species	
Protected under the Biodiversity Conservation Act and listed under the most recent Wildlife Conservation (Specially Protected Fauna Notice) or Wildlife Conservation (Rare Flora Notice). Species are listed as threatened when they face a high to very high risk of extinction in the wild.	
Critically Endangered (CR)	Species facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	Species facing a very high risk of extinction in the wild in the near future.
Vulnerable (VU)	Species considered to be "facing a high risk of extinction in the wild in the medium-term future.
Extinct species	
Extinct species (EX)	The last member of the species has died.
Extinct in the wild species (EW)	Species known to survive only in cultivation or in captivity, or as a naturalised population well outside its past range.
Specially protected species	
Species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.	
Migratory species (MI)	<p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth.</p> <p>Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program.</p>
Conservation Dependent (CD)	Fauna or flora of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other specially protected species (OS)	Fauna otherwise in need of special protection to ensure their conservation.

Appendix A2: Department of Biodiversity, Conservation and Attractions Priority Listing

Category	Definition
Priority species (P)	
	Species that do not have statutory protection under the Biodiversity Conservation Act 2016, but are identified as conservation priorities due to insufficient information to assess their conservation status or they are deemed rare but not threatened, necessitating ongoing monitoring. A register of priority species is managed by the Department of Biodiversity Conservation and Attractions (DBCA).
Priority 1	Poorly known species that are known from one or a few locations which are potentially at risk.
Priority 2	Poorly known species that are known from one or a few locations, some of which are on managed.
Priority 3	Poorly known species that are known from several locations, and the species does not appear to be under imminent threat.
Priority 4	(a) Rare. Species 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. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

APPENDIX B: SURVEY SITE INFORMATION



Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_01	681479	7662787	Plain (sand) & Drainage Line/River/Creek (Minor)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i> , <i>A. trachycarpa</i>	Sand	Thick	Up to 1/2	1-3 m	>5 years	Distinct	1 day	1 day	
WDG_02	682610	7662458	Plain (sand) & Granite Outcrops (flat domes)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	5 days	3 days	
WDG_03	683400	7662518	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	1 day	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_04	682643	7661494	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay, loam	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	5 days	3 days	
WDG_05	683634	7661435	Plain (sand)	Plain (sand) & Plain (stony/gibber)	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i> , <i>A. stellaticeps</i>	Sand, loam	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	4 days	2 days	
WDG_06	685197	7661560	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_07	683420	7660571	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia coleii</i> , <i>A. stellaticeps</i>	Sand, loam	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	5 days	3 days	
WDG_08	684537	7660480	Plain (sand)	Plain	High to low <i>Acacia</i> spp. over hummock grassland	<i>Acacia coleii</i> , <i>A. stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	4 days	2 days	
WDG_09	683713	7659498	Plain (sand) & Plain (stony/gibber)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to all	1-3 m	>5 years	Distinct	5 days	2 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_10	684625	7659475	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia colei</i> , <i>A. stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	5 days	2 days	
WDG_11	683053	7658377	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 1/2	>3 m	>5 years	Slight	6 days	3 days	
WDG_12	684598	7658530	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia colei</i>	Sand	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	4 days	2 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_13	683622	7656477	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia coleii</i> , <i>A. stellaticeps</i>	Clay, loam, laterite	Open	Up to 3/4	<1 m	1-5 years	Slight	6 days	3 days	
WDG_14	683846	7656188	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	-	Sand	Open	Up to 1/2	>3 m	>5 years	Slight	6 days	3 days	
WDG_15	681992	7656014	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i> , <i>A. stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	>5 years	Distinct	2 days	0 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_16	683483	7655813	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	6 days	0 days	
WDG_17	684224	7655520	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 1/2	Continuously sandy	>5 years	Slight	6 days	3 days	
WDG_18	682832	7655435	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i>	Sand, clay	Open	Up to 1/2	<1 m	>5 years	Distinct	2 days	0 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_19	679644	7654429	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	2 days	2 days	
WDG_20	680810	7654526	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	2 days	2 days	
WDG_21	681357	7654456	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	2 days	0 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_22	682651	7654478	Plain (sand) & Plain (stony/gibber)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 1/2	1-3 m	1-5 years	Distinct	2 days	0 days	
WDG_23	683571	7654520	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	2 days	0 days	
WDG_24	680602	7653572	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. and <i>Melaleuca</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to all	1-3 m	1-5 years	Distinct	2 days	2 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_25	681439	7653448	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	
WDG_26	682681	7653513	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	2 days	0 days	
WDG_27	683621	7653405	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	-	Sand	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	2 days	0 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_28	684686	7653543	Plain (sand)	Granite outcrops	Low shrubs of <i>Acacia</i> spp. and <i>Melaleuca</i> spp. over hummock grassland	-	Sand	Open	Up to 3/4	1-3 m	<1 year	Distinct	6 days	4 days	
WDG_29	679501	7653586	Plain (sand) & Drainage Line/River/Creek (Major)	Major Drainage Line incl. surrounding floodplain & plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	5 days	3 days	
WDG_30	680759	7652506	Plain (sand) & Drainage Line/River/Creek (Major/Minor)	Major Drainage Line incl. surrounding floodplain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 3/4	<1 m	1-5 years	Distinct	2 days	2 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_31	682221	7652298	Plain (sand)	Major Drainage Line incl. surrounding floodplain & plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Open	Up to 3/4	>3 m	1-5 years	Distinct	5 days	3 days	
WDG_32	683640	7652441	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	
WDG_33	686045	7652190	Plain (sand)	Minor Drainage Line incl. surrounding floodplain & plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Senna notabilis</i>	Sand	Open	Up to 3/4	1-3 m	<1 year	Distinct	6 days	0 days	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_34	679607	7651504	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to all	>3 m	<1 year	Distinct	1 day	1 day	
WDG_35	680958	7651620	Plain (sand) & Drainage Line/River/Creek (Minor)	Plain, Minor Drainage Line incl. surrounding floodplain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	-	Sand	Open	Up to 1/2	1-3 m	<1 year	Distinct	1 day	1 day	
WDG_36	683864	7651723	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_37	685919	7651313	Plain (sand) & Drainage Line/River/Creek (Minor) & Granite Outcrops (boulder piles)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 3/4	1-3 m	>5 years	Distinct	5 days	3 days	
WDG_38	686289	7651127	Plain (sand) & Drainage Line/River/Creek (Minor)	Minor Drainage Line incl. surrounding floodplain & plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Open	Up to 3/4	1-3 m	<1 year	Distinct	6 days	0 days	
WDG_39	678734	7650597	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	>5 years	No shadow	1 day	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_40	680186	7650612	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	<1 year	Distinct	1 day	1 day	
WDG_41	681573	7650401	Plain (sand) & Drainage Line/River/Creek (Minor)	Minor Drainage Line incl. surrounding floodplain & plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 1/2	1-3 m	<1 year	Distinct	1 day	1 day	
WDG_42	683339	7650867	Drainage Line/River/Creek (Minor) & Plain (sand)	Minor Drainage Line incl. surrounding floodplain	Mulga shrubland over hummock and tussock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 1/2	1-3 m	1-5 years	Distinct	3 days	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_43	684634	7650490	Plain (sand)	Plain with some granite outcropping	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 1/2	<1 m	1-5 years	Distinct	3 days	1 day	
WDG_44	685776	7650315	Plain (sand) & Drainage Line/River/Creek (Minor)	Minor Drainage Line incl. surrounding floodplain & plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i> , <i>Senna notabilis</i>	Sand, clay	Open	Up to 1/2	<1 m	1-5 years	Distinct	6 days	3 days	
WDG_45	679141	7649646	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Moderate	Up to 3/4	1-3 m	1-5 years	Distinct	1 day	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_46	680673	7649478	Plain (sand) & Drainage Line/River/Creek (Minor)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	<1 year	Distinct	1 day	1 day	
WDG_47	681640	7649433	Plain (sand) & Drainage Line/River/Creek (Minor)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i> , <i>A. stellaticeps</i>	Sand	Moderate	Up to 1/2	1-3 m	1-5 years	Distinct	1 day	1 day	
WDG_48	682425	7649728	Plain (sand) & Drainage Line/River/Creek (Minor)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_49	683574	7649598	Plain (sand) & Drainage Line/River/Creek (Minor) & Granite Outcrops (boulder piles)	Minor drainage line incl. surrounding floodplain and granite outcropping	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 3/4	1-3 m	1-5 years	Distinct	3 days	1 day	
WDG_50	684590	7649515	Granite Outcrops (boulder piles) & Plain (sand)	Stony rises	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand	Open	Up to 1/4	<1 m	1-5 years	Distinct	3 days	1 day	
WDG_51	680687	7648487	Plain (sand)	Plain	Low woodland of <i>Eucalyptus</i> and <i>Acacia</i> spp. over hummock grassland	<i>Acacia stellaticeps</i>	Sand, clay	Moderate	Up to 1/2	1-3 m	1-5 years	Distinct	1 day	1 day	

Site	Location		Fauna Habitat Type	Habitat Features								Survey Conditions			Photo
	Easting*	Northing		Landform	Vegetation	RDL Shrubs Present	Substate Type	Vegetation Cover	Tracking Suitability	Sand Patch Size	Time Since Last Fire	Shadow	Time since rain	Time since windy	
WDG_52	681631	7648478	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	-	Sand	Open	Up to all	1-3 m	<1 year	Distinct	1 day	1 day	
WDG_53	682570	7648492	Plain (sand)	Plain	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i> , <i>A. stellaticeps</i>	Sand	Open	Up to 1/4	<1 m	1-5 years	Distinct	2 days	1 day	
WDG_54	681624	7647448	Plain (sand)	Plain and Granite Outcropping	Low shrubs of <i>Acacia</i> spp. over hummock grassland	<i>Acacia bivenosa</i> , <i>A. stellaticeps</i>	Sand, clay	Moderate	Up to 1/4	<1 m	1-5 years	Distinct	3 days	1 day	

APPENDIX C: BILBY REGIONAL APPENDIX



APPENDIX D: BILBY SCAT REPORT



*Please note that site names have been updated and are not as listed in the Bilby scat report.

Helix

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Genotyping the Greater Bilby (*Macrotis lagotis*) from scat samples for individual identification



Prepared for

Spectrum Ecology and
Spatial

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Genotyping Greater Bilby (*Macrotis lagotis*) Individuals from Scat Samples

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Figure 1

Multilocus genotype curve used to determine required number of loci for discrimination of unknown individuals from scat samples. MLG = Number of multilocus genotypes detected, NumLoci = Number of loci sampled. Dotted line (--) depicts 100% discrimination of genotypes. 14

1.0 Glossary

allele	An allele is one of two or more versions of DNA sequence (a single base or a segment of bases) at a given genomic location.
B_p	<u>Base pairs</u> . They are the fundamental unit of double-stranded nucleic acids consisting of two nucleobases bound to each other by hydrogen bonds. They form the building blocks of the DNA double helix.
DNA	Deoxyribonucleic acid. DNA is the molecule that carries genetic information for the development and functioning of an organism.
FA	<u>Fragment Analysis</u> . Fragment analysis is a genetic analysis method that uses fluorescently labelled DNA fragments and capillary electrophoresis to size and genotype DNA.
F_{IS}	Inbreeding Coefficient also known as heterozygote deficit; a measurement of the reduction in heterozygosity of an individual as a result of non-random mating within its subpopulation.
genotype	A genotype is a scoring of the type of variant present at a given location (i.e. a locus) in the genome.
H_E	<u>Expected Heterozygosity</u> .
H_O	<u>Observed Heterozygosity</u> .
HWE	<u>Hardy Weinberg Equilibrium</u> . It is a principle stating that the genetic variation in a population will remain constant from one generation to the next in the absence of disturbing factors. When mating is random in a large population with no disruptive circumstances, the law predicts that both genotype and allele frequencies will remain constant because they are in equilibrium.
I	<u>Information index</u> .
loci	Plural of locus.
locus	A specific, fixed position on a chromosome where a particular gene or genetic marker is located.
N_a	<u>Number of alleles</u> . Allelic variation at a locus that can be measured/observed within a population.
N_e	<u>Number of effective alleles</u> . The number of equally frequent alleles that it would take to achieve the same expected heterozygosity as in your studied population. This number is, in general, lower than the actual (observed) number of alleles.
PCR	<u>Polymerase Chain Reaction</u> . A method widely used to make millions to billions of copies of a specific DNA sample rapidly, allowing scientists to amplify a very small sample of DNA (or a part of it) sufficiently to enable detailed study.
Polymorphism	Refers to the presence of two or more variant forms of a specific DNA sequence (allele) that can occur among different individuals or populations.
uH_E	<u>Unbiased Expected Heterozygosity</u> .

