Appendix G

Threatened Flora Likelihood of Occurrence Table

The table below shows species listed under either the *TSC Act* or the *EPBC Act*.

Species Name	Common Name	Habitat	*EPBC Act 2000*	*TSC Act 1995 Classification*	Likelihood of Occurrence
Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Grows in vine thickets and open shale woodland.	-	Endangered Population	Present
Cynanchum elegans	White-flowered Wax Plant	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. Usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Eucalyptus maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub.	Endangered	Endangered	Present
Allocasuarina glareicola		It grows in clay soils derived from alluvial gravels in woodland. Responds to fire by coppicing densely from a lignotuber.	Endangered	Endangered	Possible
Leucopogon exolasius	Woronora Beard-heath	Found along the upper Georges River area and in Heathcote National Park. The plant occurs in woodland on sandstone.	Vulnerable	Vulnerable	Unlikely
Leucopogon fletcheri subsp. fletcheri		Restricted to north-western Sydney between St Albans in the north and Annangrove in the south, within the local government areas of Hawkesbury, Baulkham Hills and Blue Mountains. Occurs in dry eucalypt woodland or in shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs.	-	Endangered	Unlikely

Dillwynia tenuifolia	Dillwynia tenuifolia, Kemps Creek	The core distribution is the Cumberland Plain from Windsor to Penrith east to Deans Park. Other populations in western Sydney are recorded from Voyager Point and Kemps Creek in the Liverpool LGA, Castlereagh Ironbark Forest to Castlereagh Scribbly Gum Woodland.	-	Endangered Population	Present
Pultenaea parviflora		Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. Outlier populations are recorded from Kemps Creek and Wilberforce.	Vulnerable	Endangered	Present
Pultenaea pedunculata	Matted Bush-pea	In NSW, it is represented by three disjunct populations, in the Cumberland Plains in Sydney, the coast between Tathra and Bermagui and the Windellama area. Occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area.	-	Endangered	Present
Acacia pubescens	Downy Wattle	Scattered throughout the Cumberland plain where it grows on clay and clay-shale soils.	Vulnerable	Vulnerable	Present
Gyrostemon thesioides		Within NSW, has only ever been recorded at three sites, to the west of Sydney, near the Colo, Georges and Nepean Rivers. Grows on hillsides and riverbanks and may be restricted to fine sandy soils.	-	Endangered	Absent
Callistemon linearifolius	Netted Bottle Brush	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. Grows in dry sclerophyll forest on the coast and adjacent ranges.	-	Vulnerable	Absent
Eucalyptus benthamii	Camden White Gum	Occurs on the alluvial flats of the Nepean River and its tributaries. Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment.	Vulnerable	Vulnerable	Present
Eucalyptus nicholii	Narrow-leaved Black Peppermint	Confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield, largely on private property. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite.	Vulnerable	Vulnerable	Absent

Eucalyptus scoparia	Wallangarra White Gum	In NSW it is known from only three locations near Tenterfield, including Bald Rock National Park. Found in open eucalypt forest and woodland on well-drained granite hilltops, slopes and rocky outcrops.	Vulnerable	Endangered	Present
Melaleuca deanei	Deane's Paperbark	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. The species grows in heath on sandstone.	Vulnerable	Vulnerable	Possible
Syzygium paniculatum	Magenta Lilly Pilly	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Vulnerable	Endangered	Unlikely
Diuris aequalis	Buttercup Doubletail	The Type location (from the 19th Century) is Liverpool, west of Sydney. Recorded in forest, low open woodland with grassy understorey and secondary grassland on the higher parts of the Southern and Central Tablelands (especially on the Great Dividing Range).	Vulnerable	Endangered	Unlikely
Pterostylis nigricans	Dark Greenhood	Occurs in north-east NSW north from Evans Head, and in Queensland. Coastal heathland with Heath Banksia (Banksia ericifolia), and lower-growing heath with lichen-encrusted and relatively undisturbed soil surfaces, on sandy soils.	-	Vulnerable	Unlikely
Pterostylis saxicola	Sydney Plains Greenhood	Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where *Pterostylis saxicola* occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shade soils.	Endangered	Endangered	Present
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels.	-	Vulnerable	Highly Likely
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open	Vulnerable	Vulnerable	Likely

		forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests often in open, slightly disturbed sites such as along tracks.			
Pomaderris brunnea	Brown Pomaderris	Found in a very limited area around the Colo, Nepean and Hawkesbury Rivers. It grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Vulnerable	Vulnerable	Possible
Persoonia hirsuta	Hairy Geebung	Has a scattered distribution around Sydney. Is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Endangered	Endangered	Possible
Persoonia nutans	Nodding Geebung	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Endangered	Endangered	Likely
Pimelea spicata	Spiked Rice-flower	Occurs on undulating topography on substrates derived from Wianamatta Shale in areas of Cumberland Plain Woodland Vegetation Community.	Endangered	Endangered	Possible

Appendix H

Field Survey Flora List

Species	Family	Common Name	Growth form	Endemic or Exotic	Weed or Non-weed
Acacia decurrens	Fabaceae - Mimosoideae	Black Wattle, Green Wattle	Tree	Endemic	Non-weed
Allocasuarina littoralis	Casuarinaceae	Black Sheoak	Tree	Endemic	Non-weed
Araujia sericifera	Asclepiadaceae	Moth vine	Vine	Exotic	Weed
Aristida vagans	Poaceae	Threeawn Speargrass	Graminoid	Endemic	Non-weed
Asparagus asparagoides	Asparagaceae	Bridal Creeper	Vine	Exotic	Weed
Aster subulatus	Asteraceae	Wild Aster or Bushy Starwort	Forb	Exotic	Weed
Astroloma humifusum	Ericaceae - Styphelioideae	Native Cranberry	Shrub	Endemic	Non-weed
Bidens pilosa	Asteraceae	Farmer's Friend	Forb	Exotic	Weed
Bromus catharticus	Poaceae	Prairie Grass	Graminoid	Exotic	Weed
Brunoniella spp.	Acanthaceae	Brunoniella	Forb	Endemic	Non-weed
Bursaria spinosa	Pittosporaceae	Blackthorn , Sweet Bursaria or Christmas bush	Tree	Endemic	Non-weed
Casuarina glauca	Casuarinaceae	Swamp Oak	Tree	Endemic	Non-weed
Cheilanthes sieberi	Pteridaceae-Adiantaceae	Poison Rock Fern or Mulga Fern	Forb	Endemic	Non-weed
Conyza spp.	Asteraceae	Junco, Horsweed or Fleabane	Forb	Exotic	Weed
Conyza sumatrensis	Asteraceae	Tall fleabane, broad-leaved fleabane or White Horseweed	Forb	Exotic	Weed
Corymbia maculata	Myrtaceae	Spotted gum	Tree	Endemic	Non-weed
Cyclospermum leptophyllum	Apiaceae	Slender Celery or Wild Carrot	Forb	Exotic	Weed
Dianella longifolia	Phormiaceae	smooth flax lily	Forb	Endemic	Non-weed
Dichelachne micrantha	Poaceae	Short-hair Plumegrass	Graminoid	Endemic	Non-weed
Dichondra repens	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed
Dillwynia sieberi	Fabaceae	Prickly Parrot Pea or Juniper Pea Bush	Shrub	Endemic	Non-weed
Dodonaea viscosa subsp. cuneata	Sapindaceae	Sticky Hopbush	Shrub	Endemic	Non-weed
Einadia hastata	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed
Entolasia marginata	Poaceae	Bordered Panic	Graminoid	Endemic	Non-weed
Entolasia stricta	Poaceae	Wiry Panic	Graminoid	Endemic	Non-weed
Epacrid spp.	Epacridaceae	Australian Heath	Shrub	Endemic	Non-weed
Epaltes australis	Asteraceae	Spreading nut-heads	Forb	Endemic	Non-weed
Eragrostis curvula	Poaceae	African Lovegrass	Graminoid	Exotic	Weed
Eucalyptus acmenoides	Myrtaceae	White mahogany	Tree	Endemic	Non-weed
Eucalyptus crebra	Myrtaceae	Narrow-leaved Ironbark	Tree	Endemic	Non-weed
Eucalyptus eugenioides	Myrtaceae	Thin-leaved Stringy bark	Tree	Endemic	Non-weed
Eucalyptus fibrosa	Myrtaceae	Red Ironbark or Broad-leaved Ironbark	Tree	Endemic	Non-weed
Eucalyptus moluccana	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed

