15 July 2022

Karoo Rezoning Pty Ltd

C/- Catalyze Property Consulting Pty Ltd

Attention: Craig McGaffin
Sent by email to: cjm@catalyze.net.au

SUBJECT: PLANNING PROPOSAL: LOT 1 DP 100735 AND LOTS 2, 3 AND 4 DP 1185025 – ECOLOGY ASSESSMENT.

Wedgetail Project Consulting conducted an ecological assessment to consider the vegetation and habitat present on Lot 1 DP 100735 and Lots 2, 3 and 4 DP 1185025 (Study Area) on 27 April 2021. Additional plots were conducted 5 July 2022 to address comments from Council.

The site inspection identified that the majority of the Study Area consists of mixed grasslands which are dominated by Exotic species. There are a number of plantings across the site, which are predominantly exotic species. There are some minor areas of native plantings, however, the majority of these plantings are non-endemic native species as such they do not constitute a native vegetation community.

The Study Area contains limited habitat for threatened species due to the degraded nature of the vegetation and dominance of exotic species within the grasslands. Tree species occurring within the Study Area are predominantly planted and are generally young. No hollow-bearing trees were identified. Three dams occurs in the Study Area which contained water at the time of survey, but no standing vegetation. On this basis the Study Area is appropriate from an ecological perspective to be rezoned for residential purposes.

Details of the site inspection and desktop assessment are provided in the following pages.

If you have any further questions regarding this matter, please contact me on the details provided.

Kind Regards

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1. METHODOLOGY

1.1 DESKTOP ASSESSMENT

A list of threatened species, populations and ecological communities that have been reported or modelled to occur within a 5 km radius of the study area was obtained from the following databases:

- NSW Department of Planning, Industry and Environment (DPIE) BioNet Atlas http://www.bionet.nsw.gov.au/.
- Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) https://www.environment.gov.au/epbc/protected-matters-search-toolhttp://www.environment.gov.au/erin/ert/epbc/index.html.

An assessment was made as to the likelihood of any of the reported matters occurring within the study area or using the habitat as an essential part of their foraging range based on information available concerning habitat requirements of threatened species, populations and ecological communities. Pelagic, shorebird and aquatic fish species were excluded from the analysis due to lack of habitat within the study area.

1.2 FIELD SURVEYS

1.2.1 Flora and Vegetation

The field survey included a walk over the study area to identify vegetation and habitat types. The identification of vegetation types was based on dominant species present in the overstorey, midstorey, shrub and ground layers.

The boundaries of each of the identified vegetation communities within the study area were mapped using a combination of rapid data points (RDPs), walking transects and aerial photo interpretation (API). RDPs involved collecting waypoints using a handheld GPS unit and recording dominant species, structure and condition. Walking transects involved collection of floristic composition and condition within areas of homogenous vegetation. The RDPs and survey tracks were then overlaid on an aerial photograph and used to delineate and/or clarify vegetation boundaries.

One 20 m x 20 m floristic plot, and a 50 m line intercept transect were conducted within the Study Area to determine the composition of the grasslands with regard to the proportion of native and exotic cover.

1.2.2 Fauna

1.2.2.1 Habitat Assessments

Fauna habitat values observed during inspections of the study area were recorded. Attributes considered important to fauna include: hollow-bearing trees, nests, fallen timber/hollow logs, abundance of nectar and fruit resources, water bodies, vegetation cover and structural complexity, fallen timber, and leaf litter. Suitability of habitat for threatened fauna species occurring in the locality was also assessed during the survey.

1.2.2.2 Hollow-bearing Tree Survey

A survey of trees within the study area was undertaken to locate hollow-bearing trees. The location of habitat trees was recorded using a hand-held GPS unit and the type of feature it contained was

recorded. For trees with hollows, the number and size of hollows was recorded. Hollow size was classified as either small (< 8 cm diameter), medium (8 – 20 cm diameter) or large (> 20 cm diameter) based on the size of the hollow entrance.

1.2.2.3 Nocturnal Surveys

Spotlighting was conducted on the evening of 27 April for a total of one person hours between 7:15 pm and 8:30 pm. Spotlighting was conducted using high-powered torches to search for all types of nocturnal fauna.

One Anabat™ bat-call detector was used to detect Microchiropteran bats within the Study Area. The detector was placed adjacent to the dam in the north of the Study Area between 7:15 pm and 8:30 pm on 27 April.

1.2.2.4 Koala Habitat Assessment

The site was assessed for the presence of tree species listed as Koala Tree Species under Schedule 2 of State Environmental Planning Policy (Koala Habitat Protection) 2021, for the Central and Southern Tablelands Koala management area.