2.0 Executive Summary

Helix Molecular Solutions (Helix) was engaged by Spectrum Ecology to perform DNA extractions from faecal (scat) samples collected during a targeted survey. The objective of this project was to assign individual identification based on the unique genotypes. DNA was extracted from Forty-five bilby scat samples submitted to Helix Molecular Sciences (Helix) from the project area. Eighteen samples yielded DNA of sufficient quality to produce a clean genotype suitable for individual discrimination. When all sampling years are considered, genotypes were assigned to a total of six distinct genotype identity groups, with each group representing the identity of a single individual. Three groups were exclusive to the current survey and three had previously been detected by Helix from surveys that occurred in 2021, 2022 and 2023. None of the three previously detected groups were identified in the current scat collection. Across the four survey years (2021 – 2024) there have been in total, six individual bilbies (*Macrotis lagotis*) detected.

3.0 Introduction

3.1 Study Scope

Spectrum Ecology and Spatial engaged Helix to determine the minimum number of individual bilbies (*Macrotis lagotis*) collected from the project area across three sampling periods (25th March / 1st May, 30 – 31st July, and 5th – 9th August 2024). This was undertaken by extracting DNA from scat samples collected during surveys, followed by genotyping those that yielded high quality DNA.

4.0 Methods

DNA was extracted from forty-five scat samples suspected to belong to the Greater Bilby (*Macrotis lagotis*). Collections occurred during three sampling periods: the March/May collection garnered $n=12$ samples, the July collection yielded $n=11$ samples and the August collection amassed $n=22$ samples (Table 1). Scat samples submitted to Helix were stored in a sterile vial in silica-based desiccant to preserve DNA through the provision of a dry environment. Samples were moderately to extremely dry upon receipt and ranged in size from small to large. One to three scats from each sample were selected for extraction. During analysis, reference genetic data was included from previous collections within the general project area to determine if the same individuals were detected across different survey years (2021 – 2023, Table 2).

Table 1 Bilby scat sample identification and collection details from the current collection. Shaded cells represent samples that did not produce a useable genotype.

Sampling locality	Easting (m)	Northing (m)	Collection date	Sampling year	Scat Field ID	Scat size	Scat moisture status	Helix ID
MR GB OS 23	696795	7607964	1/5/2024	2024	MRGB OS23 S1	Medium	Dry	TJ01
MR GB OS 23	696781	7607927	1/5/2024	2024	MRGB OS23 S2	Medium	Moderate	TJ02
MR GB OS 23	696781	7607927	1/5/2024	2024	MRGB OS23 S2.1	Med-Large	Dry	TJ03
MR GB OS 23	696829	7607937	1/5/2024	2024	MRGB 23 Scat 3	Small-Med	Moderate	TJ04
MR GB OS 23	696817	7607961	1/5/2024	2024	MRGB OS23 Scat 4	Large	Moderate	TJ05
MR GB OS 23	696811	7607966	1/5/2024	2024	MRGB OS23 S5	Med-Large	Very dry	TJ06
MR GB OS 23	696798	7607944	1/5/2024	2024	MRGB OS23 S6	Medium	Dry	TJ07
MR GB OS 23	696795	7607945	1/5/2024	2024	MRGB OS23 S7	Small-Med	Very dry	TJ08
MR GB OS 23	696792	7607973	1/5/2024	2024	MRGB OS23 S8	Large	Moderate	TJ09
MR GB OS 23	696761	7607983	1/5/2024	2024	MRGB OS23 S9	Small-Med	Very dry	TJ10
MR GB OS 23	696761	7607983	1/5/2024	2024	MRGB OS23 Scat 9.1	Small	Moderate	TJ11
MR GB AS 41	685880	7650686	25/3/2024	2024	MRGB ASI41	Small	Very dry	TJ12
MR GB OS 23	696748	7607992	30/7/2024	2024	GB23 P01	Med-Large	Very dry	TJ13
MR GB OS 23	696735	7607997	30/7/2024	2024	GB23 P02	Small	Very dry	TJ14
MR GB OS 23	696771	7607999	30/7/2024	2024	GB23 P03	Small	Very dry	TJ15
MR GB OS 23	696796	7607971	30/7/2024	2024	GB23 P04	Small	Dry	TJ16
MR GB OS 23	696796	7607971	30/7/2024	2024	GB23 P05	Small	Very dry	TJ17
MR GB OS 23	696780	7607997	30/7/2024	2024	GB23 P06	Large	Very dry	TJ18
MR GB OS 23	696797	7607970	30/7/2024	2024	GB23 P07	Large	Dry	TJ19
MR GB OS 23	696797	7607970	30/7/2024	2024	GB23 P08	Small-Med	Very dry	TJ20
MR GB OS 23	696795	7607972	30/7/2024	2024	GB23 P09	Med-Large	Very dry	TJ21
MR GB AS 41	685921	7650713	31/7/2024	2024	GB41 P01	Small	Extremely dry	TJ22
MR GB AS 41	685770	7650735	31/7/2024	2024	GB41 P02	Med-Large	Very dry	TJ23
WDG_43	682102	7655845	5/8/2024	2024	WDG_43 01	Medium	Moderate	TJ24

Sampling locality	Easting (m)	Northing (m)	Collection date	Sampling year	Scat Field ID	Scat size	Scat moisture status	Helix ID
WDG_54	686001	7651226	8/8/2024	2024	Peanut 01	Med-Large	Dry	TJ25
WDG_54	686136	7651140	8/8/2024	2024	Peanut 02	Medium	Dry	TJ26
WDG_54	686003	7651040	8/8/2024	2024	Peanut 03	Medium	Very dry	TJ27
WDG_54	685796	7651060	8/8/2024	2024	Peanut 04	Medium	Dry	TJ28
WDG_54	685814	7651052	8/8/2024	2024	Peanut 05	Small-Large	Very dry	TJ29
WDG_54	685813	7651048	8/8/2024	2024	Peanut 06	Medium	Dry	TJ30
WDG_54	685916	7651036	8/8/2024	2024	Peanut 07	Med-Large	Very dry	TJ31
WDG_54	685924	7651041	8/8/2024	2024	Peanut 08	Extra-large	Dry	TJ32
WDG_54	685924	7651043	8/8/2024	2024	Peanut 09	Medium	Very dry	TJ33
WDG_54	685946	7651044	8/8/2024	2024	Peanut 10	Med-Large	Very dry	TJ34
WDG_54	686003	7651034	8/8/2024	2024	Peanut 11	Large	Very dry	TJ35
WDG_54	685966	7651067	8/8/2024	2024	Peanut 12	Medium	Dry	TJ36
WDG_54	685989	7650969	8/8/2024	2024	Peanut 13	Large	Very dry	TJ37
WDG_54	685994	7650969	8/8/2024	2024	Peanut 14	Med-Large	Very dry	TJ38
WDG_51	686243	7651114	9/8/2024	2024	WDG_51 01	Large	Very dry	TJ39
WDG_51	686242	7651108	9/8/2024	2024	WDG_51 02	Medium	Very dry	TJ40
WDG_51	686289	7651059	9/8/2024	2024	WDG_51 03.1	Medium	Very dry	TJ41
WDG_51	686289	7651059	9/8/2024	2024	WDG_51 03.2	Small	Very dry	TJ42
WDG_51	686291	7651118	9/8/2024	2024	WDG_51 04	Medium	Very dry	TJ43
WDG_51	686292	7651115	9/8/2024	2024	WDG_51 05	Large	Very dry	TJ44
WDG_12	682582	7655575	5/8/2024	2024	WDG_12 01	Large	Very dry	TJ45

Table 2 Bilby scat sample identification and collection details collated from the three previous sampling years (2021 – 2023).

Shaded cells represent samples that did not produce a useable genotype.

Sampling locality	Easting (m)	Northing (m)	Collection date	Sampling year	Scat Field ID	Scat size	Scat moisture status	Helix ID
MR GB OS23	696704	7608025	27/06/2023	2023	MR GB OS 23 SO1	Medium	Dry	SM01
MR GB OS23	696704	7608025	27/06/2023	2023	MR GB OS 23 SO2	Large	Dry	SM02
MR GB OS23	696704	7608025	03/03/2023	2023	MR GB OS 23 SO3	Large	Dry	SM03
MR GB OS23	665350	7717540	03/03/2023	2023	MR GB OS 23 SO4	Medium	Dry	SM04
MR GB OS23	696790	7607969	03/03/2023	2023	2300 GB OS 23	Large	Dry	SM05
MR GB OS23	696736	7608005	28/02/2023	2023	2300 GB OS 23	Med-Large	Dry	SM06
MR GB OS23	696772	7607974	27/6/2022	2022	GBS01	Med-Large	Dry	RP01
MR GB OS23	696775	7607972	27/6/2022	2022	GBS02	Med-Large	Dry	RP02
MR GB OS23	696771	7607972	27/6/2022	2022	GBS03	Med-Large	Dry	RP03

Sampling locality	Easting (m)	Northing (m)	Collection date	Sampling year	Scat Field ID	Scat size	Scat moisture status	Helix ID
MR GB OS23	696793	7607985	27/6/2022	2022	GBS04	Med-Large	Dry	RP04
MR GB OS23	696853	7608012	27/6/2022	2022	GBS05	Med-Large	Dry	RP05
MR GB OS23	696844	7608034	27/6/2022	2022	GBS06	Med-Large	Dry	RP06
MR GB ASC16	745448	7606559	11/7/2022	2022	C16 Scat 01	Med-Large	Dry	RP07
MR GB OS23	696686	7608071	11/6/2021	2021	OS23 SCAT01NP	Medium	Dry	QT1
MR GB OS23	696689	7608074	11/6/2021	2021	OS23 SCAT02NP	Small - Med	Wet	QT4
MR GB ASC16	-	-	11/6/2021	2021	ASC16 SCAT02NP	Small - Med	Dry	QT6
MR GB ASC16	745257	7606709	11/6/2021	2021	ASC16 SCAT03NP	Medium	Moderate	QT7
MR GB OS23	696682	7608055	11/6/2021	2021	OS23 SCAT04NP	Medium	Dry	QT9
MR GB OS23	696689	7608032	11/6/2021	2021	OS23 SCAT05NP	Med - Large	Dry	QT8
MR GB OS23	696761	7608120	11/6/2021	2021	OS23 SCAT06NP	Med - Large	Dry	QT10
MR GB ASC16	744890	7606952	11/6/2021	2021	ASC16 SCAT01NP	Medium	Wet	QT14
MR GB OS23	696689	7608075	11/6/2021	2021	OS23 SCAT03NP	Medium	Wet	QT15

4.1 DNA Extraction, PCR Amplification and Fragment Sizing

All scat samples submitted to Helix were extracted using the QIAGEN QIAamp Fast DNA Stool mini kit (Qiagen, Hilden, Germany). Samples were washed in buffer as per Carpenter *et al.* (2017), incubated in the buffer overnight to allow maximum recovery of DNA and eluted as per manufacturers protocols.

Seven microsatellite loci (Moritz *et al.* 1997 and Smith *et al.* 2009) were amplified using the QIAGEN Multiplex PCR kit (Qiagen, Hilden, Germany) in triplicate (Table 3). PCR products were analysed on an ABI3730XL Sequencer using Genescan-500 LIZ internal standard (Thermo Fisher Scientific) and scored using the software Geneious Prime® version 2024.0.7 (Drummond *et al.* 2011). Individual genotypes were based on molecular weights.

Table 3 Summary Information for the seven microsatellite loci used on the Bilby scat samples across all sampling years.

T optimal annealing temperature, *B_p* allele size range.

Loci	Repeat bases	Primer sequences (5' - 3')	<i>T</i>	<i>B_p</i>
B22	(CA) ₁₆	F: GGT ATG AGG AAT TAG AAT TAC AGG	55	183-193
		R: CGG TAT TAA ATG GGC TAT GGA GT		
B63	(CA) ₁₄	F: CTT AGG CAA ATA GGG TGA AGT GG	55	232-250
		R: CAG AAC CAT TAG GAA GGA GTT TC		
B41	(CA) ₁₄	F: TGA CTT TCT TTT GCT ACA ACA ACC	55	177-192
		R: GGA AAA GTT TTT AGC CTA ATA GTG G		
B55	(CA) ₂₄	F: GCA CCA ACC TAT CCT CTT CAT TC	55	186-196
		R: CTA CAA GTC TGA TAA TTC CAG GC		
B02	(CA) ₁₇	F: GCA TGT ACT TAA CCC CCT TTG CC	55	170-183

Loci	Repeat bases	Primer sequences (5' - 3')	T	B _p
		R: CCC GAC AAT CCA GCC TGT TAT TC		
B17	(CA) ₁₆	F: AGC CTG TGT GTC TTA AAA TGC	55	212-221
		R: CTC CAA TTC ACT TTT CCT GAG AC		
B56	(CA) ₂₃	F: CACACTTATACATACACGTACACG	55	157-170
		R: CAC TAA CAA ATA TGC TTG GGA AAG G		

For quality control, samples that failed genotyping were diluted and re-amplified to test if PCR failure was due to inhibitors in the DNA. When this did not yield additional data points a species identification PCR was performed to confirm the quality of the DNA and species of origin. Species identification PCR amplified an internal fragment of the cytochrome oxidase I gene (COI) which was then compared against the publicly available database GenBank (ncbi.nlm.nih.gov/genbank/) to determine the most likely species of origin. Ten of the twenty-seven scat samples amplified and were sent to third party service Australian Genome Research Facility (AGRF) for sanger sequencing. The sequences were edited using GENEIOUS Prime software version 2024.0.7 (Drummond *et al.* 2011).