Species	Family	Common Name	Growth form	Endemic or Exotic	Weed or Non-weed
Eucalyptus platyphylla	Myrtaceae	Cabbage gum or Poplar Gum	Juvenile Tree	Endemic	Non-weed
Eucalyptus spp.	Myrtaceae	Eucalypt sapling with angular stem	Juvenile Tree	Endemic	Non-weed
Eucalyptus spp.	Myrtaceae	Euc seedling - hairy fruit, pleasant smelling	Juvenile Tree	Endemic	Non-weed
Eucalyptus tereticornis	Myrtaceae	Forest Red Gum	Tree	Endemic	Non-weed
Eucalyptus terticornis	Myrtaceae	Forest Red Gum	Tree	Endemic	Non-weed
Geranium spp.	Geraniaceae	garden geranium	Forb	Exotic	Weed
Glycine clandestina	Fabaceae	Twining Glycine or Love Creeper	Vine	Endemic	Non-weed
Gnaphalium americanum	Asteraceae	Cudweed	Forb	Exotic	Weed
Hardenbergia violacea	Fabaceae	Native sarsaparilla or Purple coral pea	Shrub	Endemic	Non-weed
Juncus spp.	Juncaceae	Rush	Shrub	Exotic	Weed
Laxmannia spp.	Anthericaceae		Forb	Endemic	Non-weed
Lepidium africanum	Brassicaceae	Peppergrass	Forb	Exotic	Weed
Lepidosperma gunnii	Cyperaceae	Little or Narrow Sword-sedge	Graminoid	Endemic	Non-weed
Leucopogon juniperinum	Ericaceae - Styphelioideae	Prickly Beard-heath	Shrub	Endemic	Non-weed
Ligustrum sinense	Oleaceae	Small-leaved Privot	Shrub	Exotic	Weed
Lissanthe strigosa	Ericaceae	Peach heath	Shrub	Endemic	Non-weed
Lolium perenne	Poaceae	Perennial Ryegrass	Graminoid	Exotic	Weed
Lomandra filiformis subsp. coriacea	Lomandraceae	Wattle Mat-rush	Forb	Endemic	Non-weed
Lomandra filiformis subsp. filiformis	Lomandraceae - Xanthorrhoeaceae	Wattle Mat-rush	Forb	Endemic	Non-weed
Lomandra longifolia	Lomandraceae - Xanthorrhoeaceae	Spiny-headed Mat-rush or Honey Reed	Forb	Endemic	Non-weed
Lomandra longifolia	Lomandraceae - Xanthorrhoeaceae	Spiny-head Mat Rush or Basket Grass	Forb	Endemic	Non-weed
Lomandra multiflora	Lomandraceae	Matrush	Forb	Endemic	Non-weed
Luzula spp.	Juncaceae	Wood-rush	Forb	Endemic	Non-weed
Lycium ferocissimum	Solanaceae	African Boxthorn	Shrub	Exotic	Weed
Melaleuca decora	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed
Microlaena stipoides	Poaceae	Weeping grass	Graminoid	Endemic	Non-weed
Myrsiphyllum Asparagoides	Asparagaceae	Common Bridal Creeper	Vine	Exotic	Weed
Olea europaea	Oleaceae	African Olive	Shrub	Exotic	Weed
Onopordum acanthium	*Asteraceae*	Scotch Thistle	Forb	Exotic	Weed
Opercularia diphylla	Rubiaceae	Thin Leaf Stink Weed	Forb	Endemic	Weed
Opuntia stricta	Cactaceae	Prickly Pear	Shrub	Exotic	Weed
Oxalis perennans	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed
Ozothamnus	Asteraceae	Sago flower or pill flower	Shrub	Endemic	Non-weed

Species	Family	Common Name	Growth form	Endemic or Exotic	Weed or Non-weed
diosmifolius					
Panicum simile	Poaceae	Two-colour Panic	Forb	Endemic	Non-weed
Parsonsia spp.	Apocynaceae	woody vines/climbers	Vine	Endemic	Non-weed
Paspalum dilatatum	Poaceae	Dallis Grass	Graminoid	Exotic	Weed
Pinus spp.	Pinaceae	Garden Pine - exotic	Juvenile Tree	Exotic	Weed
Plantago debilis	Plantaginaceae	Shade Plantain or Weak Plantain	Forb	Endemic	Weed
Plectranthus parviflorus	Lamiaceae	Cockspur Flower	Shrub	Endemic	Weed
Pratia purpurascens	Lobeliaceae	White Root	Forb	Endemic	Non-weed
Pterostylis concinna	Orchidaceae	Trim Greenhood Orchid	Forb	Endemic	Non-weed
Senecio madagascariensis	Asteraceae	Fireweed	Forb	Exotic	Weed
Senecio vulgaris	Asteraceae	Common Groundsel	Forb	Exotic	Weed
Setaria parviflora	Poaceae	Slender Pigeon Grass	Graminoid	Exotic	Weed
Sida rhombifolia	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Shrub	Exotic	Weed
Solanum nigrum sens.lat.	Solanaceae	Blackberry nightshade	Forb	Exotic	Weed
Solanum prinophyllum	Solanaceae	Forest nightshade	Forb	Endemic	Non-weed
Solanum pseudocapsicum	Solanaceae	Madeira Winter Cherry or Jerusalem Cherry	Shrub	Exotic	Weed
Sonchus spp.	Asteraceae	Milk Thistle	Forb	Exotic	Weed
Stellaria media	Caryophyllaceae	Common Chickweed	Forb	Exotic	Weed
Taraxacum officinale	Asteraceae	Dandelion	Forb	Exotic	Weed
Themeda triandra	Poaceae	Kangaroo Grass	Graminoid	Endemic	Non-weed
Tredescantia albiflora	Commelinaceae	Wandering Jew	Forb	Exotic	Weed
Unidentifiable grass	Poaceae	Grass D - round stem	Graminoid	Exotic	Weed
Unidentifiable grass	Poaceae	tiny grass	Graminoid	Exotic	Weed
Unidentifiable grass	Poaceae	Grass F	Graminoid	Exotic	Weed
Unidentifiable grass	Poaceae	blue grass	Graminoid	Exotic	Weed
Unidentifiable plant		(bulby species?)		Exotic	Weed
Unidentifiable plant		opposite-leaved, white hairs & flowers herb	Forb	Exotic	Weed
Unidentifiable plant		Square-stemmed opposite lieaved creeper	Graminoid	Exotic	Weed
Verbena bonariensis	Verbenaceae	Purpletop	Forb	Exotic	Weed
Veronica plebeia	Scrophulariaceae	Trailing Speedwell, Creeping Speedwell	Forb	Endemic	Non-weed
Wahlenbergia gracilis	Campanulaceae	Australian Bluebell	Forb	Endemic	Non-weed