2. RESULTS

2.1 DESKTOP ASSESSMENT

A total of 30 threatened species have previously been recorded or are modelled to occur within a 5 km radius of the Study Area (**Appendix 1**). These include eight plants, two amphibian, 11 bird, one insect, seven mammal and one reptile species. Additionally, seven migratory bird species and three threatened ecological communities (TECs) were modelled to occur within a 5 km radius of the Study Area.

2.2 FIELD SURVEYS

2.2.1 Flora and Vegetation

The Study Area is dominated by Exotic Grasslands and a mixture of exotic and native plantings. The plantings on site were planted by the current landholder and the species and source of the seeds was confirmed and included a mixture of native species and non-endemic natives.

Two remnant native trees occur to the north of the house within Lot 1 DP 1007355. Both individuals were identified as *Eucalyptus bicostata* (Southern Blue Gum). As only two individuals occur, this area was not mapped as a native vegetation community.

Plate 1: **Grasslands in the east of the Study Area, with Conifer plantings and native plantings along the boundary of the property.**

Plate 2: **Grasslands in the central portion of the Study Area, with Conifer plantings along an internal fence line**

Plate 3: **Grasslands in the western portion of the Study Area**

2.2.1.1 Grasslands

The Grasslands contain a mixture of exotic and native species and are dominated by *Phalaris aquatica* (Phalaris), *Eragrostis curvula* (African Lovegrass), *Rytidosperma racemosum, Hypochaeris radicata* (Catsear), *Trifolium repens* (White Clover), *Panicum effusum* (Hairy Panic), *Eragrostis brownii* (Brown's Lovegrass), *Setaria parviflora, Echium plantagineum* (Paterson's Curse), *Bothriochloa macra* (Red Grass), *Cathamus lanatus* (Saffron Thistle), *Cirsium vulgare* (Spear Thistle), *Mircolaena stipoides* var. *stipoides* (Weeping Grass), *Dysphania pumilio* (Small Crumbweed), *Cenchrus clandestinus* (Kikuyu), *Juncus subsecundus* and *Avena* sp. (Oats).

Four plots and 50 m line intercept transects were conducted within the grasslands to determine if these areas were dominated by native or exotic species. The line intercept showed that grasslands are dominated by Exotic species, with all plots having over 50% Exotic cover (**Table 1**). The line intercept data shows that there is some variability within the site, however, all plots were dominated by exotic species.

Table 1: **Line intercept data**

Plot / Transect	Number of Intercepts along 50 m Transect		Proportion Cover (total %)	
	Native	Exotic	Native	Exotic
Q01	18	49	***27%***	***73%***
Q02	50	4	***93%***	***7%***
Q03	32	37	***46%***	***54%***
Q04	5	49	***9%***	***91%***

2.2.1.2 Plantings

A number of exotic plantings occur throughout the central and eastern portion of the Study Area. These plantings typically occur in rows of blocks as wind breaks, and include; *Cupressus* sp. (Conifer), *Pinus radiata* (Radiata Pine), *Fraxinus excelsior* subsp. *aurea* (Golden Ash), *Fraxinus angustifolia* subsp. *angustifolia* (Desert Ash) and *Fraxinus oxycarpa* (Claret Ash).

Plantings of non-endemic native trees occur along the eastern boundary of the Study Area, and around the house within Lot 1 DP 1007355. Species primarily included; *Eucalyptus golbulus* (Tasmanian Blue Gum), *Eucalyptus mannifera* (Brittle Gum) and *Eucalyptus sideroxylon* (Mugga Ironbark), with some *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus albens* (White Box).

Due to the mixture of the species, the inclusion of non-endemic native species, and the large distance to any areas of surrounding native woodland, the areas of native plantings were not deemed to meet a native vegetation community.

2.2.2 Fauna

2.2.2.1 Habitat

The majority of the Study Area consists of actively grazed paddocks (Sheep grazing) which contain few areas of refugia with limited rocky areas and/or fallen timber was identified. Contains scattered patches of trees, however, these planted trees were young, and no hollow-bearing trees were identified within the Study Area. Three dams occurs in the Study Area, which contained water at the time of survey but no standing vegetation. The site is surrounded by high density residential to the north-west, large lot subdivisions to the east and south and areas of grazing paddocks to the west and south-east, with no areas of remnant native vegetation in the surrounding area.

2.2.2.2 Nocturnal Surveys

Three bat species were identified via Anabat detection, including; *Chalinolobus morio* (Chocolate Watteld Bat), *Nyctphilus* sp. (Unidentified Long-eared Bat) and *Ozimops ridei* (Ride's Free-tailed Bat). Three species were identified during spotlighting; *Oryctolagus cuniculus* (European Rabbit), *Macropus giganteus* (Eastern Grey Kangaroo) and *Podargus strigoides* (Tawny Frogmouth).