4.2 Genetic Diversity Analyses

Basic population genetic statistics were generated using *R* (R core team, 2022) software and the excel add-in GenALEx version 6.5 (Peakall and Smousse, 2006, 2012). The *R* package ‘PopGenReport’ (Adamack and Gruber, 2017) was used to assess data quality in the form of null alleles, with the frequency of null alleles determined per locus using the method of Brookfield (1996). Departures from Hardy-Weinberg equilibrium (*HWE*) were assessed for each locus and sampling year with the *R* package ‘pegas’ (Paradis, 2010), using an exact test with 1000 Monte Carlo permutations and $\alpha = 0.05$. The *R* package ‘poppr’ (Kamvar *et al.* 2014) was used to evaluate the level of missing data. GenALEx (Peakall and Smousse, 2006, 2012) was used to calculate the number of alleles (N_A), number of effective alleles (N_E), observed and unbiased expected heterozygosities (H_O and uH_E), the Information index (I) and the inbreeding coefficient (F_{IS}).

The *R* package ‘poppr’ (Kamvar *et al.* 2014) was used to create an accumulative genotype curve to assess whether the number of loci was sufficient to discriminate unique multilocus genotypes (MLG’s) from the genetic data of unknown individuals. Loci were randomly sampled until $n - 1$ loci (n being the total number of loci), and the number of observed genotypes were counted with each iteration. A distribution for each locus was generated by resampling 10,000 times without replacement. A plateau point in the curve indicates that the loci are sufficient to accurately describe the number of MLG’s in the data. The ‘poppr’ (Kamvar *et al.* 2014) package was also used to discriminate between the identified MLG’s and assign them to genotype identity groups. Assignment was confirmed through manual appraisal of the genetic data.

5.0 Results

Seven loci were successfully amplified in eighteen bilby scat samples collected from the project area. The current sample genotypes were combined with genotypes generated during prior collections for analysis.

The genotype accumulation curve plateaus at four loci, indicating four loci are sufficient to accurately discriminate the number of unique individuals in this dataset with high confidence (Figure 1). Sample genotypes of less than four loci were excluded from further analyses (see Table 1 and Table 2)

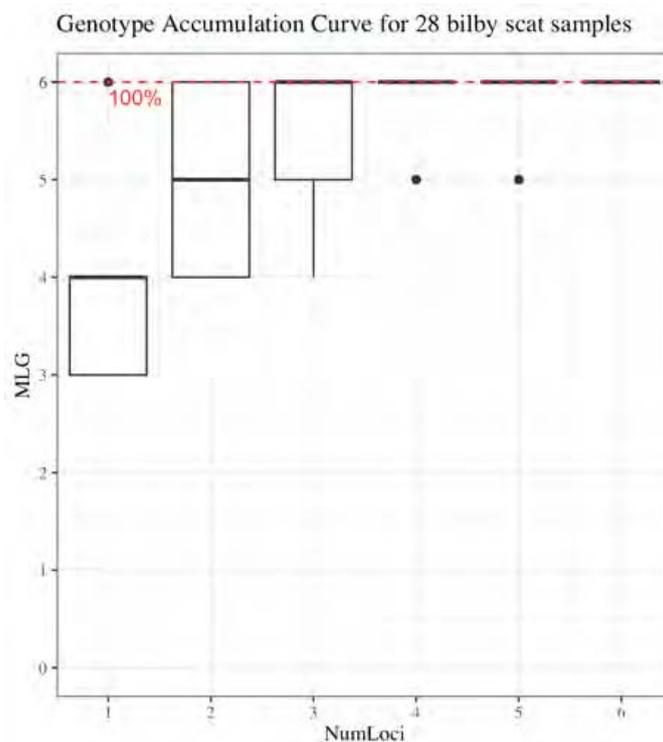


Figure 1 Multilocus genotype curve used to determine required number of loci for discrimination of unknown individuals from scat samples. MLG = Number of multilocus genotypes detected, NumLoci = Number of loci sampled. Dotted line (--) depicts 100% discrimination of genotypes.

All seven loci were polymorphic and conformed to Hardy-Weinberg equilibrium. No null alleles were detected. Of the analysed samples with a unique genotype and four or greater working loci, missing data was insignificant and averaged 1.5%. The number of alleles observed across the seven loci ranged from 1.75 (± 0.25) to 2.25 (± 0.25) and averages 1.96 (± 0.13) alleles (Table 4). The number of effective alleles is similar, ranging from 1.60 (± 0.25) – 2.15 (± 0.54) and averaging 1.83 (± 0.26) effective alleles. The information index averages 0.58 (± 0.16) across loci, with *B55* identified as the most informative ($I = 0.77 \pm 0.08$) and *B17* the least informative ($I = 0.43 \pm 0.25$) loci. Observed and unbiased expected heterozygosity's are moderate and similar, averaging about 70 % (mean $H_o = 0.70 \pm 0.19$, mean $uH_e = 0.68 \pm 0.20$). No inbreeding is detected, as exemplified by the negative inbreeding coefficient estimate (mean $F_{IS} = -0.78 \pm 0.05$).

Table 4 Genetic diversity statistics generated from seven microsatellite loci for the unique Bilby genotypes ($n = 6$) collected during four survey years.

N_a – number of alleles, N_e – number of effective alleles, I – information index, F_{IS} – inbreeding coefficient, H_o – observed heterozygosity, uH_e – unbiased expected heterozygosity.

Loci	N_a	N_e	I	F_{IS}	H_o	uH_e
B55	2.25 ± 0.25	2.14 ± 0.14	0.77 ± 0.08	-0.90	1.00 ± 0.00	0.93 ± 0.07
B22	1.75 ± 0.25	1.60 ± 0.25	0.50 ± 0.16	-0.83	0.58 ± 0.25	0.58 ± 0.25
B63	2.25 ± 0.63	2.15 ± 0.54	0.68 ± 0.27	-0.74	0.75 ± 0.25	0.72 ± 0.24
B41	1.75 ± 0.25	1.70 ± 0.24	0.51 ± 0.17	-0.85	0.67 ± 0.24	0.63 ± 0.24
B02	1.75 ± 0.25	1.60 ± 0.25	0.50 ± 0.16	-0.83	0.58 ± 0.25	0.58 ± 0.25
B17	1.75 ± 0.48	1.64 ± 0.39	0.43 ± 0.25	-0.50	0.41 ± 0.25	0.43 ± 0.26
B56	2.25 ± 0.25	2.00 ± 0.00	0.74 ± 0.04	-0.83	0.91 ± 0.08	0.90 ± 0.10
Mean	1.96 ± 0.34	1.83 ± 0.26	0.58 ± 0.16	-0.78 ± 0.05	0.70 ± 0.19	0.68 ± 0.20

For this current sampling year, eighteen of the forty-five submitted samples were of sufficient quality to assign a genotype identity (Table 5). Twenty-seven samples failed genotyping across six repeat runs, amplifying for only three or less loci. Sequence analysis confirmed that nine of these samples originated from the bilby (100% sequence match to *Macrotis lagotis*); however sequence analysis of the remaining eighteen samples was not possible due to DNA degradation (Table 5) - a factor which precluded the 27 samples from use in microsatellite analysis. DNA degradation can likely be attributed to scat age and/or exposure to adverse weather conditions. Of the eighteen remaining samples that were assigned a genotype identity, three genotypes (individual identity groups *four*, *five* and *six*) were identified. All three genotypes were new and were detected ten, five and three times respectively. When all four sampling years (2021 – 2024) are considered, six individual bilbies were detected from the total sixty-seven scat samples. In addition to the three genotypes exclusive to the current collection, one genotype is solely detected from samples collected in 2022 and 2023 (individual identity group *one*) and two genotypes are restricted to samples collected during the 2021 and 2022 sampling periods (individual identity groups *two* and *three*). None of the previously detected genotypes were observed in the current collection (2024).

Table 5 Bilby scat identifying characteristics, number of genotyped loci and individual identity group assignment for samples collected across the project area during four sampling years. **BOLD text indicates samples identified as bilby through genetic sequencing.**

Helix ID	Field Scat ID	Sampling Year	Sampling Point	Individual Identity
TJ01	MRGB OS23 S1	2024	MR GB OS 23	4
TJ02	MRGB OS23 S2	2024	MR GB OS 23	Failed
TJ03	MRGB OS23 S2.1	2024	MR GB OS 23	Failed
TJ04	MRGB 23 Scat 3	2024	MR GB OS 23	5
TJ05	MRGB OS23 Scat 4	2024	MR GB OS 23	Failed
TJ06	MRGB OS23 S5	2024	MR GB OS 23	4
TJ07	MRGB OS23 S6	2024	MR GB OS 23	4
TJ08	MRGB OS23 S7	2024	MR GB OS 23	4
TJ09	MRGB OS23 S8	2024	MR GB OS 23	4

Helix ID	Field Scat ID	Sampling Year	Sampling Point	Individual Identity
TJ10	MRGB OS23 S9	2024	MR GB OS 23	5
TJ11	MRGB OS23 Scat 9.1	2024	MR GB OS 23	5
TJ12	MRGB ASI41	2024	MR GB AS 41	6
TJ13	GB23 P01	2024	MR GB OS 23	4
TJ14	GB23 P02	2024	MR GB OS 23	5
TJ15	GB23 P03	2024	MR GB OS 23	4
TJ16	GB23 P04	2024	MR GB OS 23	4
TJ17	GB23 P05	2024	MR GB OS 23	5
TJ18	GB23 P06	2024	MR GB OS 23	4
TJ19	GB23 P07	2024	MR GB OS 23	4
TJ20	GB23 P08	2024	MR GB OS 23	Failed
TJ21	GB23 P09	2024	MR GB OS 23	Failed
TJ22	GB41 P01	2024	MR GB AS 41	Failed
TJ23	GB41 P02	2024	MR GB AS 41	Failed
TJ24	WDG_43 01	2024	WDG 43	Failed
TJ25	Peanut 01	2024	WDG 54	Failed
TJ26	Peanut 02	2024	WDG 54	Failed
TJ27	Peanut 03	2024	WDG 54	Failed
TJ28	Peanut 04	2024	WDG 54	Failed
TJ29	Peanut 05	2024	WDG 54	Failed
TJ30	Peanut 06	2024	WDG 54	Failed
TJ31	Peanut 07	2024	WDG 54	Failed
TJ32	Peanut 08	2024	WDG 54	Failed
TJ33	Peanut 09	2024	WDG 54	Failed
TJ34	Peanut 10	2024	WDG 54	Failed
TJ35	Peanut 11	2024	WDG 54	Failed
TJ36	Peanut 12	2024	WDG 54	Failed
TJ37	Peanut 13	2024	WDG 54	Failed
TJ38	Peanut 14	2024	WDG 54	Failed
TJ39	WDG_51 01	2024	WDG 51	Failed
TJ40	WDG_51 02	2024	WDG 51	Failed
TJ41	WDG_51 03.1	2024	WDG 51	Failed
TJ42	WDG_51 03.2	2024	WDG 51	6
TJ43	WDG_51 04	2024	WDG 51	Failed
TJ44	WDG_51 05	2024	WDG 51	6
TJ45	WDG_12 01	2024	WDG 12	Failed
SM03	MR GB OS 23 SO3	2023	MR GB OS 23	1

Helix ID	Field Scat ID	Sampling Year	Sampling Point	Individual Identity
SM06	2300 GB OS 23	2023	MR GB OS 23	1
RP01	MR GB OS 23	2022	MR GB OS 23	2
RP02	MR GB OS 23	2022	MR GB OS 23	1
RP03	MR GB OS 23	2022	MR GB OS 23	2
RP05	MR GB OS 23	2022	MR GB OS 23	2
RP07	MR GB AS C16	2022	MR GB ASC16	3
QT4	OS23 SCAT02NP	2021	MR GB OS 23	2
QT9	OS23 SCAT04NP	2021	MR GB ASC16	2
QT7	ASC16 SCAT03NP	2021	MR GB OS 23	3

6.0 Discussion

Scat DNA extraction and genotype assignment has been successful to determine the minimum number of unique bilby individuals collected from the project area, from samples with sufficient quality DNA.

Based on the genetic diversity of the bilby individuals and variability of the microsatellite loci, it was determined that at least four loci are required for accurate discrimination between individual genotypes. Eighteen of the forty-five scat samples produced good quality genomic DNA with a high amplification success rate of at least six loci. Of these eighteen genotypes, three unique individuals were detected and assigned the genotype identification codes *four*, *five* and *six*. All three genotypes represented new, distinct individuals. None of the three previously identified genotypes were detected from the current collection.

