Appendix A : Likelihood table

1.1 Likelihood assessment

Using databases or other records (i.e. ELA 2017), presence or absence of suitable habitats, features of the proposed site, results of field surveys and professional judgement, the likelihood of occurrence for MNES has been determined and is presented in the tables below. MNES were assessed as 'known', 'likely', 'possible', 'unlikely' or 'no' according to the criteria below. This assessment is based on a number of factors including the species'/communities' distribution and habitat requirements, previous records in the vicinity of the Parklands, field assessment results and professional experience of this report's authors and their colleagues.

Likelihood of occurrence criteria include:

- "known" = the species, population or ecological community was or has been observed on the site.
- "likely" = suitable high quality habitat for a species, population or ecological community occurs on the site.
- "potential" = suitable habitat for a species, population or ecological community occurs on the site, but there is insufficient information to categorise the species as likely, or unlikely to occur.
- "unlikely" = a low to very low probability that a species, population or ecological community uses/occurs on the site.
- "no" = the species will not occur on site e.g. marine species in a terrestrial study site.

An analysis of the likely level of impact of the proposed action on species with a likelihood of occurrence of "known", "likely" or "potential" (highlighted in blue below) were undertaken in the relevant referral Impact Tables.

Table 1: Likelihood of Occurrence Assessment

(Source: Office of Environment and Heritage and Department of the Environment and Energy)

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
ECOLOGICAL COMMUNITIES						
Castlereagh Scribbly Gum Woodland and Agnes Banks Woodland in the Sydney Basin Bioregion		CE	E	Areas of wind-blown sand which overlay Tertiary Alluvium deposits from ancient river systems. Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion	No	No
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion		E	CE	Mainly occurs on clay soils derived from the deposits of ancient river systems (alluvium), or on shale soils of the Wianamatta Shales.	Unlikely	No
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest		CE	CE	Flat to undulating or hilly terrain, at elevations up to approximately 350 metres above sea level. Predominantly associated with clay soils, that are derived from Wianamatta Shale geology. Minor occurrences may be present on other soil groups, notably Holocene Alluvium and soils derived from the Mittagong Formation.	Potential	Yes
Western Sydney Dry Rainforest and Moist Woodland on Shale		E	CE	It generally occurs in rugged terrain and other patches may occur on undulating terrain, with dry rainforest patches typically occupying steep lower slopes and gullies, and moist woodland patches typically occupying upper sections of the slope Occurs almost exclusively on clay soils derived from Wiannamatta Group shales.	No	No
FAUNA						

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Anthochaera phrygia	Regent Honeyeater	E4A	CE	Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak).	No	No
Apus pacificus	Fork-tailed Swift	-	C,J,K, Mar	Riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	No	No
Botaurus poiciloptilus	Australasian Bittern	E1	E	Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. (bullrushes) and *Eleocharis* spp. (spikerushes).	Unlikely	No
Calidris ferruginea	Curlew Sandpiper	E1	C,J,K	Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	No	No
Chalinolobus dwyeri	Large-eared Pied-bat	V	V	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Potential	No – not identified during targeted survey
Cuculus optatus	Oriental Cuckoo	-	C, J, R	This species has an extremely large range, breeding from European Russia in the west to Japan and northern Siberia in the East. During winter, birds occur throughout Indonesia, the Philippines, Papua New Guinea and in northern and eastern Australia.	No	No
Dasyurus maculatus	Spot-tailed Quoll	V	E	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely	No
Gallinago hardwickii	Latham's Snipe	-	C,J,R, Mar	Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Haliaeetus leucogaster	White-bellied Sea Eagle	-	C	Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.	Unlikely	No
Heleioporus australiacus	Giant Burrowing Frog	V	V	Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	No	No
Hirundapus caudacutus	White-throated Needletail	-	C,J,K	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely	No
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	No	No
Lathamus discolor	Swift Parrot	E1	E	Box-ironbark forests and woodlands.	Unlikely	No
Litoria aurea	Green and Golden Bell Frog	E1	V	Marshes, dams and stream-sides, particularly those containing Typha spp. (bullrushes) or *Eleocharis* spp. (spikerushes). Some populations occur in highly disturbed areas.	Potential	No – not identified during targeted survey
Litoria littlejohni	Little John's Tree Frog	V	V	Breeding habitat is the upper reaches of permanent streams and perched swamps. Non-breeding habitat is heath-based forests and woodlands	No	No
Merops ornatus	Rainbow bee-eater	-	J	Distributed across much of mainland Australia, including NSW. Open forests and woodlands, shrublands, farmland, areas of human habitation, inland and coastal sand dune systems, heathland, sedgeland, vine forest and vine thicket.	Unlikely	No
Monarcha melanopsis	Black-faced Monarch	-	Bonn, Mar	Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	Unlikely	No
Motacilla flava	Yellow Wagtail	-	C,J,K	Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Potential	No