2.2.2.3 Koala Habitat

Four tree species listed as Koala Tree Species on the Central and Southern Tablelands have been planted within the Study Area; *Eucalyptus mannifera* (Brittle Gum) and *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus albens* (White Box). However, none of the individuals have a DBH greater than 10 cm, as such are not classified as a 'tree' under the Draft Koala Habitat Protection Guideline. Therefore, no Koala habitat was identified within the Study Area.

Created by: AO
Date: 25/05/2021
Modified: 15/07/2022 (KB)

WEDGETAIL PROJECT CONSULTING
https://www.wedgetail.com.au

Legend

Study Area | Contour | Plot Location | Lot

N

0 100 200 300 400 500 m

Vegetation Communities

Figure: 1

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APPENDIX 1. DATABASE SEARCH

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
Flora						
1.	*Ammobium craspedioides* Yass Daisy	V	V	-	PMST	Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. **Marginal habitat due to dominance of exotic species. No records of the species in the locality.**
2.	*Amphibromus fluitans* River Swamp Wallaby-grass	V	V	-	PMST	Grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels. **Marginal habitat within the Dam in the north of the Study Area (to be retained). However, species is not known from the region.**
3.	*Leucochrysum albicans* var. *tricolor* Hoary Sunray	-	E	-	PMST	The Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination. **Marginal habitat within grassland areas. All records in the region over 10 years old.**
4.	*Prasophyllum petilum* Tarengo Leek Orchid	E	E	-	PMST	Grows in open sites within Natural Temperate Grassland, also grows in grassy woodland in association with River Tussock, Black Gum and tea-trees and within the grassy groundlayer dominated by Kanagroo Grass under Box-Gum Woodland. Highly susceptible to grazing, being retained only at little-grazed travelling stock reserves and in cemeteries. **No suitable habitat due to weed occurrence and grazing. Species not known from the region.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
5.	*Rutidosis leptorrhynchoides* Button Wrinklewort	E	E	-	PMST	Occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland; and often in the ecotone between the two communities. Grows on soils that are usually shallow, stony red-brown clay loams; tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees). **No suitable habitat within the Study Area. Species not known from the region.**
6.	*Senecio macrocarpus* Large-fruit Fireweed	-	V	-	PMST	In NSW, Large-fruit Fireweed occurs in partly cleared dry forests and box-gum woodlands which transition to Brittle Gum Forest with a relatively undisturbed understorey of native grasses, forbs and subshrubs. **No Suitable habitat within the Study Area. Only records in the region from Gundaroo.**
7.	*Swainsona recta* Small Purple-pea	E	E	-	PMST	Grows in association with understorey dominants that include Kangaroo Grass *Themeda triandra*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. **Marginal habitat due to dominance of exotic species. No records of the species in the locality.**
8.	*Thesium australe* Austral Toadflax	V	V	-	PMST	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass. A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. **Marginal habitat due to dominance of exotic species and lack of *Themeda*. Species not known from the region.**
Ecological Communities						
1.	Inland Grey Box Woodland (BC Act) / Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (EPBC Act)	E	E	-	PMST	**Not identified within the Study Area.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
2.	Natural Temperate Grassland of the South-Eastern Highlands	-	CE	-	PMST	**Not identified within the Study Area.**
3.	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	CE	CE	-	PMST	**Not identified within the Study Area.**
Amphibians						
1.	*Litoria booroolongensis* Booroolong Frog	E	E	-	PMST	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. **No suitable habitat within the Study Area.**
2.	*Litoria raniformis* Growling Grass Frog	E	V	-	PMST	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. **No suitable habitat within the Study Area.**
Birds						
1.	*Anthochaera phrygia* Regent Honeyeater	CE	CE	-	PMST	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. **No suitable habitat within the Study Area due to lack of preferred feed trees. Species not known from the locality.**
2.	*Artamus cyanopterus cyanopterus* Dusky Woodswallow	V	-	2	BioNet	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. **No suitable habitat within the Study Area.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
3.	*Botaurus poiciloptilus* Australasian Bittern	E	E	-	PMST	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). **No suitable habitat within the Study Area.**
4.	*Falco hypoleucos* Grey Falcon	V	V	-	PMST	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. **Marginal habitat in the Study Area, and species not known from the locality.**
5.	*Grantiella picta* Painted Honeyeater	V	V	-	PMST	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. **No suitable habitat within the Study Area.**
6.	*Haliaeetus leucogaster* White-bellied Sea-Eagle	V	-	11	BioNet	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. **No suitable habitat within the Study Area.**
7.	*Hieraaetus morphnoides* Little Eagle	V	-	4	BioNet	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. **No suitable habitat within the Study Area.**
8.	*Hirundapus caudacutus* White-throated Needletail	-	V, M	-	PMST	In Australia, the species is mostly aerial, from heights of less than 1 m up to more than 1,000 m above the ground. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. The species roosts in trees amongst dense foliage in the canopy or in hollows **No suitable habitat within the Study Area.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
9.	*Lathamus discolor* Swift Parrot	CE	CE	-	PMST	This migratory species has been recorded on the mainland from a variety of habitat types including dry and wet sclerophyll forest, forested wetlands, coastal swamp forests and heathlands. **No suitable habitat within the Study Area.**
10.	*Polytelis swainsonii* Superb Parrot	V	V	11	BioNet & PMST	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. **No suitable habitat within the Study Area.**
11.	*Rostratula australis* Australian Painted Snipe	E	E	-	PMST	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. **No suitable habitat within the Study Area.**
Insects						
1.	*Synemon plana* Golden Sun Moth	E	CE	16	BioNet & PMST	Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses or Kangaroo Grass. The species has been identified in degraded grasslands dominated by Chilean Needlegrass. The density and quality of Wallaby Grass at a site may be of importance to the Golden Sun Moth larval development as they may need to feed on more than one Wallaby Grass tussock. The total area of Wallaby grass at a site may not be the limiting factor to occupation, rather the quality of the grassland. **Degraded habitat present. Wallaby Grasses present within the site however, grasslands within the Study Area are degraded through weed invasion.**
Mammals						
2.	*Chalinolobus dwyeri* Large-eared Pied Bat	V	V	-	PMST	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. **No habitat present within the Study Area.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
3.	*Dasyurus maculatus maculatus* (SE mainland population) Spotted-tailed Quoll	E	E	-	PMST	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. **Highly marginal habitat present due to lack of surrounding remnant native vegetation.**
4.	*Miniopterus orianae oceanensis* Large Bent-winged Bat	V	-	1	BioNet	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. At other times of the year, populations disperse within about 300 km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the tree tops. **No suitable habitat present within the Study Area.**
5.	*Nyctophilus corbeni* Corben's Long-eared Bat		V	-	PMST	Inhabits a variety of vegetation types, including mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. **No suitable habitat within the Study Area.**
6.	*Phascolarctos cinereus* Koala	V	V	-	PMST	Found in a variety of forest types with suitable feed tree species. **No suitable habitat within the Study Area, no Koala tree species greater than 10-cm DBH.**
7.	*Pteropus poliocephalus* Grey-headed Flying-fox	V	V	7	BioNet & PMST	Occurs across a wide range of habitat types along the eastern seaboard of Australia, depending on food availability. Fruit from myrtaceous trees and rainforest trees form the major components of their diet. **Marginal foraging habitat within planted Eucalyptus trees, however, limited flowering due to age of trees. No camps present.**
Reptiles						
1.	*Delma impar* Striped Legless Lizard	V	V	13	BioNet & PMST	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. **Marginal habitat present within the Study Area.**