7.0 References

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**Appendix 1 Bilby (*Macrotis lagotis*)
microsatellite
genotyping results**

Table 6 Genotypes and individual identity assignments for the current bilby scat samples. Genotyping is based on seven microsatellite loci and coloured shading signifies dye type.

Helix ID	Sample ID	B55		B22		B63		B41		B02		B17		B56		Individual ID
TJ01	MRGB OS23 S1	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ02	MRGB OS23 S2	0	0	0	0	0	0	0	0	172?	174?	210?	210?	0	0	-
TJ03	MRGB OS23 S2.1	0	0	0	0	0	0	0	0	180?	180?	0	0	0	0	-
TJ04	MRGB 23 Scat 3	184	190	191	193	234	236	177	183	172	174	211	211	158	168	5
TJ05	MRGB OS23 Scat 4	190	196/198	193	193	228?	228?	177	183?	174	174	197?	197?	168	168	-
TJ06	MRGB OS23 S5	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ07	MRGB OS23 S6	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ08	MRGB OS23 S7	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ09	MRGB OS23 S8	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ10	MRGB OS23 S9	184	190	191	193	234	236	177	183	172	174	211	211	158	168	5
TJ11	MRGB OS23 Scat 9.1	184	190	191	193	234	236	177	183	172	174	211	211	158	168	5
TJ12	MRGB ASI41	190	196	193	193	228	238	177	177	174	174	197	218	168	168	6
TJ13	GB23 P01	190	196	193	193	228	236	177	183	174	174	197	211	156	168	6
TJ14	GB23 P02	184	190	191	193	234	236	177	183	172	174	211	211	158	168	4
TJ15	GB23 P03	190	196	193	193	0	0	177	183	174	174	197	211	156	168	5
TJ16	GB23 P04	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ17	GB23 P05	184	190	191	193	234	236	177	183	172	174	211	211	158	168	4
TJ18	GB23 P06	190	196	193	193	228	236	177	183	174	174	197	211	156	168	5
TJ19	GB23 P07	190	196	193	193	228	236	177	183	174	174	197	211	156	168	4
TJ20	GB23 P08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
TJ21	GB23 P09	194	194/196	193	193	236?	236?	177	177	174	174	197	197/211	156/168	156/168	-
TJ22	GB41 P01	0	0	0	0	0	0	0	0	0	0	212?	212?	0	0	-
TJ23	GB41 P02	196?	196?	0	0	0	0	0	0	0	0	210?	210?	0	0	-
TJ24	WDG_43 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ25	Peanut 01	184?	184?	0	0	0	0	177?	177?	168/174	174?	0	0	168/170	168/170	-
TJ26	Peanut 02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ27	Peanut 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-

Helix ID	Sample ID	B55		B22		B63		B41		B02		B17		B56		Individual ID
TJ28	Peanut 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ29	Peanut 05	182	184/190	193/197	193/197	234?	238?	177/183	177/183	168?	168?	0	0	168	168	-
TJ30	Peanut 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ31	Peanut 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ32	Peanut 08	190?	190?	0	0	0	0	0	0	174?	174?	218?	218?	166?	168?	-
TJ33	Peanut 09	190/196	190/196	193?	193?	238	238	177?	177?	174/180	174/182	218?	218?	164/170	168/170	-
TJ34	Peanut 10	184?	184?	193	193	0	0	177?	177?	168/174	168/174	0	0	168	168	-
TJ35	Peanut 11	190?	190?	193/197	193/197	238?	238?	177?	177?	0	0	211?	211?	168?	168?	-
TJ36	Peanut 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ37	Peanut 13	0	0	0	0	0	0	0	0	174?	174?	211?	211?	166/168	168	-
TJ38	Peanut 14	190?	190?	193?	193?	228?	228?	0	0	174?	174?	197?	197?	0	0	-
TJ39	WDG_51 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TJ40	WDG_51 02	0	0	0	0	0	0	177?	177?	168?	169?	0	0	168?	168?	-
TJ41	WDG_51 03.1	0	0	0	0	228?	228?	0	0	174?	174?	0	0	168?	168?	-
TJ42	WDG_51 03.2	190	196	193	193	228	238	177	177	174?	174?	197	218	168	168	6
TJ43	WDG_51 04	190?	190?	193/197	197	0	0	183/177	183/177	172?	172?	211?	211?	168?	168?	6
TJ44	WDG_51 05	190	196	193	193	228	238	177	177	174?	174?	197	218	168	168	-
TJ45	WDG_12 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-

Table 7 Previously reported genotypes and individual identity assignments for the two successfully amplified Bilby scat samples that were collected in March – June 2023. Genotyping is based on seven microsatellite loci and coloured shading signifies dye type.

Helix ID	Sample ID	B55		B22		B63		B41		B02		B17		B56		Individual ID
SM03	MR GB OS 23 SO3	190	196	193	193	230	238	177	183	174	174	211	211	157	168	1
SM06	2300 GB OS 23	190	196	193	193	230	238	177	183	174	174	211	211	157	168	1

Table 8 Previously reported genotypes and individual identity assignments for the five successfully amplified Bilby scat samples that were collected in June 2022.

Genotyping is based on seven microsatellite loci and coloured shading signifies dye type.

Helix ID	Sample ID	B55		B22		B63		B41		B02		B17		B56		Individual ID
RP01	GBS01	184	190	191	197	236	238	177	183	169	172	211	211	159	166	2
RP02	GBS02	190	196	193	193	230	238	177	183	174	174	211	211	157	168	1
RP03	GBS03	184	190	191	197	236	238	177	183	169	172	211	211	159	166	2
RP05	GBS05	184	190	191	197	236	238	177	183	169	172	211	211	159	166	2
RP07	C16 Scat 01	186	190	191	193	232	232	183	183	169	189	210	221	159	168	3

Table 9 Previously reported genotypes and individual identity assignments for the three successfully amplified Bilby scat samples that were collected in June 2021.

Genotyping is based on seven microsatellite loci and coloured shading signifies dye type.

Helix ID	Sample ID	B55		B22		B63		B41		B02		B17		B56		Individual ID
QT4	OS23 SCAT02NP	184	190	191	197	236	238	177	183	169	172	211	211	159	166	2
QT9	OS23 SCAT04NP	184	190	191	197	236	238	177	183	169	172	211	211	159	166	2
QT7	ASC16 SCAT03NP	186	190	191	193	232	232	183	183	169	189	210	221	159	168	3



Appendix 6: Land Use Certification Acquisitions and Tenements Procedure



Procedure

Land Use Certification

Acquisitions & Tenements (Business Process Owner)

26 April 2023

100-PR-TA-0001 Rev 2

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Land Use Certification			
Document & Revision Number	100-PR-TA-0001	Rev 2	26/04/2023
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Author	Melissa Carter		
Checked or Squad Review# (if applicable)	Sarah Mason Durack		
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Appendix 1:	Standard LUC Process Flowchart
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1. PURPOSE

This procedure details the requirements of Fortescue's Land Management System (LMS) as it relates to land use and the associated certification process.

Following this Land Use Certification Procedure (Procedure) ensures that the appropriate approvals have been obtained for all proposed activities before the activities commence and any related obligations can be effectively managed.

This is critical for protecting Fortescue's licence to operate.

Fortescue's land use certification process is managed in the InfoScope LMS software with an embedded web-map (Fortescue Maps), which is integrated with Fortescue GIS.

The Procedure:

- defines when a Land Use Certificate (LUC) is required and what type
- details the steps and associated guidelines for obtaining and managing LUCs (at a high-level)
- provides business justifications for key requirements
- defines key roles and responsibilities

The Procedure does not provide full details of how the LUC process is managed in InfoScope and Fortescue Maps. Detailed training and guidance, such as *Quick Reference Guides* (QRGs) for each process, are also available on the Fortescue Hub.

2. BACKGROUND

In June 2017, Fortescue upgraded its system for managing land use in WA, to achieve better protection of our licence to operate through improved transparency and accountability. The key changes that were implemented were:

- Ground Disturbance Permits (GDPs) were phased out and replaced by LUCs
- Retirement of the GDP module of the Business Management System (BMS)
- Management of the LUC process commenced in the InfoScope Land Management System (LMS)
- The scope for managing land use was increased - LUCs are required to cover more work types, i.e. not just ground disturbance activities
- An increased auditing and enforcement function of LUC close-outs was developed to improve accountability and reporting
- Overall, a more comprehensive and efficient application, assessment and approvals process was established

The changes were implemented following more than two (2) years of stakeholder consultation, assessment of previous and alternate systems, development and testing.

2.1 RECENT CHANGES

In 2020 an independent review of the system was undertaken by an external consultancy group called Veev and recommendations were made to assist FMG to manage our internal approvals and reduce risk to the business.

In 2021 LUC extensions and Retrospective LUCs were revoked, LUCs by Jurisdiction were implemented to encompass South Australia to start and reductions in size and shapes for geospatial mapping were also introduced.

In 2022 LUC Extensions were reinstated with approvals to ensure compliance. MRF Disturbance accounting grids were introduced along with selection of Tenure and ELP per work category. Partial Returns for cookie cut reductions and Pre-Endorsements were also introduced. Additional Jurisdictions for LUCs include Kazakhstan, Queensland, Gabon and FFI.

3. SCOPE

This procedure applies to all situations where a LUC is required, whenever a Fortescue employee, or contractor engaged to work on Fortescue's behalf, will be:

- disturbing new ground
- re-disturbing rehabilitated ground
- changing the purpose/usage of land¹
- increasing the previously approved capacity of an area²
- accessing an area to conduct a Non-exempt Activity
- conducting maintenance work that involves earth movement or relocation of fixed infrastructure
- rehabilitating previously disturbed ground

Refer to Sections 7.1 and 7.2 of the procedure for full details of when a LUC is required, and if so, what type.

¹ For example, an area previously cleared and used as a laydown being transitioned to be a fuel storage area.

² For example, increased number of rooms at a camp, increased amount of fuel at storage location.

4. KEY ROLES

To ensure the integrity and effectiveness of the LUC process is maintained, there are several key roles with specific responsibilities, as listed in Table 1.

Table 1: Key Accountabilities

Role	Responsibility	Accountable Person(s)
Applicant	The person responsible for oversight, facilitation and/or conduct of an eligible activity. Works together with the Secondary Contact(s) and On-site Responsible Person(s) (optional) to manage all LUC activity.	Fortescue employees with appropriate level of authority to oversee activities.
Application Owner	The person responsible for ensuring the software application used to deliver the LUC business process (InfoScope) continues to meet business requirements, and if it does not the Application Owner will sponsor the required enhancement(s).	Acquisitions & Tenements Manager
Approver	The person responsible for assessing whether a LUC application has any constraints or obligations relating to their business unit. For example: A Tenure Approver assesses potential tenement constraints and obligations; an Environment Approver conducts an assessment of potential environmental constraints and obligations; etc.	Nominated Fortescue employees from the Tenure, Government & CSR, Environment, Heritage, Pastoral Access and Water Management teams. The persons nominated as Approvers representing each team are at the discretion of the team or group managers (Manager Acquisitions & Tenements; Manager Government & CSR; Site HSES Managers; Manager Exploration; Manager Heritage; Manager Pastoral Access; Manager Water Planning).
Business Process Owner	The person responsible for ensuring the LUC process and associated system(s) continue to meet Fortescue business requirements – driving enhancements where required.	Acquisitions & Tenements Manager
Endorser	The person responsible for conducting a first-pass assessment of whether a Ground Disturbing LUC application is as per the expected mining, exploration or development plan.	<p>Nominated Fortescue employees from Mine Planning, Mining Operations and Exploration teams. The persons nominated are at the discretion of each site General Manager. The Primary Endorser role for an operations area is generally filled by Manager Operations Planning (or a nominated direct report).</p> <p>The Primary Endorser role for an exploration area is generally filled by Manager Exploration (or a nominated direct report).</p>

Role	Responsibility	Accountable Person(s)
Endorser & Approver Teams	<p>Those responsible for conducting a first-pass assessment of whether a Ground Disturbing LUC application is as per the expected mining, exploration or development plan. Both a Primary Endorser Team and Backup Endorser Team are required to be nominated for each Activity Area to avoid an individual person becoming a 'bottleneck'.</p> <p>These Teams are also responsible for the development and maintenance of internal team/departmental processes for assessing LUCs.</p>	<p>Endorser Teams: nominated Fortescue employees from Mine Planning, Mining Operations and Exploration teams.</p> <p>Approver Teams: nominated Fortescue employees from the Tenure, Government & CSR, Environment, Heritage, Pastoral Access and Water Management teams.</p>
Interested Parties	<p>Persons who have an interest in being informed/alerted about LUCs of certain types or in certain areas. Adding a watch to a LUC will trigger email notifications when certain LUC processes occur.</p>	<p>Any Fortescue employee who has LUC access</p>
Land Use Advisor(s) (LUA)	<p>Persons within the business who have authority to provide high level advice on the LUC process. LUAs are the only people who can provide advice that a LUC is not required for a particular activity. If there is uncertainty after reading this procedure advice should be obtained in writing.</p>	<p>See Section 7.8 Land Use Advisors</p>
LMS Team	<p>Responsible for InfoScope/LUC Support, application development and maintenance.</p>	<p>Sarah Mason Durack – Approvals Senior Advisor Melissa Carter – Systems Analyst Sophie Papalia – Approval Support Nicole Broderick – Approvals Support</p>
On-site Responsible Person	<p>The person responsible for assessing and accepting LUC conditions, oversight, facilitation or conduct of an eligible activity at a site-level. The Applicant and On-site Responsible Person may be the same.</p>	<p>Fortescue employees or contractors with appropriate level of authority to oversee activities.</p>
Pre-Endorser	<p>The person responsible for basic fact check of the LUC application; Estimated disturbance to be equivalent to shapefile submitted, Detailed scope of Works and spatial sensitivities.</p>	<p>LMS Team</p>
Proxies	<p>To ensure sufficient people have capacity to draft, edit, review and manage a LUC and the associated activities, once a LUC is created by an Applicant, the additional roles can act as proxies:</p> <ul style="list-style-type: none"> • Secondary Contact(s) • On-site Responsible Person(s) • Responsible Team members <p>Collectively, these people are responsible.</p>	<p>Refer to details provided for Secondary Contact, On-site Responsible Person, and Responsible Team.</p>

Role	Responsibility	Accountable Person(s)
Responsible Team	The team of people responsible for oversight, facilitation or conduct of a LUC activity. Teams are not extracted from SAP or Org Charts, but setup in InfoScope through discussion with an LMS Application Specialist(s). Nominating a Responsible Team may assist in searching for and managing LUCs for your work area.	Groups of Fortescue employees nominated/setup as Teams in InfoScope.
Secondary Contact	A person who assists or works together with the LUC Applicant to ensure the LUC is obtained and provided to the correct personnel.	Fortescue employees with appropriate level of authority to oversee activities.