Appendix I

Reference Site Assessments

To compare and contrast the quality of existing habitat and provide meaningful management and conservation recommendation measures, a field survey was undertaken to identify and characterise the vegetation communities on site. The selected benchmark sites are shown in **Figure I1** and the results of the survey are shown in **Tables I1 – I7**.

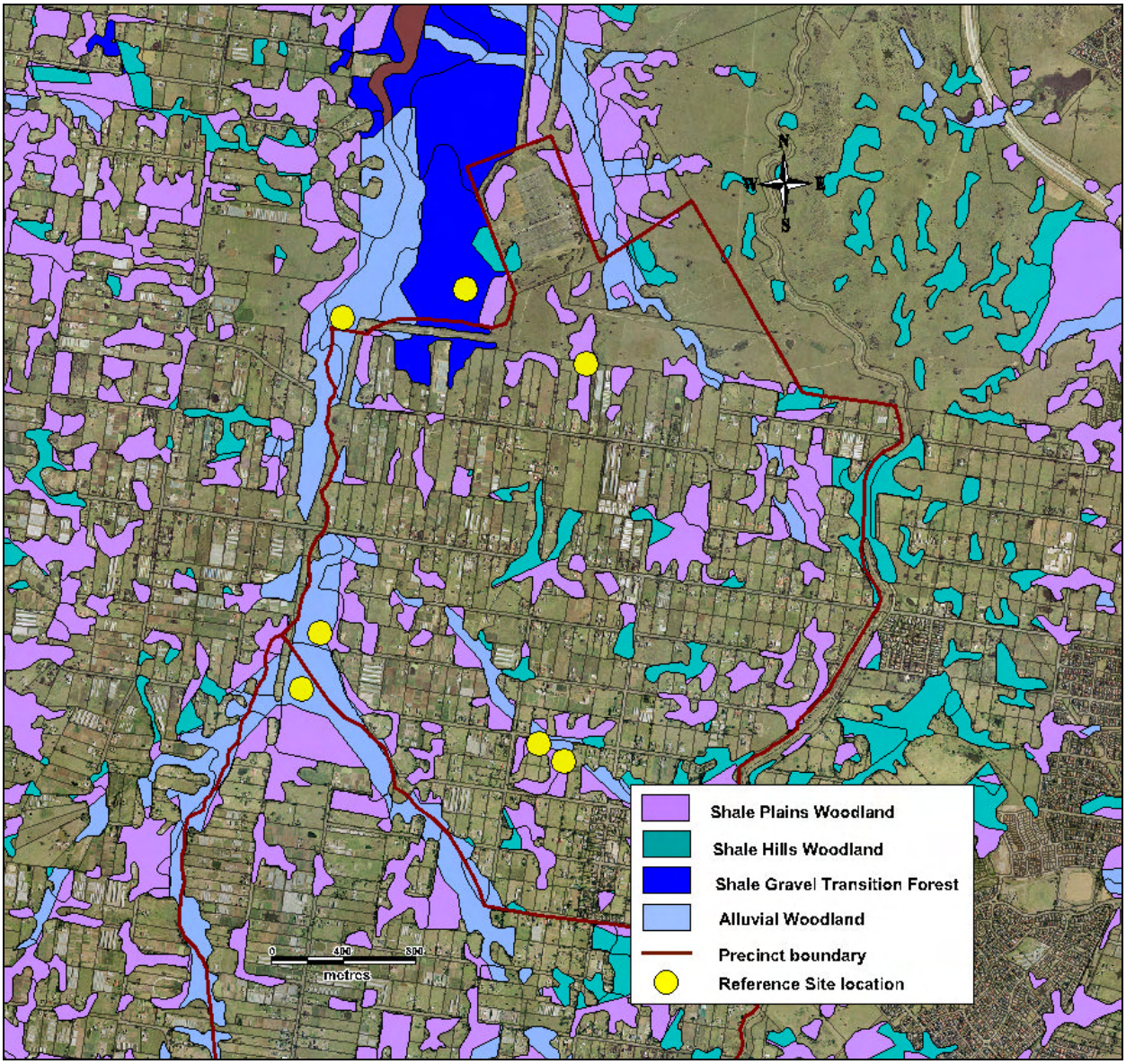


Figure I1 Location of reference sites.

Table Key

Layers
T1 = Canopy trees
T2 = Sub canopy understory trees
S1 = Shrub strata
S2 = Shrub strata
G = Ground

Dominance
D = Dominant
C = Co-dominant
A = Associated
S = Suppressed

Cover = Density of strata

Table I1 Shale Plains Woodland reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 1 - Shale Plains Woodland									
T1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	D	15m	Moderate
T1	*Eucalyptus tereticornis*	Myrtaceae	Forest Red Gum	Tree	Endemic	Non-weed	C	15m	Moderate
T2	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed	D	9m	Sparse
S1	*Acacia decurrens*	Fabaceae - Mimosoideae	Black Wattle, Green Wattle	Tree	Endemic	Non-weed	D	2-4m	Sparse
S1	Juvenile *Eucalyptus spp.*	Myrtaceae		Juvenile Tree	Endemic	Non-weed	C	2-4m	Sparse
S2	*Acacia decurrens*	Fabaceae - Mimosoideae	Black Wattle, Green Wattle	Tree	Endemic	Non-weed	C	2-4m	Sparse
S2	Juvenile *Eucalyptus spp.*	Myrtaceae		Juvenile Tree	Endemic	Non-weed	D	0.5-1.5m	Sparse
S2	*Dodonaea viscosa subsp. cuneata*	Sapindaceae	Sticky Hopbush	Shrub	Endemic	Non-weed	S	0.5-1.5m	Sparse
S2	*Pinus spp.*	Pinaceae	Garden Pine - exotic	Juvenile Tree	Exotic	Weed	S	0-1m	Sparse
S2	*Olea europaea*	Oleaceae	African Olive	Shrub	Exotic	Weed	S	0-1m	Sparse
G	*Senecio madagascariensis*	Asteraceae	Fireweed	Forb	Exotic	Weed	S	0-1m	Sparse
G	*Plantago debilis*	Plantaginaceae	Shade Plantain or Weak Plantain	Forb	Endemic	Weed	-	0-1m	Dense
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	-	0-1m	Dense
G	*Pratia purpurascens*	Lobeliaceae	White Root	Forb	Endemic	Weed	-	0-1m	Dense
G	*Bidens pilosa*	Asteraceae	Farmer's Friend	Forb	Exotic	Weed	-	0-1m	Dense
G	*Sonchus spp*	Asteraceae	Milk Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Taraxacum officinale*	Asteraceae	Dandelion	Forb	Exotic	Weed	-	0-1m	Dense