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences
		BC Act	EPBC Act			
Migratory Species						
1.	*Apus pacificus* Fork-tailed Swift	-	M	-	PMST	Forages aerially over a very wide range of habitats includes both vegetated and non-vegetated areas. **Potential aerial foraging habitat above the study area.**
2.	*Gallinago hardwickii* Latham's Snipe	-	M	-	PMST	They usually inhabit open, freshwater wetlands with low, dense vegetation. However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. **No suitable habitat in the Study Area.**
3.	*Hirundapus caudacutus* White-throated Needletail	-	V, M	-	PMST	In Australia, the species is mostly aerial, from heights of less than 1 m up to more than 1,000 m above the ground. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. The species roosts in trees amongst dense foliage in the canopy or in hollows **Potential aerial foraging habitat above study area.**
4.	*Motacilla flava* Yellow Wagtail	-	M	-	PMST	Typically inhabits inundated fields, saltmarsh and wetlands and occasionally coastal areas. **No suitable habitat within the study area.**
5.	*Myiagra cyanoleuca* Satin Flycatcher	-	M	-	PMST	Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. **No suitable habitat within the study area.**
6.	*Pandion cristatus* (BC Act) / *P. haliaetus* (EPBC Act) Eastern Osprey	V	M	-	PMST	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. **No suitable habitat within the Study Area.**
7.	*Rhipidura rufifrons* Rufous Fantail	-	M	-	PMST	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. **No suitable habitat within the study area.**

* Legal Status: V = Vulnerable, E = Endangered, CE = Critically Endangered under BC and EPBC Acts; M = Migratory under EPBC Act.
# Source: BioNet = BioNet Atlas (NSW), PMST = Protected Matter Search Tool (Commonwealth).