5. DEFINITIONS

Key definitions used in the Procedure are set out in Table 2.

Table 2: Definition of Terms/Acronyms

Word/Term	Definition
Activity Area	Spatially defined area where Fortescue conducts activities, either at an exploration, development, or operations level (i.e. Port, Solomon, Chichesters, Iron Bridge, Eliwana, Rail, FFI, Exploration ALL).
Application Date	Date on which a LUC is submitted for assessment.
Approval Date	Date on which all required endorsements & approvals have been received and any LUC conditions have been accepted. This is also the date at which the LUC status becomes 'Active'.
BMS	Refer to Business Management System for full definition.
Business Management System (BMS)	A web-based Fortescue IT system used for tracking and managing several processes, including: Incidents & Events; Environmental Approvals; Environmental Obligations; Field Leadership; etc. Prior to June 2017, GDPs were also managed in BMS. BMS is available via the Fortescue Hub App Centre https://fmgl.sharepoint.com/apps/Pages/BMS.aspx
ELP	Environmental Licence or Permit
ELP ID	BMS unique identifier given to individual environmental licence or permit approvals records.
Estimated Disturbance	The approximate area to be designated to a work category in Ha. When including multiple work categories under the one Ground Disturbing LUC, the approximate Ha for each category must be provided.

Word/Term	Definition
Estimated Topsoil Volume	The approximate amount of topsoil to be disturbed during the proposed Works in M ² .
Exempt Activity	Activity defined as not requiring a LUC - See Procedure section 7.1
Expiry Date	Date on which a LUC ceases to be valid and no longer covers any proposed works.
FM	Fortescue Maps
Fortescue	Fortescue Metals Group Limited all subsidiaries and employees.
Fortescue Maps (FM)	<p>A web-based Fortescue IT system providing specialised GIS web-map services. FM is a self-service mapping package that will allow anyone with a current Fortescue account to access certain GIS data directly from the live GIS database.</p> <p>FM is also embedded into InfoScope and provides the web-map functionality for the LUC process. For all LUC processes users should log in to InfoScope first.</p> <p>Additional information, training materials and direct access to FM are available via the Fortescue Hub App Centre App Centre - Fortescue Maps (sharepoint.com)</p>
GDP	Ground Disturbance Permit
Ground Disturbance Permit (GDP)	A historical certificate or permit issued to confirm that proposed ground disturbing activities had been assessed against various potential constraints and obligations. In June 2017, GDP were replaced by LUCs.
InfoScope	A web-based Vendor IT system used for tracking and handling a number of processes, including: Land Use Certification; Tenement acquisition & management; Tenement, Pastoral, Native Title & Heritage obligations; Aboriginal heritage surveys & approvals; VTEC training & case management. InfoScope and all training materials are available via the Fortescue Hub App Centre App Centre - InfoScope (sharepoint.com)
Land Use Certificate	A certificate issued to confirm that proposed land use activities adhere to the correct approvals granted by Government departments and have been assessed against various potential constraints and obligations.
LUC Area	The spatially defined location that the proposed or approved activity will take place.
LUC Breach	<p>A breach has occurred if:</p> <ul style="list-style-type: none"> LUC condition(s) have not been complied with

Word/Term	Definition
	<ul style="list-style-type: none"> The LUC activity took place outside of the active LUC period (i.e. before the LUC became active or after the LUC expired, including where no LUC Application has been made) The activity took place outside the approved LUC Areas The activity conducted was not in line with the defined scope
LUC ID	Infoscope unique identifier given to individual Land Use Certificate record.
LUC Short Name	A brief, anecdotal title or descriptor given to a LUC to provide a useful search or reference term. Naming conventions are recommended
LUC Type	The category of LUC applicable to a specific activity. See Procedure section 7.2
Mining Rehabilitation Fund (MRF)	An established fund to provide the State Government with a secure source of funding for the rehabilitation of abandoned mine sites and other land affected by mining operations. The fund is administered by the Department of Mines and Petroleum.
Non-exempt Activity	Activity defined as requiring a LUC application - See Procedure section 7.1
Proposed End Date	Date the proposed works are expected to be completed; This can be amended following approval if plans change, or works are delayed.
Proposed Start Date	Date the proposed works are expected to commence; This can be amended following approval if plans change, or works are delayed.
Sensitivity Checks	A series of assessments conducted in Fortescue Maps which check a LUC Area and Type against numerous GIS data sets and provide feedback on possible issues.
Topsoil Storage Location	A designated area used for the purpose of storing topsoil when it is disturbed. Topsoil Storage Locations are a type of Ground Disturbing LUC activity, but must stand alone (cannot be captured with other work categories under a broader LUC).

6. LEGISLATIVE CONTEXT

The following Legislation, Agreements and Management Plans provides the broad framework for which this procedure must operate and with which it needs to comply. The endorsement and approval steps included in the LUC process ensure key areas of the Fortescue business can assess proposed activities against the relevant obligations.

Table 3: Legislation/Obligations

Legislation, Agreements, Management Plans
Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSIHP Act)
Aboriginal Heritage Act 1972 (WA)
Access and Commercial Agreements between Fortescue and 3 rd party landholders
Agreements between Fortescue and Pastoralists
Agriculture and Related Resources Protection Act 1976 (WA)
Conservation and Land Management Act 1984 (WA)
Cultural Heritage Management Plans
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
Environmental Management Plans
Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA)
Environmental Protection Act 1986 (WA) (EP Act)
Environmental Protection Regulations 1987 (WA)
Heritage, Land Access, Land Use and Project Area Agreements between Fortescue and Aboriginal stakeholders
Iron Ore (FMG Chichester Pty Ltd) Agreement Act 2006 (WA)
Mineral Resources) Act 2019 (SA)
Mines Safety and Inspection Regulations 1995 (WA)
Mining Act 1971 (SA)
Mining Act 1978 (WA)
Mining Regulations 2020 (SA)
Mining Rehabilitation Fund Act 2012 (WA)
Railway and Port (The Pilbara Infrastructure Pty Ltd) Agreement Act 2004 (WA)
Rights in Water and Irrigation Act 1914 (WA)
Soil and Land Conservation Act 1945 (WA)
Statutes Amendment (Mineral Resources) Act 2019 (SA)
Wildlife Conservation Act 1950 (WA)

7. PROCEDURE

7.1 WHEN A LUC IS REQUIRED

An active LUC is required whenever a Fortescue Employee, or contractor engaged to work on Fortescue's behalf, will be:

- disturbing new ground
- rehabilitating previously disturbed ground
- re-disturbing rehabilitated ground
- changing the purpose/usage of land³
- increasing the previously approved capacity of an area⁴
- accessing an area to conduct a Non-exempt Activity
- conducting maintenance work that involves earth movement (including grading or digging)

Along with the above description of circumstances, carefully read section 7.2 of this Procedure, which further clarifies the type of LUC you should obtain for the activity being undertaking.

7.2 LUC TYPE SELECTION

The most appropriate LUC type should be selected based on the activity being conducted, referring to the following definitions:

- **Ground Disturbing** – disturbance of previously undisturbed ground, re-disturbance of rehabilitated ground or a change in purpose/usage of land
- **Maintenance** – upkeep of existing infrastructure or disturbance that involves earth movement (without any increase in footprint or change in purpose)
- **Rehabilitation** – rehabilitation of previously disturbed ground
- **Access** – conduct of only non-ground disturbing, 'Non-exempt Activity'

³ For example, an area previously cleared and used as a laydown being transitioned to be a fuel storage area.

⁴ For example, increased number of rooms at a camp, increased amount of fuel at storage location.

'Exempt Activities' are those using existing tracks and roads to access active mining, rail and port operations (i.e. offices, OPF, conveyors, rail, port.), or exploration camps, to conduct only non-ground disturbing, routine operational activities. This includes:

- Travelling to and from established operations and office facilities
- Transport of materials (i.e. extracted ore, waste, tailings etc) via existing mine operations road network
- Routine maintenance of processing and non-processing infrastructure in operations areas

'Non-exempt Activities' are those not covered by the previous definition, and include:

- Heritage, environmental, and hydrological surveys, studies and monitoring
- Non-ground disturbing/low impact geological investigations (i.e. gravity survey, rock-chipping/sampling, etc)
- Accessing areas that require travel off existing tracks/roads
- Maintenance of fixed infrastructure outside of operations area.

If, after reading Procedure sections 7.1 and 7.2 along with the Definitions section, you require further clarification of:

- (i) whether a LUC is required for the activity you will be involved in, or
- (ii) the most appropriate LUC type for your activity,

you should contact an LUA to discuss. Only Fortescue employees who are designated LUAs have the authority to provide confirmation that an activity can proceed without a LUC. Such approval to proceed should be obtained in writing (via email LUAs@fmg.com.au) to ensure transparency and accountability.

7.3 LUC TRAINING AND GENERAL SUPPORT

To ensure you understand when this procedure might apply; your role and responsibilities as an Applicant/Proxy, Endorser or Approver; and how to use the InfoScope and Fortescue Maps systems to implement the LUC process, it is a requirement to complete the LUC training. Training can be undertaken through each individual's [SuccessFactors](#). Once the training has been completed LMS Support grant permissions.

A copy of this procedure, along with other support and training materials, such as Quick Reference Guides (QRGs) for each process, can be accessed on the Fortescue Hub, via:

- [InfoScope Quick Reference Guides](#);
- [LUC Training Videos](#); or
- [Land Management System Hub](#)

A central mailbox is also monitored by the LMS team to assist or redirect general support enquiries (lmssupport@fmgl.com.au).

To be able to fulfil the role of Applicant/Proxy, Endorser or Approver in the LUC process you will also need to be granted the relevant security permissions in InfoScope. This will be completed following LUC Training.

7.4 STANDARD LUC PROCESSES

The process below is to be followed to apply for a LUC

Table 4: Standard LUC Process

Responsibility	Steps (Tasks)	Refer Guideline
Applicant	1. Create and Submit a LUC	Section 8.1
Endorser(s)	2. Assess and endorse the LUC (Ground Disturbing LUCs WA only)	Section 8.2
Approver(s)	3. Assess and approve the LUC (with conditions)	Section 8.3
On-Site Responsible or Proxies	4. Assess and accept conditions of the LUC and finalise map in FM	Section 8.4
Applicant and Proxies	5. Receive LUC Certificate and proceed with approved activity in line with scope and conditions	Section 8.5
Applicant or Proxies	6. Complete approved activity and close out LUC	Section 8.6

Refer to Attachment 1 for a workflow map of the Standard LUC process.

7.5 OPTIONAL LUC PROCESSES

In addition to the standard LUC steps, there are several optional steps included in Table 5, which may occur depending on:

- Edits made to a LUC during the drafting and assessment stages.
- Outcome of assessments conducted by Endorsers and Approvers (before a LUC becomes active).
- How your approved activities progress following the issue of an active LUC.

Table 5: Optional LUC Steps

Responsibility	Steps (Tasks)	Refer Guideline
Applicant and/or Proxies	Edit or Amend the LUC	Section 8.7
Applicant and/or Proxies	Withdraw the LUC	Section 8.8
LMS Application Specialist	Cancel the LUC	Section 8.9
New Applicant	Clone a LUC	Section 8.10
Endorser(s) or Approver(s)	Partially Return or Return the LUC to the Applicant for review or amendment	Section 8.11

7.6 LUC STATUS OVERVIEW

As a LUC progresses from initial draft through to close-out, it will change status to clearly indicate the stage it has reached. Table 6 lists the various statuses a LUC can have and the associated definitions.