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Myiagra cyanoleuca	Satin Flycatcher	-	Bonn, Mar	Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Potential	No
Numenius madagascariensis	Eastern Curlew	-	C,J,K	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	No	No
Petrogale penicillata	Brush-tailed Rock Wallaby	E1	V	Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	No	No
Phascolarctos cinereus	Koala	V	V	Eucalypt forests and woodlands. Key likely habitats within the site LGA are: Swamp Mahogany Forest, ecotone between Spotted Gum Forest & Hawkesbury Sandstone Open-Forest, Northern form of Coastal Sandstone Woodland at Whale Beach, Red Bloodwood - Scribbly Gum Woodland, Bilgola Plateau Forest and the Grey Ironbark - Grey Gum form of the Newport Bangalay Woodland.	No	No
Pommerhelix duralensis	Dural Land Snail	E1	E	Endemic to NSW. Occurs along the northwest fringes of the Cumberland Plain, within the Hills Shire, Blue Mountains City, Penrith City, Hornsby Shire and Parramatta City LGAs. Shale-sandstone transitional landscapes. Found in Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest; Turpentine-Ironbark Forest; Shale/Sandstone Transition Forest; Turpentine Ironbark Margin Forest; Hinterland Sandstone Gully Forest; and Sydney Hinterland Transition Woodland."	Unlikely	No
Pseudomys novaehollandiae	New Holland Mouse	-	V	Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	No	No
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Unlikely	No

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Rhipidura rufifrons	Rufous Fantail	-	Bonn, Mar	Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	Unlikely	No
Rostratula australis	Australian Painted Snipe	E1	E, Mar	Swamps, dams and nearby marshy areas.	Potential	No – not identified during targeted survey
Tringa nebularia	Common Greenshank	-	C,J,K	Terrestrial wetlands (swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans, saltflats, sewage farms and saltworks dams, inundated rice crops and bores) and sheltered coastal habitats (mudflats, saltmarsh, mangroves, embayments, harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).	Potential	No – not identified during targeted survey
FLORA						
Acacia bynoeana	Bynoe's Wattle	E1	V	Heath or dry sclerophyll forest on sandy soils.	Unlikely	No
Acacia pubescens	Downy Wattle	V	V	Open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones.	Unlikely	No
Allocasuarina glareicola	-	E1	E	Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora.*	No	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest.	No	No

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Cynanchum elegans	White-flowered Wax Plant	E1	E	Dry rainforest; littoral rainforest; *Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia* (Coastal Tea-tree–Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) or *Corymbia maculata* (Spotted Gum) open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle) scrub.	No	No
Eucalyptus benthamii	Camden White Gum	V	V	Occurs in open forest. Requires a combination of deep alluvial sands and a flooding regime.	No	No
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Dry sclerophyll forest and moss gardens over sandstone.	No	No
Grevillea parviflora subsp. parviflora	Small Flower Grevillea	V	V	Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.	Unlikely	No
Haloragis exalata subsp. exalata	Square Raspwort	V	V	Protected and shaded damp situations in riparian habitats.	No	No
Micromyrtus minutiflora	-	E1	V	Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	Unlikely	No
Pelargonium sp.(G.W.Carr 10345)	Omeo Storksbill	E1	E	Irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and wetland or aquatic communities.	Unlikely	No
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	Potential	No – not identified during targeted survey

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Associations	Likelihood of Occurrence	Impact Assessment Required
Persoonia nutans	Nodding Geebung	E1	E	Northern populations: sclerophyll forest and woodland (Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland and Cooks River / Castlereagh Ironbark Forest) on 8eolian and alluvial sediments. Southern populations: tertiary alluvium, shale sandstone transition communities and Cooks River / Castlereagh Ironbark Forest.	No	No
Pimelea curviflora var. curviflora	-	V	V	Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	No	No
Pimelea spicata	Spiked Rice-flower	E1	E	Well-structured clay soils. Eucalyptus moluccana (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Unlikely	No
Pomaderris brunnea	Brown Pomaderris	E	V	Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely	No
Pterostylis saxicola	Sydney Plains Greenhood	E1	E	Small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.	No	No
Pultenaea parviflora	-	E1	V	Dry sclerophyll forest, especially Castlereagh Ironbark Forest, Shale Gravel Transition Forest and transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	Unlikely	No
Thelymitra kangaloonica	Kangaloon Sun Orchid	E4A	CE	Swamps in sedgelands over grey silty grey loam soils.	No	No
Thesium australe	Austral Toadflax	V	V	Grassland on coastal headlands or grassland and grassy woodland away from the coast.	No	No

TSC Act Key: V = vulnerable, E1 = endangered, E2 = endangered population, E4A = critically endangered

EPBC Act Key: V = vulnerable, E = endangered, CE = critically endangered, C, J, K = Migratory under CAMBA, JAMBA RoKAMBA, Bonn = Migratory under the Bonn Agreement, Mar = Marine