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
G	Unidentifiable Weed			Forb	Exotic	Weed	-	0-1m	Dense
G	*Wahlenbergia gracilis*	Campanulaceae	Australian Bluebell	Forb	Endemic	Non-weed	-	0-1m	Dense
G	*Onopordum acanthium*	*Asteraceae*	Scotch Thistle	Forb	Exotic	Weed	-	0-1m	Dense
G	*Conyza spp.*	*Asteraceae*	Junco, Horsweed or Fleabane	Forb	Exotic	Weed	-	0-1m	Dense
G	*Sida rhombifolia*	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Glycine clandestina*	Fabaceae	Twining Glycine or Love Creeper	Vine	Endemic	Non-weed	-	0-1m	Dense
G	*Brunoniella spp.*	Acanthaceae	Brunoniella	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Setaria parviflora*	Poaceae	Slender Pigeon Grass	Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Dichelachne micrantha*	Poaceae	Short-hair Plumegrass	Graminoid	Endemic	Non-weed	-	0-1m	Dense
G	*Eragrostis curvula*	Poaceae	African Lovegrass	Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Dense
G	*Cyclospermum leptophyllum*	Apiaceae	Slender Celery or Wild Carrot	Forb	Exotic	Weed	-	0-1m	Sparse
G	Unidentifiable Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Cheilanthes sieberi*	Pteridaceae-Adiantaceae	Poison Rock Fern or Mulga Fern	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Dodonaea viscosa subsp. cuneata*	Sapindaceae	Sticky Hopbush	Shrub	Endemic	Non-weed	-	0-1m	Dense
G	*Gnaphalium americanum*	Asteraceae	Cudweed	Forb	Exotic	Weed	-	0-1m	Dense
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Dense
G	*Microlaena stipoides*	Poaceae	Weeping grass	Graminoid	Endemic	Non-weed	-	0-1m	Dense
G	Unidentifiable Weed				Exotic	Weed	-	0-1m	Sparse
G	Unidentifiable Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Lomandra filiformis subsp. coriacea*	Lomandraceae	Wattle Mat Rush	Forb	Endemic	Non-weed	-	0-1m	Dense
G	*Verbena bonariensis*	Verbenaceae	Purpletop	Forb	Exotic	Weed		0-1m	Dense
G	*Asparagus asparagoides*	Asparagaceae	Common Bridal Creeper	Vine	Exotic	Weed	-	0-1m	Dense
G	*Paspalum dilatatum*	Poaceae	Dallis Grass	Graminoid	Exotic	Weed	-	0-1m	Dense

Table I2 Shale Plains Woodland reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 2 - Shale Plains Woodland									
T1	*Corymbia maculata*	Myrtaceae	Spotted gum	Tree	Endemic	Non-weed	D	≤18m	Moderate
T1	*Eucalyptus crebra*	Myrtaceae	Narrow-leaved Ironbark	Tree	Endemic	Non-weed	C	≤18m	Moderate
T1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	A	≤18m	Moderate
T2	*Eucalyptus crebra*	Myrtaceae	Narrow-leaved Ironbark	Tree	Endemic	Non-weed	D	≤8m	Sparse
T2	*Eucalyptus eugenioides*	Myrtaceae	Thin-leaved Stringy bark	Tree	Endemic	Non-weed	S	≤8m	Sparse
S1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Juvenile Tree	Endemic	Non-weed	D	≤2m	Sparse
S1	*Corymbia maculata*	Myrtaceae	Spotted gum	Juvenile Tree	Endemic	Non-weed	D	≤2m	Sparse
G	*Lolium perenne*	Poaceae	Perennial Ryegrass	Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Dense
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Dense
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Moderate
G	*Epaltes australis*	Asteraceae	Spreading nut-heads	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Juncus spp.*	Juncaceae	Rush	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Glycine clandestina*	Fabaceae	Twining Glycine or Love Creeper	Vine	Endemic	Non-weed	-	0-1m	Sparse
G	*Eucalyptus spp.*	Myrtaceae	Euc seedling	Juvenile Tree	Endemic	Non-weed	-	0-1m	Sparse
G	*Lomandra filiformis subsp. coriacea*	Lomandraceae - Xanthorrhoeaceae	Wattle Mat-rush	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentied Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Laxmannia spp.*	Anthericaceae		Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Plantago debilis*	Plantaginaceae	Shade Plantain or Weak Plantain	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Bidens pilosa*	Asteraceae	Farmer's Friend	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Cyclospermum leptophyllum*	Apiaceae	Slender Celery or Wild Carrot	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Gnaphalium americanum*	Asteraceae	Cudweed	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Conyza sumatrensis*	Asteraceae	Tall fleabane, Broad-leaved Fleabane or White Horseweed	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Senecio madagascariensis*	Asteraceae	Fireweed	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Solanum pseudocapsicum*	Solanaceae	Madeira Winter Cherry or Jerusalem	Shrub	Exotic	Weed	-	0-1m	Sparse

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
			Cherry						
G	*Entolasia marginata*	Poaceae	Bordered Panic	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Panicum simile*	Poaceae	Two-colour Panic	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Solanum prinophyllum*	Solanaceae	Forest nightshade	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Sida rhombifolia*	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Lomandra longifolia*	Lomandraceae	Spiny-headed Mat-rush or Honey Reed	Forb	Endemic	Non-weed	-	0-1m	Sparse

Table I3 Alluvial Woodland Flats reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 3 - Starr Park - Alluvial Woodland Flats									
T1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	D	18-20m	Dense
T1	*Eucalyptus terticornis*	Myrtaceae	Forest Red Gum	Tree	Endemic	Non-weed	D	18-20m	Dense
T2	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed	D	8-10m	Moderate
S1	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Juvenile Tree	Endemic	Non-weed	D	2-4m	Sparse
S1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Juvenile Tree	Endemic	Non-weed	C	2-4m	Sparse
S1	*Bursaria spinosa*	Pittosporaceae	Blackthorn , Sweet Bursaria or Christmas bush	Tree	Endemic	Non-weed	A	2-4m	Sparse
G	*Setaria parviflora*	Poaceae	Slender Pigeon Grass	Graminoid	Exotic	Weed	D	0-1m	Dense
G	*Plectranthus parviflorus*	Lamiaceae	Cockspur Flower	Shrub	Endemic	Weed	C	0-1m	Moderate
G	*Tredescantia albiflora*	Commelinaceae	Wandering Jew	Forb	Exotic	Weed	C	0-1m	Moderate
G	*Lolium perenne*	Poaceae	Perennial Ryegrass	Graminoid	Exotic	Weed	C	0-1m	Dense
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Araujia sericifera*	Asclepiadaceae	Moth vine	Vine	Exotic	Weed	-	0-1m	Sparse
G	*Asparagus asparagoides*	Asparagaceae	Common Bridal Creeper	Vine	Exotic	Weed	-	0-1m	Sparse
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Sida rhombifolia*	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Shrub	Exotic	Weed	-	0-1m	Sparse