Table 6: LUC Statuses

Status	Definition
Draft	A LUC application has commenced but is yet to be submitted OR a returned LUC application has been reverted to draft whilst amendments are made.
Pending	A LUC application has been submitted / resubmitted and is awaiting endorsement / approval.
Returned	An Endorser or Approver has returned a LUC to the Applicant, following assessment, requesting review or changes.
Partial Return	An Approver requires a sensitivity to be cookie cut out of the spatial data. All other approvals are left intact.
Conditional	A LUC application has been endorsed (if applicable) and approved and is waiting for the On-Site Responsible Person or Applicant to review and accept any conditions.
Active	A LUC has been issued following endorsement (if applicable) and approval, and conditions have been accepted.
Withdrawn	A LUC has been retracted before becoming active (i.e. no longer required).
Expired	A LUC is no longer active (expiry date has passed), but close-out is not yet complete
Cancelled	A LUC was active, but after no work being conducted, was no longer required. IMPORTANT NOTE: If any work is conducted under a LUC, it must be closed-out, not cancelled.
Completed	LUC is no longer active, and close-out has been completed.

7.7 SENSITIVITY CHECKS OVERVIEW

A key part of the LUC process is the capability to assess a proposed LUC Area against current GIS data. This is achieved in the embedded web-map Fortescue Maps, which is integrated with Fortescue GIS.

When a proposed LUC Area is assessed a comprehensive set of GIS data sets are checked and results are provided based on the potential sensitivity of the data. The level of sensitivity of data sets can vary depending on the potential for the intersecting data to constrain the LUC activity. For example:

- an Access LUC is likely to result in less warnings and lower warning levels than a Ground Disturbing LUC in the same area, because of the low impact nature of activities conducted under an Access LUC
- intersection with a Heritage Place will present a higher level of warning compared to intersection with a Heritage Place Buffer
- intersection with an Environmental Restriction Zone may present a higher level of warning compared to intersection with an area of Introduced Flora

A full list of sensitivity checks and their resulting warnings is maintained by the GIS team, in consultation with the LMS Team; however, the level of sensitivity of various data sets is based on advice from the relevant business unit.

The results provided through the sensitivity check process provide valuable information on potential constraints which may affect a LUC, enabling the Applicant, Endorser and Approvers to complete the LUC process accurately and efficiently.

The sensitivity checks run at three (3) stages during the standard LUC Process:

- When an Applicant defines the LUC Area during the drafting and submission process.
- When a Pre-Endorser / Endorser assesses the LUC Area.
- When an Approver assesses the LUC Area.

Most of the checks provide information to guide the application and assessment stages and will not stop a LUC application from progressing. There are some results which will prevent a LUC from receiving approval by the relevant Approver group; however, these results will also not prevent a LUC application from being submitted^{5,5} It may simply mean that further approvals or actions must be completed by the Approver group before the data can be updated and the LUC can proceed. This prevents human error from occurring in relation to certain high sensitivity matters.

⁵ For example, a Ground Disturbing LUC that intersects with a Heritage Place can be submitted but cannot be approved by a Heritage Approver until the conflict is resolved. This may require further survey, consultation or approval to be completed to enable Heritage Place GIS data to be updated, thereby removing the constraint and allowing approval to proceed.

7.8 EXCEPTIONS

Exceptions to the standard LUC requirements will only be accommodated in special circumstances.

7.8.1 EMERGENCIES

In the even of an emergency on site where there is an imminent threat to life, critical infrastructure or larges portions of the environment, work can be conducted without a LUC as State or Local Government agencies will generally step in to manage the situation. In this situation, a Fortescue assisting in managing the emergency or their delegate must contact the LMS team within 24 hours to request a Retroactive LUC to account for any clearing that has taken place. Only in these circumstances will a Retroactive LUC be issued.

7.8.2 IMMEDIATE INCIDENT RESPONSE PROCESS

In the event of an incident or event occurring on site, where lives, critical infrastructure or large portions of the environment are not at imminent risk, an Immediate Incident Response Process (IIRP) must be followed. This process is the same as the Ground Disturbing LUC, however approval can be obtained within 24 hours or less. The purpose of this process is to allow rapid recovery and clean up after a major incident once the threat has been neutralised and the area has been declared safe to enter. An example is collapse of the tailing dam wall – once the spill has been contained and wall secured, a recovery team will need an IIRP to contain the spread of the slurry and clean up any environment that has been contaminate.

7.9 LAND USE ADVISORS

Several roles/people in the business have been delegated responsibility as Land Use Advisors (LUAs). The LUAs work as a team to ensure the LUC process aligns with business requirements and that clear and consistent advice is available to employees and contractors regarding the LUC process. The current LUAs are:

Table 7: Land Use Advisors (LUAs)

Position	Name	Job Title
Chair	Sarah Mason Durack	Approvals Senior Advisor
Member	Rebekah Jenaway	Manager Projects and Access
Member	Damon Edwards	General Manager Acquisitions & Tenements
Member	Jenny Thomson	Senior Manager Data & Information
Member	Johanna Hopfmuller	Superintendent Information Management Delivery
Member	Zena Harman	Senior Manager Governance
Member	Marlene Lootz	Manager Environment Operations

Position	Name	Job Title
Member	Peter Hood	Manager Approvals & Compliance
Member	Stuart Badock	Manager Exploration Iron WA
Member	Yuluwiri Mcgrady	Manager Heritage Compliance and Operations
Member	Rosalyn Sloan	Senior Geologist Approvals & Tenements
Member	Justin Barclay	Manager Water Planning
Member	Michael Carroll	Specialist Hydrogeologist (Delegate)
Member	Wendy Treasure	Principal Native Title
Member	Max Coyne	Land Access Specialist
Member	Melissa Carter	LMS Systems Analyst
Member	Sophie Papalia	Approval Support Officer
Member	Nicole Broderick	Approval Support Officer

The LUAs come from different business units, but are responsible for representing the full spectrum of business needs (i.e. not only representing their business unit). Collectively the LUAs have a soft reporting line to the LUC Business Process Owner and work together with the LMS Team to ensure procedural requirements and software functionality align.

In addition to providing general advice on procedural matters (i.e. what type of LUC to apply for, what level of detail is required for certain works) LUAs are the only people who can provide advice that a LUC is not required for a particular activity.

In this situation an approval to proceed should be obtained in writing (via email) to ensure transparency and accountability.

8. GUIDELINES

The LUC process is detailed through the LUC lifecycle below.

8.1 CREATING AND SUBMITTING A LUC

8.1.1 LUC Drafting Overview

To create a new LUC a Fortescue employee must have the correct security permissions in InfoScope, as a potential LUC Applicant. Once a new LUC has been created, only the people nominated as the Applicant, Secondary Contact(s) or On-site Responsible Person(s) or Responsible Team can edit that LUC.

The steps involved in creating a LUC are set out in Table 8:

Table 8: LUC Creation and Submission

Steps (Tasks)	Notes
1. Create a new draft LUC in InfoScope and enter the relevant details	Type and level of detail to be entered will vary depending on the proposed activity and LUC type
2. Spatially define the LUC Area in the FM web-map.	There are a number of options for doing this, i.e. using the map drawing tools or uploading spatial data.
3. Assess the results of the Sensitivity Checks and decide whether any amendments are required to the application.	Refer to section 7.7 Sensitivity Checks Overview and section 8.3.3 Reviewing Sensitivity Checks for more information.
4. Add Work Category details to the MRF Grid by Tenement and ELP	Where work category areas span multiple tenements then each tenement must be defined separately.
5. Submit the LUC application for assessment.	Ground Disturbing LUCs require Endorsement and Approvals; other LUC types only require Approvals.

For detailed technical instructions on creating and submitting a LUC in the LMS, refer to the following QRGs:

- Enter Details for Ground Disturbing LUC/ Access, Maintenance or Rehabilitation LUC/Topsoil LUCs; and
- Define Work Area.

8.1.2 Roles & Responsibilities

The person who is responsible for overseeing or facilitating an eligible land use activity should apply for a LUC and be the nominated LUC Applicant. At least one Secondary Contact should be nominated for a LUC application to ensure enquiries can be dealt with effectively. In most cases the Secondary Contact will be an Applicant's 'back-to-back' and/or a person in the same reporting line (a supervisor or a direct report).

In addition, if appropriate and/or different to the Applicant and Secondary Contact(s), On-site Responsible Person(s) can be nominated. The On-site Responsible Person(s) are those with the appropriate authority to oversee or facilitate the conduct and completion of the LUC activity, once the LUC becomes active.

Note that if an On-site Responsible Person is nominated, they will be allocated the task of reviewing and accepting the LUC conditions before a LUC is issued. They will also be allocated responsibility for close out tasks, though they can redirect such tasks back to the Applicant or Secondary Contact(s) if it is appropriate to do so.

LUC Applicants, Secondary Contact(s), On-site Responsible Person(s) and Responsible Teams are jointly responsible for ensuring the LUC accurately reflects the proposed activities and the activities proceed in line with LUC conditions.

8.1.3 Defining a LUC Scope of Works

The information requested and the level of detail required for a LUC differs somewhat based on the LUC type. Ground Disturbing LUCs require detailed explanations of works to be conducted as well as any applicable approvals and agreements i.e. POW reference

The information requested during the drafting and application process is used to ensure Endorsers and Approvers have sufficient and appropriate information to complete their assessment, and to ensure Fortescue can meet statutory and contractual reporting obligations.

8.1.3.1 Work Categorisation

Applicants will be requested to select Work Categories and Sub-categories, from pre-defined lists, along with the relevant tenement and ELP to define the proposed scope at a high level. For some LUCs the categorisation aligns with that defined by the relevant government department i.e. Ground Disturbing LUCs aligns with the Mining Rehabilitation Fund (MRF) categories in WA; hence, it is important to ensure the categorisation used matches the government definition for the activity.

If an Applicant cannot find a category/sub-category that is appropriate to the proposed scope of works, they should contact the LMS team, via LMS Support, to discuss. The LMS team will facilitate a discussion with the Business Process Owner and LUAs, and additional categorisation will be incorporated if required.

A list of Work Categories & Sub-Categories, along with their definitions, can be viewed by clicking on the 'info tool' button  adjacent to the Work Category field on any LUC record in InfoScope.

8.1.3.2 Topsoil Management

Ground Disturbing LUC applications will be required to provide details relating to the management of topsoil, including an Estimated Topsoil Volume to be moved and proposed Topsoil Storage Location(s).

Topsoil Storage Locations must also be covered by active LUCs specific to that Work Category (purpose). Applicants can search for active Topsoil Storage Locations in several ways to assist in confirming the most appropriate and efficient option(s).

LUC Applicants will be asked to nominate one or more LUC IDs (which correspond to active Topsoil Storage LUCs) as the proposed Topsoil Storage Location. If an Applicant is proposing to use a Topsoil Storage Location which is not currently covered by an active LUC, that Topsoil Storage LUC must be created and approved before the other LUC application can be submitted.

An exception to the above-mentioned situation applies when you are intending to retain disturbed topsoil at the clearing location (i.e. pushed temporarily to the edge of the cleared area), rather than relocate it to a Topsoil Storage location. For details of how to reflect this in the LUC, refer to the Enter Details for Ground Disturbing LUCs QRG.

8.1.3.3 Supplementary Questions

LUC Applicants may also be asked some supplementary questions about the proposed scope of works (i.e. about blasting, unaccompanied consultants, new native vegetation clearing, infrastructure construction, underground services or travel methods) which enable comprehensive workflow and reporting requirements to be achieved.

8.1.4 Defining a LUC Area

The LUC Area is the spatially defined location where the proposed activity will take place. A LUC Area may vary in size, up to a maximum of 10,000Ha, and specificity depending on a number of factors, including:

- the LUC type and proposed activity; and
- the degree of detail which is known about the proposed activity (scope of works) at the point of application.

It may be appropriate for a LUC Area to be larger than the exact area of the proposed activity, however Applicants should ensure they provide sufficient level of detail to enable assessment to be effectively conducted and a reasonable level of accountability to be achieved. Submitting a LUC Application over a large LUC Area, with limited details of proposed work, has a greater potential of being returned by an Endorser or Approver, who may require more information.

As a general guide, the greater potential a particular activity has for constraints and obligations, the more specific the Applicant will need to be to enable effective assessment.

8.1.5 Reviewing Sensitivity Checks

Refer to Section 7.7 Sensitivity Checks Overview for general information about the purpose of Sensitivity Checks.

During the LUC drafting process, the Sensitivity Checks process will run in the FM web-map once a LUC Area has been defined. The results show potential constraints that spatially relate to the LUC Area and are provided to assist Applicants in forecasting whether:

- The LUC scope or Area may need to be amended.
- The LUC application may be delayed whilst further studies/surveys/approvals/permits /licences are obtained.

- Conditions may be applied by an Approver and, if so, what type.

After reviewing the results of the Sensitivity Checks, an Applicant may choose to make changes before submission, (i.e. amend the LUC Area to avoid a Priority Flora Area or overlapping Ground Disturbing LUCs), or submit the LUC without changes and await assessment by the Endorser(s)/Approvers.

If an Endorser/Approver proposes that an amendment is required based on the results of the Sensitivity Checks, they may return the LUC application to the Applicant for review and potential amendment. Endorsers/Approvers do not have the capacity to make direct changes to the LUC details or LUC Area; this must be done by the Applicant.

8.2 ENDORSING A LUC

The endorsement process applies to Ground Disturbing LUCs in WA only.

LUC pre-endorsements allow the LMS team to review the basic minimum standards required for a LUC i.e. detailed scope of works is understandable and written so that any new team member can understand what is expected of them.

LUC endorsement allows the person(s) responsible for managing a particular site (Activity Area) to conduct a high-level assessment of whether the proposed activity is in line with their expectations.

The Endorsers for a LUC are selected based on the spatially intersecting Activity Areas; however, only certain Activity Areas in InfoScope are used to assign Endorsers. The Activity Areas which currently meet that criteria are:

- Christmas Creek Project
- Cloudbreak Project
- Eliwana Project
- Eliwana Rail Infrastructure
- Exploration Project
- Herb Elliott Port Infrastructure
- Iron Bridge Project
- Pilbara Transmission Project
- Port Authority Area
- Power Generation Project Infrastructure
- Rail (Mainline & Hamersley) Infrastructure
- Solomon Project

If a LUC Area intersects with multiple Activity Areas, multiple Endorsers will assess.

8.2.1 Endorsement Overview

An overview of the endorsement processes (which includes both pre-endorsers and endorsers) for a LUC and the related QRGs which provide the technical instructions, is set out in Table 9. Each endorsement team is responsible for developing and maintaining internal procedures or guidelines about how they assess LUCs against the legislative and procedural obligations for their area.⁶

Table 9: LUC Endorsement Process

Steps (Tasks)	Notes
1. Submitted Ground Disturbing LUC is ready for review	
2. Endorser assesses the LUC details in InfoScope	
3. Endorser continues assessment of the LUC in the FM web-map	Conditional mark-ups can be added in the map.
4. Endorser can EITHER: <ul style="list-style-type: none"> • Endorse the LUC; or • Return the LUC back to the Applicant for review/amendment. 	Endorsing a LUC means it will proceed to Approvers for assessment. Remedy mark-ups should be added in the map if returning LUC. Refer to Section 8.2.5 for more details on the process of returning a LUC.

For detailed technical instructions on completing the endorsement process in the LMS, refer to the following QRGs:

- LUC Overview Endorsers
- Endorse LUC
- View Sensitivity Checks
- Add Conditional Markup
- Add Remedy Markup (Return LUC)

8.2.2 Endorsement Timeframes

Endorsers are allocated three (3) business days to complete a LUC endorsement assessment (i.e. review and endorse or review and return to the Applicant). If an endorsement assessment is not completed within the allocated time, the task will display as overdue.

⁶ For example, some operations areas elect to use a spatial check against the “MODE” (approved clearing boundary) to guide the management of ground clearing limits.

8.2.3 Reviewing Sensitivity Checks

Refer to Section 7.7 Sensitivity Checks Overview for general information about the purpose of Sensitivity Checks.

During the LUC endorsement process, the Sensitivity Checks process will run in the FM web-map, providing results of any potential constraints that spatially relate to the LUC Area. The results are provided to assist Endorsers in assessing whether:

- a proposed LUC activity should proceed; or
- a LUC scope or Area needs to be amended.

The level of warning and the data sets that are checked during the Sensitivity Checks are managed by GIS, as directed by each Approvals Team.

If an Endorser believes there is an issue with the Sensitivity Checks or wishes to add additional checks to assist in the completion of their assessment, this should be discussed with the LMS Team.

If an Endorser recommends, after review of the Sensitivity Checks, that the LUC Area should be amended, this can be done through annotations on the web-map (remedy mark-ups). Endorsers do not have the capacity to directly make changes to the LUC details or LUC Area; this must be done by the Applicant.

8.2.4 Conditional & Remedy Mark-ups

When an Endorser is assessing a LUC in the FM web-map, there are two (2) types of annotations which can be made for the reference of the Applicant and Proxies:

- Conditional Mark-ups; and
- Remedy Mark-ups.

Adding a Conditional Mark-up to the FM web-map means that the LUC is going to receive endorsement, but there is a condition to be applied to the endorsement. If an Endorser creates a Conditional Mark-up it will appear on the LUC Certificate, once it is issued, as a reference for the Applicant and Proxies.

Adding a Remedy Mark-up to the FM web-map means that an amendment is proposed to the LUC before it can be endorsed. For example, the LUC Area may need to be shifted to another location based on a competing priority in the mine plan. This can be annotated on the web-map by the Endorser before the LUC is returned to the Applicant for review.

8.2.5 Returning a LUC

If an Endorser returns a LUC to the Applicant for amendments to be made, they should provide context and clarification of this decision by adding a Remedy Mark-up to the map and in the final return process. This can then be viewed on the LUC by the Applicant and Proxies. When a LUC is returned the LUC status is changed to 'Returned'. If there are multiple Endorsers for a LUC and one Endorser returns the LUC all other Endorser workflows will stop to avoid unnecessary work being conducted.

8.3 APPROVING A LUC

The Approvers required to assess a LUC may differ based on the LUC type and location. The full list of potential Approvers, which correspond to Fortescue business units who will assess a LUC against known obligations and constraints, are:

- Tenure
- State Agreement
- Environment
- Heritage
- Pastoral Access
- Water Infrastructure

8.3.1 Approval Overview

An overview of the approval processes for a LUC, and the related QRGs which provide the technical instructions, is set out in Table 10. Each approval group or team is responsible for developing and maintaining internal departmental procedures or guidelines about how they assess LUCs against the legislative, contractual and procedural obligations for their approval area. This is important for ensuring consistency.

Table 10: LUC Approval Process

Steps (Tasks)	Notes
1. Submitted LUC is ready for review	For Ground Disturbing LUCs, Endorsement must have already been received.
2. Approver assesses the LUC details in InfoScope	
3. Approver continues assessment of the LUC in the FM web-map	Conditional mark-ups can be added in the map.
4. Approver can EITHER: <ul style="list-style-type: none"> • Approve the LUC with no conditions; or • Approve the LUC with conditions; or • Partially Return just their approval for a cookie cut of the shapefile from a sensitivity; or • Return the LUC back to the Applicant for review/amendment. 	Remedy mark-ups should be added in the map if returning LUC. Refer to Section 8.3.5 for more details on the process of returning a LUC.

Refer to Section 8.3.7 (Tenure Approval) and Section 8.3.9 (Environment Approval) for details of an additional step specific to those business units.

For detailed technical instructions on completing the approval process in the LMS, refer to the following QRGs:

- Approve LUC – Assess in Map
- View Sensitivity Checks
- Approve LUC – Set Conditions
- Add Conditional Markup
- Add Remedy Markup (Partial or Full LUC Return)

8.3.2 Approval Timeframes

Approvers are allocated seven (7) business days to complete a LUC approval assessment (i.e. review and approve, or review and return to the Applicant). If an approval assessment is not completed within the allocated time, the task will display as overdue and the task escalation process will be initiated.

8.3.3 Reviewing Sensitivity Checks

Refer to Section 7.7 Sensitivity Checks Overview for general information about the purpose of Sensitivity Checks.

During the LUC approval process, the Sensitivity Checks process will run in the FM web-map, providing results of any potential constraints that spatially relate to the LUC Area. The results are provided to assist Approvers in assessing whether:

- The LUC scope or Area needs to be amended.
- The LUC requires a further study/survey/approval/permit/licence to be obtained before the activity can proceed.
- Certain conditions need to be applied to a LUC as part of the LUC approval process.
- An error or omission in the GIS or obligations data needs to be corrected⁷.

The level of warning and the data sets that are checked during the Sensitivity Checks are managed by GIS, as directed by each Approvals Team. If an Approver and Approvals Team believes the Sensitivity Checks for their business unit needs to be adjusted, this should be discussed with the LMS Team.

If an Approver recommends that the results of Sensitivity Checks be used to amend the LUC Area (i.e. an intersecting Heritage Place needs to be cut out of the LUC Area), this can be done through annotations on the FM web-map (Remedy Mark-ups). Approvers do not have the capacity to make changes to the LUC details or LUC Area; this must be done by the Applicant.

⁷ If a particular sensitivity warning appears due to an error or omission in the GIS or other data (BMS or InfoScope obligations), Approvers are responsible for correcting this issue, not simply disregarding the warning. If an Approver is not the custodian/person responsible for the relevant data set, they should communicate with the relevant custodian to alert them to the issue.

8.3.4 Conditional & Remedy Mark-ups

When an Approver is assessing a LUC in the FM web-map, there are two (2) types of annotations which can be made for the reference of the Applicant and Proxies:

- Conditional Mark-ups; and
- Remedy Mark-ups.

Adding a Conditional Mark-up to the FM web-map means that the LUC is going to receive approval, but there are conditions which require further explanation in a spatial context. For example, if no amendments are required to the LUC, but the Heritage Approval includes a condition requiring the installation of flags in a nominated location before clearing commences, the proposed location can be drawn as an annotation on the map as a Conditional Mark-up.

If an Approver creates a Conditional Mark-up it will appear on the LUC Certificate, once issued, as a reference for the Applicant and Proxies.

Adding a Remedy Mark-up to the FM web-map means that an amendment is proposed to the LUC before it can be approved. For example, a section of the LUC Area may need to be excised because it intersects with an area of protected flora. This can be annotated on the FM web-map by the Environment Approver before the LUC is partially returned to the Applicant for review.

8.3.5 Returning a LUC

If an Approver returns a LUC the Approver should provide context and clarification of this decision by adding a Remedy Mark-up to the map. If the LUC can be amended through a sensitivity cookie cut then a partial return is sufficient so the rest of the LUC approvals can continue. If the change required cannot be completed this way, then the LUC must be Returned. Returning a LUC changes the LUC status to 'Returned'. If one Approver returns the LUC, all other Approver workflows will stop to avoid unnecessary work being conducted.

8.3.6 Approval Conditions

When reviewing a LUC, Approvers may deem it appropriate to propose certain conditions to ensure the activities are conducted in accordance with specific obligations. It is critical that Approvers ensure only relevant conditions are selected or applied to a LUC, to avoid creating an unmanageable or seemingly redundant task for LUC holders.

There are three (3) potential ways of assigning conditions to a LUC during the approval process⁸:

- Selecting the commonly used conditions for your Approval area.
- Manually drafting an ad-hoc condition.

⁸ Options 1 and 2 are always available, whereas option 3 may only be available if there are centrally managed obligations in BMS or InfoScope which relate to the LUC Area.

- Selecting the obligations which have been imported from corresponding Tenement Obligations or Environmental Obligations.

8.3.7 Tenure Approval

Assessment by a Tenure Approver is always required. In addition to the standard approval process, Tenure Approvers are also responsible for selecting which tenement(s) relate to a LUC application. For example, if there are overlapping tenements (i.e. an Exploration licence and a Miscellaneous licence) the tenement which is relevant to the proposed LUC activity should be selected.

This process is important for future compliance reporting and ensures only the Tenement Obligations which potentially relate to the LUC are pulled across for possible selection as LUC Approval Conditions.

8.3.8 State Agreement Approval

Assessment by a State Agreement Approver is only required when a LUC Area spatially intersects with the State Agreement data set managed in GIS.

8.3.9 Environment Approval

Assessment by an Environment Approver is always required. To enable a more automated process for assessing potential applicable Environmental Approvals and associated obligations, the LMS is integrated with sections of BMS and GIS. Environmental Approvals are read from BMS, referencing the associated ELP ID, and cross referenced against spatial data held by GIS. The integrity and accuracy of the source data should be managed by the Environment team to ensure that the full value can be gained from the integration between the systems.

In addition to the standard approval process, Environment Approvers are also responsible for selecting which Environmental Approval(s) relate to a LUC application. For example, if there are multiple intersecting approvals (i.e. a Program of Works Approval, an EP Act Part IV Approval and an EPBC Act approval) only the approvals which are relevant to the proposed LUC activity should be selected.

This process is important for future compliance reporting and ensures only the Environmental Obligations for the selected approval are available for selection as LUC Approval Conditions.

8.3.10 Heritage Approval

Assessment by a Heritage Approver is always required; however, the individual/team allocated the approver task will vary based on the native title area the LUC Area intersects with.

8.3.11 Pastoral Access Approval

Assessment by a Pastoral Access Approver is always required.