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
G	*Lomandra longifolia*	Xanthorrhoeaceae	Spiny-head Mat Rush or Basket Grass	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Onopordum acanthium*	Asteraceae	Scotch Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Dianella longifolia*	Phormiaceae	smooth flax lily	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Solanum nigrum* sens.lat.	Solanaceae	Blackberry nightshade	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Geranium spp.*	Geraniaceae	garden geranium	Forb	Exotic	Weed	-	0-1m	Sparse
G	Unidentified Weed		opposite-leaved, white hairs & flowers herb	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Lepidium africanum*	Brassicaceae	Peppergrass	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Themeda triandra*	Poaceae	Kangaroo Grass	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Grass		blue grass	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Bromus catharticus*	Poaceae	Prairie Grass	Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Solanum prinophyllum*	Solanaceae	Forest nightshade	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Bidens pilosa*	Asteraceae	Farmer's Friend	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Opuntia stricta*	Cactaceae	Prickly Pear	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Stellaria media*	Caryophyllaceae	Common Chickweed	Forb	Exotic	Weed	-	0-1m	Sparse

Table I4 Alluvial Woodland Proper Flats reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 4 - Alluvial Woodland Proper Flats									
T1	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed	D	16m	Dense
T1	*Casuarina glauca*	Casuarinaceae	Swamp Oak	Tree	Endemic	Non-weed	C	16m	Dense
T1	*Eucalyptus terticornis*	Myrtaceae	Forest Red Gum	Tree	Endemic	Non-weed	A	16m	Dense
T2	*Casuarina glauca*	Casuarinaceae	Swamp Oak	Tree	Endemic	Non-weed	D	<8m	Sparse
S1	*Ligustrum sinense*	Oleaceae	Small-leaved Privot	Shrub	Exotic	Weed	D	2-4m	Sparse
S1	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Juvenile Tree	Endemic	Non-weed	D	2-4m	Sparse
S1	*Casuarina glauca*	Casuarinaceae	Swamp Oak	Juvenile Tree	Endemic	Non-weed	A	2-4m	Sparse
G	*Lolium perenne*	Poaceae	Perennial Ryegrass	Graminoid	Exotic	Weed	C		Dense

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
G	*Microlaena stipoides*	Poaceae	Weeping grass	Graminoid	Endemic	Non-weed	D	0-1m	Dense
G	*Sonchus spp*	Asteraceae	Milk Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Myrsiphyllum Asparagoides*	Asparagaceae	Common Bridal Creeper	Vine	Exotic	Weed	-	0-1m	Sparse
G	*Tredescantia albiflora*	Commelinaceae	Wandering Jew	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Sida rhombifolia*	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Geranium spp.*	Geraniaceae	Garden Geranium or Cranebill	Forb	Exotic	Weed	-	0-1m	Sparse
G	Unidentified Weed		opposite-leaved, white hairs & flowers herb	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Solanum nigrum* sens.lat.	Solanaceae	Blackberry nightshade	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Senecio vulgaris*	Asteraceae	Common Groundsel	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Bidens pilosa*	Asteraceae	Farmer's Friend	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Araujia sericifera*	Asclepiadaceae	Moth vine	Vine	Exotic	Weed	-	0-1m	Sparse
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Aster subulatus*	Asteraceae	Wild Aster or Bushy Starwort	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Onopordum acanthium*	Asteraceae	Scotch Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Cyclospermum leptophyllum*	Apiaceae	Slender Celery or Wild Carrot	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Sparse

Table I5 Shale Plains Woodland Flats reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 5 - Shale Plains Woodland Flats									
T1	*Corymbia maculata*	Myrtaceae	Spotted gum	Tree	Endemic	Non-weed	D	18m	Moderate
T2	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	D	14m	Sparse
T2	*Corymbia maculata*	Myrtaceae	Spotted gum	Tree	Endemic	Non-weed	A	14m	Sparse
S1	*Bursaria spinosa*	Pittosporaceae	Blackthorn , Sweet Bursaria or Christmas bush	Tree	Endemic	Non-weed	D	2-4m	Moderate

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
S1	*Eucalyptus platyphylla*	Myrtaceae	Cabbage gum or Poplar Gum	Juvenile Tree	Endemic	Non-weed	C	2-4m	Sparse
S1	*Casuarina glauca*	Casuarinaceae	Swamp Oak	Juvenile Tree	Endemic		S	2-4m	Sparse
S2	*Lycium ferocissimum*	Solanaceae	African Boxthorn	Shrub	Exotic	Weed	S	0.5-1.5m	Sparse
S2	*Lissanthe strigosa*	Ericaceae	Peach heath	Shrub	Endemic	Non-weed	D	0.5-1.5m	Sparse
G	*Setaria parviflora*	Poaceae	Slender Pigeon Grass	Graminoid	Exotic	Weed	D	0-1m	Dense
G	*Pratia purpurascens*	Lobeliaceae	White Root	Forb	Endemic	Weed	A	0-1m	Moderate
G	*Brunoniella spp.*	Acanthaceae	Brunoniella	Forb	Endemic	Non-weed	A	0-1m	Sparse
G	*Solanum prinophyllum*	Solanaceae	Forest nightshade	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Onopordum acanthium*	Asteraceae	Scotch Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Sonchus spp*	Asteraceae	Milk Thistle	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Sida rhombifolia*	Malvaceae	Paddy's Lucerne or Arrow-leaf Sida	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Plantago debilis*	Plantaginaceae	Shade Plantain or Weak Plantain	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Taraxacum officinale*	Asteraceae	Dandelion	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Glycine clandestina*	Fabaceae	Twining Glycine or Love Creeper	Vine	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Bidens pilosa*	Asteraceae	Farmer's Friend	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Cheilanthes sieberi*	Pteridaceae-Adiantaceae	Poison Rock Fern or Mulga Fern	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Geranium spp.*	Geraniaceae	garden geranium	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Paspalum dilatatum*	Poaceae	Dallis Grass	Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Bromus catharticus*	Poaceae	Prairie Grass	Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Dianella longifolia*	Phormiaceae	smooth flax lily	Forb	Endemic	Non-weed	-	0-1m	Sparse

Table I6 Shale Transition Forest Flats reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 6 - Shale Transition Forest Flats									
T1	*Eucalyptus fibrosa*	Myrtaceae	Red Ironbark or Broad-leaved Ironbark	Tree	Endemic	Non-weed	A	20-22m	Moderate
T1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	D	20-22m	Moderate
T2	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed	D	8-10m	Moderate
T2	*Eucalyptus moluccana*	Myrtaceae	Juvenile Grey Box or Gum-topped box	Juvenile Tree	Endemic	Non-weed	S	6-8m	Sparse
S1	*Dillwynia sieberi*	Fabaceae	Prickly Parrot Pea or Juniper Pea Bush	Shrub	Endemic	Non-weed	D	1-2m	Moderate
S1	*Ozothamnus diosmifolius*	Asteraceae	Sago flower or pill flower	Shrub	Endemic	Non-weed	A	1-2m	Moderate
S1	*Melaleuca decora*	Myrtaceae	Juvenile White Feather Honeymyrtle	Juvenile Tree	Endemic	Non-weed	S	1-2m	Moderate
S2	*Leucopogon juniperinum*	Ericaceae - Styphelioideae	Prickly Beard-heath	Shrub	Endemic	Non-weed	A	1-2m	Sparse
S2	*Opuntia stricta*	Cactaceae	Prickly Pear	Shrub	Exotic	Weed	A	0.5-1.5m	Sparse
G	*Themeda triandra*	Poaceae	Kangaroo Grass	Graminoid	Endemic	Non-weed	D	0-1m	Sparse
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	A	0-1m	Moderate
G	*Lomandra filiformis subsp. coriacea*	Lomandraceae	Wattle Mat Rush	Forb	Endemic	Non-weed	A	0-1m	Moderate
G	*Glycine clandestina*	Fabaceae	Twining Glycine or Love Creeper	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Acacia decurrens*	Fabaceae - Mimosoideae	Black Wattle, Green Wattle	Seedling	Endemic	Non-weed	-	0-1m	Sparse
G	*Cheilanthes sieberi*	Pteridaceae-Adiantaceae	Poison Rock Fern or Mulga Fern	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Aristida vagans*	Poaceae	Threeawn Speargrass	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Brunoniella spp.*	Acanthaceae	Brunoniella	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Pratia purpurascens*	Lobeliaceae	White Root	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Solanum prinophyllum*	Solanaceae	Forest nightshade	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Taraxacum officinale*	Asteraceae	Dandelion	Forb	Exotic	Weed	-	0-1m	Sparse
G	*Lomandra multiflora*	Lomandraceae	Matrush	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
G	*Astroloma humifusum*	Ericaceae - Styphelioideae	Native Cranberry	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Entolasia stricta*	Poaceae	Wiry Panic	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Weed			Forb	Exotic	Weed	-	0-1m	Sparse
G	*Opercularia diphylla*	Rubiaceae	Thin Leaf Stink Weed	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Opercularia diphylla*	Rubiaceae	Thin Leaf Stink Weed	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Parsonsia spp.*	Apocynaceae	woody vines/climbers	Vine	Endemic	Non-weed	-	0-1m	Sparse

Table I7 Alluvial Woodland reference site assessment results.

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
Site 7 - Alluvial Woodland									
T1	*Eucalyptus moluccana*	Myrtaceae	Grey Box or Gum-topped box	Tree	Endemic	Non-weed	D	16-18m	Moderate
T1	*Eucalyptus acmenoides*	Myrtaceae	White mahogany	Tree	Endemic	Non-weed	A	16-18m	Moderate
T1	*Eucalyptus fibrosa*	Myrtaceae	Red Ironbark or Broad-leaved Ironbark	Tree	Endemic	Non-weed	A	16-18m	Moderate
T2	*Allocasuarina littoralis*	Casuarinaceae	Black Sheoak	Tree	Endemic	Non-weed	A	8-12m	Moderate
T2	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Tree	Endemic	Non-weed	D	8-12m	Moderate
T2	*Acacia decurrens*	Fabaceae - Mimosoideae	Black Wattle, Green Wattle	Tree	Endemic	Non-weed	A	8-12m	Moderate
S1	*Bursaria spinosa*	Pittosporaceae	Blackthorn , Sweet Bursaria or Christmas bush	Tree	Endemic	Non-weed	D	2-3m	Dense
S1	*Allocasuarina littoralis*	Casuarinaceae	Black Sheoak	Juvenile Tree	Endemic	Non-weed	A	2-4m	Moderate
S1	*Melaleuca decora*	Myrtaceae	White Feather Honeymyrtle	Juvenile Tree	Endemic	Non-weed	C	4m	Moderate
S2	*Dillwynia sieberi*	Fabaceae	Prickly Parrot Pea or Juniper Pea Bush	Shrub	Endemic	Non-weed	A	1-2m	Sparse
S2	*Epacrid spp.*	Epacridaceae	Australian Heath	Shrub	Endemic	Non-weed	D	1-2m	Moderate
G	*Themeda triandra*	Poaceae	Kangaroo Grass	Graminoid	Endemic	Non-weed	D	0-1m	Dense
G	*Lepidosperma gunnii*	Cyperaceae	Little or Narrow Sword-sedge	Graminoid	Endemic	Non-weed	A	0-1m	Dense
G	*Lomandra filiformis subsp. coriacea*	Lomandraceae - Xanthorrhoeaceae	Wattle Mat Rush	Forb	Endemic	Non-weed	A	0-1m	Dense

Layer	Species	Family	Common Name	Growth Form	Endemic or Exotic	Weed or Non-weed	Dominance	Median Height	Cover
G	*Cheilanthes sieberi*	Pteridaceae-Adiantaceae	Poison Rock Fern or Mulga Fern	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Dichondra repens*	Convolvulaceae	Kidney Weed	Forb	Endemic	Weed	-	0-1m	Sparse
G	*Lomandra filiformis subsp. filiformis*	Lomandraceae - Xanthorrhoeaceae	Wattle Mat Rush	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Pratia purpurascens*	Lobeliaceae	White Root	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Opuntia stricta*	Cactaceae	Prickly Pear	Shrub	Exotic	Weed	-	0-1m	Sparse
G	*Lissanthe strigosa*	Ericaceae	Peach heath	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Einadia hastata*	Chenopodiaceae	Berry Saltbush	Shrub	Endemic	Non-weed	-	0-1m	Sparse
G	*Oxalis perennans*	Oxalidaceae	Grassland Wood-sorrel	Graminoid	Endemic	Non-weed	-	0-1m	Sparse
G	*Brunoniella spp.*	Acanthaceae	Brunoniella	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Pterostylis concinna*	Orchidaceae	Trim Greenhood Orchid	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Myrsiphyllum Asparagoides*	Asparagaceae	Common Bridal Creeper	Vine	Exotic	Weed	-	0-1m	Sparse
G	*Veronica plebeia*	Scrophulariaceae	Trailing Speedwell, Creeping Speedwell	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	*Luzula spp.*	Juncaceae	Wood-rush	Forb	Endemic	Non-weed	-	0-1m	Sparse
G	Unidentified Grass	Poaceae		Graminoid	Exotic	Weed	-	0-1m	Sparse
G	*Glycine clandestina*	Fabaceae	Twining Glycine or Love Creeper	Shrub	Endemic	Non-weed	-	0-1m	Sparse