8.3.12 Water Infrastructure Approval

Assessment by a Water Infrastructure Approver is required in WA. The remit of water infrastructure approval is to assess each LUC for:

- Interaction with any water planning (dewatering, raw water supply, surface water management and monitoring) infrastructure (managed by sensitivity checks)
- Suitability against any RIWI Act licences (5C, 26D, Bed and Banks) and associated Groundwater Operating Strategies (managed by sensitivity checks and review of scope)
- Risk of unwanted impact owing to interaction with groundwater or surface water resources (i.e. risk of exceeding design flow in established drainage infrastructure from upstream activity). Managed by scope review and broader spatial review of LUC outside of designated LUC boundary

It is important to note the Water Infrastructure Approver will not be checking against groundwater or surface water approvals/management plans under EP Act or Mining Act legislation.

Additionally, a proposed LUC activity that impacts the surface water flow regime may trigger additional approval requirements or mitigation works before the LUC can be approved internally. Examples include:

- Increased flood levels that overlap with heritage restricted zones or unsurveyed land. In this case surveys, consultation and/or further approvals may be required.
- Changes to flow velocity that increase erosion on 3rd party tenure or proximal to 3rd party infrastructure. In this case an engineering solution may need to be built.

Applicant teams are encouraged to engage with the Water Planning – Water Engineering team during the design phase to work through these potential risks.

8.4 REVIEWING, AMENDING AND ACCEPTING CONDITIONS

Once Endorsement(s) (if applicable) and Approvals have been received for a LUC, the status is set to 'Conditional' and the Applicant and Proxies are notified. The LUC will not become 'Active' until any assigned Approval Conditions have been reviewed and accepted and the Spatial Mapping requirements have been confirmed in Fortescue Maps.

If an On-site Responsible Person is nominated on a LUC application, they are responsible for reviewing and accepting the Approval Conditions. If no On-site Responsible Person is nominated this is the Applicant's or Secondary Contact's responsibility.

Applicants/Proxies should be sure to complete a thorough review of Approval Conditions before accepting, as they are accountable for complying. If a condition is unclear, seems unnecessary or contradicts/conflicts with another condition, this should be queried.

Any concerns with Approval Conditions should be discussed with the relevant Approver during the review period. If agreed, amendments to conditions can be made by Approvers using the 'Amend Conditions' function on the LUC Approval. This can only be done whilst the LUC status is 'Conditional'. Once the conditions have been accepted and the LUC is active, no further changes can be made.

A LUC maintains the status of 'Conditional' for 180 days, after which it will expire; hence, Applicant/Proxies should ensure they review and accept the conditions in this period.

The process for assessing and accepting LUC Conditions is set out in Table 11.

Table 11: Assessing and Accepting LUC Conditions

Steps (Tasks)	Notes
1. Applicant and Proxies receive notification that LUC is Endorsed and Approved and is ready for review.	LUC status is set to 'Conditional'
2. On-site Responsible Person or, if none, Applicant/Secondary Contact review the LUC Approval Conditions and accepts.	180 days to complete review and accept.
3. On-site Responsible Person or, if none, Applicant/Secondary Contact confirms the data export and mapping options required for the LUC in Fortescue Maps	LUC status is set to 'Active'
4. The LUC is now 'Active'. The certificate and associated data package are issued.	This can take up to 1 hour following Activation in FM.

For detailed technical instructions on reviewing, amending, and accepting LUC conditions in the LMS, refer to the following QRGs:

- Accept LUC Conditions; and
- Approve LUC – Amend Approval.

8.5 LUC ACTIVATION & CERTIFICATE

Once a LUC becomes 'Active' it will be issued for use and the following actions occur:

- Expiry Date is set for twelve (12) months from the Approval Date (the date it became 'Active').
- LUC Certificate is generated in PDF format and attached as a Document in InfoScope.
- A zip file containing maps and spatial data (.shp, .dxf and .kml) is generated and attached as a Document in InfoScope.
- An email is generated notifying the Applicant, Proxies and any Interested Parties that the LUC has been issued.

The initial period of certificate activity (12 months) is automatically assigned for all LUC types. It is possible for the LUC Expiry Date to be amended to reflect the expiry of the supporting ELP if it is less than 12 months. It is also possible for the LUC Expiry Date to exceed the Proposed End Date of the activity, meaning you may Close out the LUC earlier than the Expiry Date, once the scope is complete.

Refer to Section 8.6 LUC Close Out for details of how to proceed with closing a LUC once the scope is complete.

For detailed technical instructions on the LUC Activation process in the LMS, refer to the following QRGs:

- Accept LUC Conditions; and
- View LUC Certificate and Attachments.

8.5.1 The Certificate

The LUC Certificate contains all the information critical to the assessment outcome and should be reviewed closely by the Applicant/Proxies. It will include the following crucial details:

- LUC ID, Type, Responsible Team and Short Name
- Key dates (Expiry Date, Application Date, Approval Date, Proposed Start Date, Proposed End Date)
- Key contacts, roles, and details
- Summary of Works
- Standard Conditions
- High Risk Heritage Conditions (if applicable)
- Assigned Conditions from Approvers
- Endorsement details
- Approval details
- LUC Area overview map
- If Conditional Mark-ups have been used by an Endorser/Approver, a map showing those annotations with details.

If an Applicant or Proxy is unclear about any of the details or conditions displayed on the Certificate, they should contact the relevant Endorser/Approver that corresponds to that section. If in doubt about who to contact, please discuss with an LMS Specialist.

8.6 LUC CLOSE-OUT

A LUC should be closed-out by the Applicant or Proxies once the approved activities have been completed and/or no further activity is proposed under that LUC. The process for LUC Close-out is set out in Table 12.

Table 12: Assessing and Accepting LUC Conditions

Steps (Tasks)	Notes
1. Confirm the actual start and end dates for the activities conducted	
2. Confirm whether LUC approval conditions were complied with	If there was a condition non-compliance annotate the breach details against the condition
3. If there was a LUC Breach provide a BMS incident number	See "LUC Breach" in the Definitions section for more details.
4. If required (only applied to certain LUCs) confirm and upload 'as built' data	

For detailed technical instructions on completing the close-out process in the LMS, refer to the Close Out a LUC QRG.

8.7 AMENDING A LUC

Once initiated, an individual LUC can only be amended in InfoScope by the Applicant or Proxies; this ensures transparency and accountability.

8.7.1 Amendments During Application

Most details of a LUC can still be amended up to the point of becoming Active, at three (3) key stages of drafting:

- During initial drafting stages, before submission (i.e. draft LUCs can be saved at key points and Applicants can complete an application over numerous sittings).
- After being submitted, an Applicant or Proxy realises an error has been made or a change is required and chooses to amend.⁹
- After being submitted, an Endorser/Approver refers a LUC back to the Applicant for review and the Applicant elects to make a change.

⁹ Amending a LUC application after it is submitted will stop any endorsement/approval workflows which have triggered. Endorser/Approver workflows will trigger again once the amended LUC is resubmitted.

8.7.2 Amendments Post Activation

After a LUC has been approved and becomes Active, edits can still be made to the following fields:

- LUC Short Name
- Primary Site
- Applicant
- Secondary Contact(s)
- On-site Responsible Person(s)
- Responsible Team
- Proposed Start Date and End Date
- Topsoil Storage Location (if applicable)

Note that InfoScope maintains a record of all previous field entries and the user responsible for making edits, so historical information is available if required for reporting and compliance purposes.

For detailed technical instructions on amending a LUC in the LMS, refer to the Edit Active LUC QRG.

8.8 WITHDRAWING A LUC

A LUC application can be withdrawn by the Applicant or Proxies at any time during the drafting and assessment process. An Applicant/Proxy might withdraw a LUC application because plans have changed and the proposed works are no longer proceeding, or alternate plans enable multiple scopes (previously proposed under multiple LUCs) to be managed under one LUC (i.e. scopes can be combined and a LUC becomes defunct).

Once a LUC becomes Active and is issued for use, it can no longer be withdrawn and any changes to plans should be managed either by:

- Cancelling a LUC if no work has commenced (refer to Procedure section 8.9); or
- Closing out the LUC (refer to Procedure section 8.6) and applying for an alternate LUC.

For detailed technical instructions on withdrawing a LUC in the LMS, refer to the Withdraw LUC QRG.

8.9 CANCELLING A LUC

A LUC can be cancelled by an LMS Specialist while it is still Active, but only if no work has been conducted under that LUC. Confirmation is required that no work has been conducted and this correspondence is added to the documents tab for audit purpose.

If any work has been conducted under a LUC it cannot be cancelled and must be closed-out to confirm the outcome of the work conducted (even if only a portion of the scope was complete). This is important for compliance and reporting reasons.

For detailed technical instructions on cancelling a LUC in the LMS, refer to the Cancel LUC QRG.

8.10 CLONING A LUC

A LUC can be copied or 'cloned' in InfoScope to assist with streamlining the drafting process (i.e. to save having to re-enter the same details again if a new LUC application is similar to another already in the system). When a LUC is cloned, the following information is maintained in the cloned version:

- Jurisdiction;
- LUC Type;
- Secondary Contact(s), On-Site Responsible Person(s), Responsible Team;
- Proposed Start Date & End Date;
- LUC Short Name;
- Work categorisation details and Detailed Scope of Works text;
- Topsoil management information;
- Answers to supplementary questions; and
- spatially defined LUC Area.

Using the clone functionality may be useful when:

- Creating a LUC which is similar to another one created previously.
- Creating a new LUC type over the same LUC Area as another LUC.¹⁰
- Where a newly disturbed area is to be added to an existing maintenance LUC, so that one LUC can continue to be used to cover that activity (i.e. a site road maintenance network);¹¹

For detailed technical instructions on cloning a LUC in the LMS, refer to the Clone LUC QRG.

¹⁰ For example, an Applicant could clone a Ground Disturbing LUC which was approved for a drilling program, then adjust the type to Rehabilitation to cover the rehab work over that same LUC Area.

¹¹ The Applicant could clone the existing LUC, add the newly disturbed area to the overall LUC Area, get approvals, then close-out the previous version which has now been superseded.

8.11 RETURNING A LUC

During an assessment by an Endorser or Approver it is possible for them to return the LUC to the Applicant for amendments to be made. Endorsers/Approvers should provide context and clarification of their decision by adding a Remedy Mark-up to the map, which can then be reviewed by the Applicant before any changes are made.

Returning a LUC to an Applicant changes the LUC status to 'Returned'.

In addition, referring a LUC back stops any open Endorser/Approver workflows and avoids unnecessary work being conducted. After the Applicant has reviewed, potentially amended the LUC, and resubmitted the application, new workflows will be triggered.

For detailed technical instructions on returning a LUC in the LMS, refer to the Add Remedy Markup (Return LUC) QRG.

8.12 EXTENDING A LUC

A LUC can be extended with the final 30 days of the Active LUC. The extension will be considered for an additional 12 months following a completion of the Close Out record on the original LUC. Once completed, with the close out saved and validated the extension is then submitted and a full set of approval records are created. The LUC will follow the usual approval process. If the approval is granted when the new LUC has been activated the original LUC will be automatically completed.

The maximum length of time a LUC can be active for is three (3) years or thirty six (36) months. Initial application period plus an additional two (2) extension applications.

9. MONITORING AND REVIEW

This Procedure will be reviewed according to the schedule set out in Table 13.

Table 13: Programmes and Schedules

Monitor (Audit) and Review	Frequency	Responsibility
Procedure Review	Annually (or as required following business process changes)	LUAs and LMS Systems Analyst

10. DOCUMENTATION AND RECORDS MANAGEMENT

This Procedure and all supporting documents will be managed as per Fortescue Document Governance Standards.

The following documents should be read in conjunction with this procedure:

Table 14: Policy, Standard, Work Instructions, Forms (Templates)

Document ID	Title of Document
InfoScope Training & Quick Reference Guides	InfoScope - Training & Quick Reference Guides (sharepoint.com)
100-PR-EN-1058	Approving Land Use Certificates for Environment
E-PL-EN-0002	Exploration Environmental Management Plan
EX-WI-EX-0039	Exploration Clearing Gridlines and Pads - without EEMIS Work Instruction
EX-WI-EX-0001	Exploration Clearing Gridlines and Pads Work Instruction
EX-WI-EX-0007	Exploration Clearing Gridlines and Pads - without EEMIS Work Instruction
100-PR-HE-0003 (Rev 9)	Heritage Blasting Procedure
SWI-CC-WI-GE-0008	Clearing Procedure
EW-03000-PR-OP-0001	Eliwana - Resource Definition Drill Pad Preparation
SO-PR-GY-0001	Solomon LUC/ LCA Definition Procedure
SO-00000-PR-OP-0006	Solomon Resource Definition Drill Pad Creation Preparation Procedure
EX-GU-EX_0003	Exploration Working and/ or Operating a Vehicle Outside of GDP Approved or Previously Cleared Areas Guideline
EX-WI-EX-0006	Exploration Maintenance of Pre-Existing Tracks Work Instruction

Subject Matter Expert(s) are responsible to ensure all records as described above are forwarded to Fortescue Document Control Department for retention and archiving in accordance with the Fortescue Records Retention Manual.

Appendix 1:

Standard LUC Process Flowchart