Appendix J

Remote Site Assessment

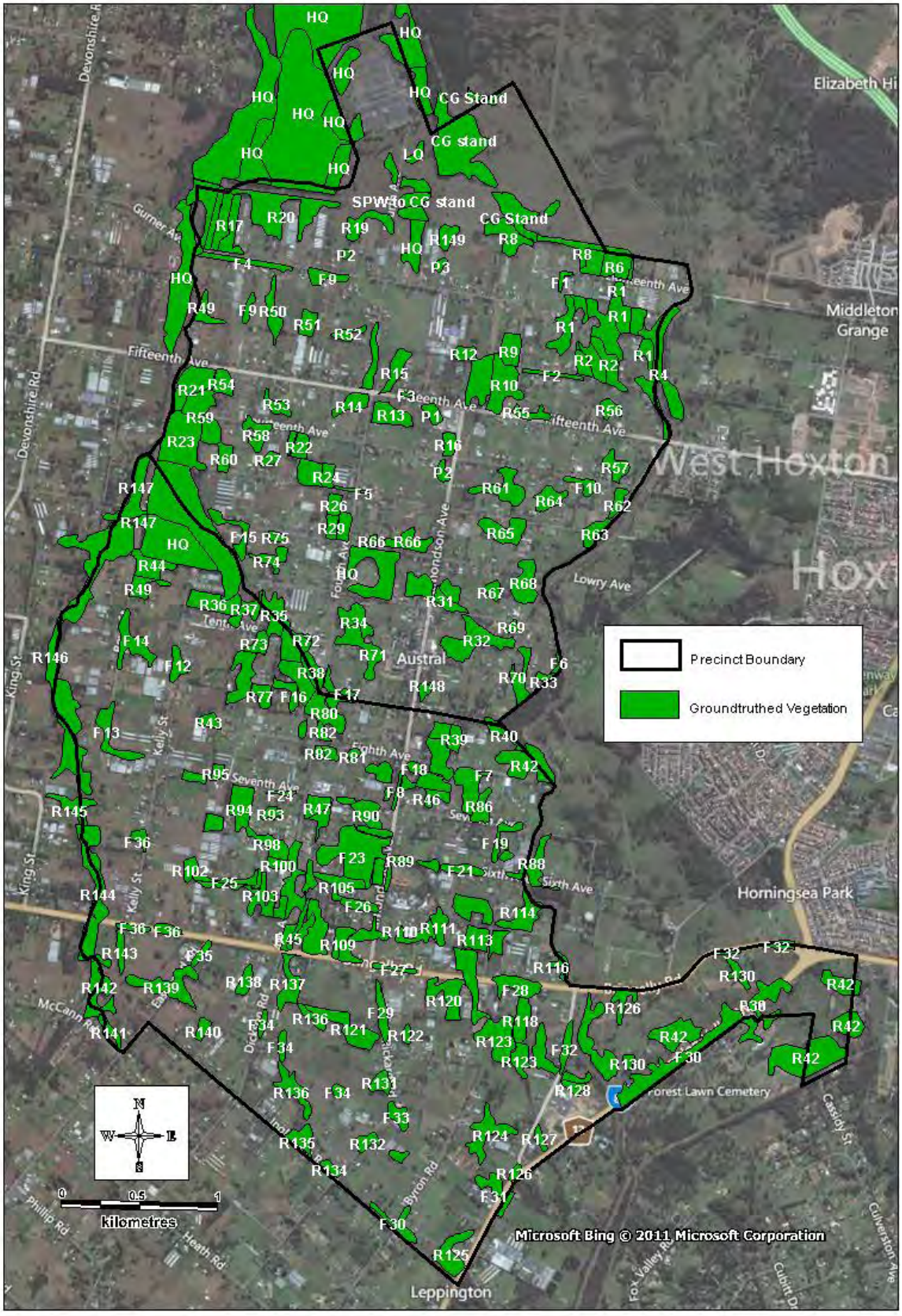
Site Number	Present/Absence Score	Cover Score	Species Richness Score	Dominant Species Score	Non-Native Cover Score	Total Score	Site Condition Value
R1	7.50	6.67	5.38	5.00	5.00	29.55	Medium
R2	10.00	9.17	2.31	3.75	6.67	31.89	Medium
R3	10.00	5.83	6.15	5.00	5.83	32.82	Medium
R4	10.00	7.50	6.92	7.50	8.33	40.26	High
R5	10.00	8.33	5.38	6.25	10.00	39.97	High
R6	7.50	5.00	0.77	2.50	7.50	23.27	Low
R7	10.00	5.00	1.54	2.50	10.00	29.04	Medium
R8	10.00	6.67	5.38	8.75	10.00	40.80	High
R9	7.50	4.17	1.54	3.75	7.50	24.46	Medium
R10	5.00	1.67	0.77	3.75	5.00	16.19	Low
R11	10.00	3.33	3.85	5.00	9.17	31.35	Medium
R12	7.50	5.83	2.31	2.50	6.67	24.81	Medium
R13	7.50	6.67	3.85	3.75	5.00	26.76	Medium
R14	7.50	5.00	3.85	5.00	6.67	28.01	Medium
R15	10.00	5.83	6.15	6.25	7.50	35.74	High
R16	10.00	7.50	3.85	6.25	7.50	35.10	High
R17	10.00	5.00	6.15	5.00	9.17	35.32	High
R18	10.00	4.17	3.08	1.25	7.50	25.99	Medium
R19	10.00	8.33	4.62	6.25	9.17	38.37	High
R20	10.00	5.00	3.85	6.25	7.50	32.60	Medium
R21	10.00	6.67	4.62	6.25	10.00	37.53	High
R22	5.00	4.17	5.38	2.50	2.50	19.55	Low
R23	10.00	8.33	7.69	8.75	7.50	42.28	High
R24	10.00	7.50	5.38	7.50	7.50	37.88	High
R25	10.00	5.83	3.85	3.75	7.50	30.93	Medium
R26	10.00	10.00	3.85	5.00	7.50	36.35	High
R27	10.00	7.50	3.08	5.00	7.50	33.08	Medium
R28	7.50	7.50	2.31	3.75	5.00	26.06	Medium
R29	10.00	6.67	3.85	5.00	6.67	32.18	Medium
R30	10.00	7.50	6.15	6.25	7.50	37.40	High
R31	10.00	6.67	7.69	7.50	5.83	37.69	High
R32	10.00	7.50	3.85	6.25	7.50	35.10	High
R33	10.00	6.67	4.62	5.00	7.50	33.78	Medium
R34	10.00	5.00	3.08	6.25	7.50	31.83	Medium
R35	10.00	8.33	6.15	6.25	7.50	38.24	High
R36	7.50	2.50	2.31	3.75	5.00	21.06	Low
R37	10.00	6.67	6.15	7.50	7.50	37.82	High
R38	10.00	7.50	4.62	6.25	7.50	35.87	High

Site Number	Present/Absence Score	Cover Score	Species Richness Score	Dominant Species Score	Non-Native Cover Score	Total Score	Site Condition Value
R39	7.50	7.50	1.54	3.75	5.00	25.29	Medium
R40	10.00	9.17	3.08	5.00	7.50	34.74	High
R41	10.00	6.67	6.15	5.00	7.50	35.32	High
R42	10.00	6.67	5.38	6.25	8.33	36.63	High
R43	7.50	5.83	1.54	1.25	5.00	21.12	Low
R44	5.00	4.17	0.00	1.25	2.50	12.92	Low
R45	10.00	9.17	6.15	7.50	6.67	39.49	High
R46	7.50	3.33	1.54	2.50	5.00	19.87	Low
R47	10.00	4.17	6.15	3.75	6.67	30.74	Medium
R48	10.00	8.33	5.38	5.00	7.50	36.22	High
R49	7.50	6.67	3.08	5.00	5.83	28.08	Medium
R50	7.50	7.50	2.31	1.25	2.50	21.06	Low
R51	10.00	7.50	4.62	3.75	5.00	30.87	Medium
R52	10.00	10.00	5.38	6.25	6.67	38.30	High
R53	7.50	3.33	2.31	2.50	5.83	21.47	Low
R54	10.00	3.33	3.08	1.25	9.17	26.83	Medium
R55	10.00	5.83	7.69	5.00	1.67	30.19	Medium
R56	10.00	6.67	6.15	5.00	5.00	32.82	Medium
R57	10.00	10.00	6.92	6.25	9.17	42.34	High
R58	7.50	6.67	2.31	3.75	5.00	25.22	Medium
R59	7.50	3.33	4.62	6.25	5.83	27.53	Medium
R60	10.00	6.67	6.15	5.00	7.50	35.32	High
R61	10.00	7.50	3.08	6.25	8.33	35.16	High
R62	10.00	6.67	3.85	2.50	5.00	28.01	Medium
R63	10.00	9.17	3.85	5.00	8.33	36.35	High
R64	7.50	6.67	0.77	2.50	6.67	24.10	Medium
R65	7.50	5.00	3.08	2.50	3.33	21.41	Low
R66	7.50	5.00	3.08	3.75	4.17	23.49	Low
R67	7.50	6.67	2.31	5.00	5.83	27.31	Medium
R68	10.00	5.83	2.31	5.00	10.00	33.14	Medium
R69	5.00	2.50	0.00	2.50	5.00	15.00	Low
R70	10.00	6.67	6.15	6.25	7.50	36.57	High
R71	7.50	4.17	0.77	2.50	4.17	19.10	Low
R72	10.00	6.67	6.92	5.00	8.33	36.92	High
R73	7.50	5.83	5.38	2.50	4.17	25.38	Medium
R74	10.00	6.67	3.08	5.00	7.50	32.24	Medium
R75	10.00	5.83	6.15	3.75	5.00	30.74	Medium
R76	10.00	8.33	5.38	3.75	6.67	34.13	High

Site Number	Present/Absence Score	Cover Score	Species Richness Score	Dominant Species Score	Non-Native Cover Score	Total Score	Site Condition Value
R77	10.00	5.00	5.38	5.00	10.00	35.38	High
R78	10.00	5.83	3.85	0.00	2.50	22.18	Low
R79	10.00	4.17	6.92	5.00	3.33	29.42	Medium
R80	10.00	8.33	6.92	5.00	4.17	34.42	High
R81	10.00	7.50	5.38	7.50	9.17	39.55	High
R82	10.00	3.33	3.85	6.25	6.67	30.0962	Medium
R83	7.50	5.83	0.77	1.25	5.00	20.35	Low
R84	7.50	5.83	0.77	2.50	7.50	24.10	Medium
R85	7.50	5.00	2.31	5.00	5.00	24.81	Medium
R86	7.50	5.00	1.54	3.75	5.00	22.79	Low
R87	7.50	5.83	0.77	5.00	6.67	25.77	Medium
R88	10.00	8.33	6.92	3.75	5.00	34.01	High
R89	10.00	7.50	6.92	7.50	5.00	36.92	High
R90	7.50	3.33	6.92	6.25	5.00	29.01	Medium
R91	10.00	7.50	5.38	8.75	6.67	38.30	High
R92	10.00	6.67	4.62	3.75	7.50	32.53	Medium
R93	10.00	8.33	3.85	5.00	8.33	35.51	High
R94	10.00	9.17	6.15	3.75	7.50	36.57	High
R95	10.00	5.83	3.85	1.25	5.83	26.76	Medium
R96	10.00	7.50	6.15	2.50	3.33	29.49	Medium
R97	7.50	2.50	3.08	3.75	5.00	21.83	Low
R98	7.50	3.33	2.31	1.25	6.67	21.06	Low
R99	10.00	4.17	3.08	2.50	6.67	26.41	Medium
R100	10.00	9.17	3.85	6.25	10.00	39.26	High
R101	7.50	5.00	0.77	2.50	5.00	20.77	Low
R102	10.00	5.83	3.08	3.75	7.50	30.16	Medium
R103	10.00	6.67	4.62	5.00	8.33	34.62	High
R104	10.00	5.83	7.69	6.25	5.00	34.78	High
R105	7.50	6.67	1.54	5.00	7.50	28.21	Medium
R106	10.00	8.33	6.92	7.50	5.83	38.59	High
R107	10.00	5.83	6.92	3.75	5.83	32.34	Medium
R108	7.50	5.00	0.77	3.75	6.67	23.69	Medium
R109	10.00	6.67	3.08	5.00	7.50	32.24	Medium
R110	10.00	6.67	4.62	5.00	9.17	35.45	High
R111	10.00	5.83	7.69	7.50	5.00	36.03	High
R112	7.50	5.00	3.85	3.75	5.83	25.93	Medium
R113	10.00	8.33	6.15	5.00	5.83	35.32	High
R114	10.00	5.83	5.38	3.75	3.33	28.30	Medium

Site Number	Present/Absence Score	Cover Score	Species Richness Score	Dominant Species Score	Non-Native Cover Score	Total Score	Site Condition Value
R115	7.50	5.00	3.08	3.75	5.83	25.16	Medium
R116	10.00	5.83	6.15	3.75	3.33	29.07	Medium
R117	10.00	5.83	6.92	6.25	4.17	33.17	Medium
R118	10.00	4.17	3.08	5.00	9.17	31.41	Medium
R119	10.00	10.00	7.69	6.25	5.83	39.78	High
R120	10.00	7.50	6.92	3.75	6.67	34.84	High
R121	10.00	5.83	5.38	6.25	6.67	34.13	High
R122	5.00	4.17	0.77	3.75	3.33	17.02	Low
R123	10.00	7.50	6.92	8.75	7.50	40.67	High
R124	10.00	6.67	4.62	2.50	8.33	32.12	Medium
R125	7.50	5.83	2.31	2.50	5.83	23.97	Medium
R126	10.00	6.67	5.38	6.25	8.33	36.63	High
R127	10.00	7.50	6.92	5.00	7.50	36.92	High
R128	10.00	6.67	5.38	6.25	7.50	35.80	High
R129	10.00	5.83	5.38	5.00	7.50	33.72	Medium
R130	10.00	7.50	4.62	3.75	9.17	35.03	High
R131	10.00	8.33	3.85	6.25	10.00	38.43	High
R132	10.00	6.67	5.38	5.00	9.17	36.22	High
R133	10.00	6.67	5.38	5.00	9.17	36.22	High
R134	10.00	5.00	6.92	5.00	7.50	34.42	High
R135	10.00	7.50	7.69	10.00	7.50	42.69	High
R136	10.00	8.33	2.31	3.75	6.67	31.06	Medium
R137	10.00	9.17	7.69	7.50	10.00	44.36	High
R138	10.00	8.33	3.85	5.00	9.17	36.35	High
R139	10.00	5.00	4.62	6.25	8.33	34.20	High
R140	10.00	8.33	4.62	6.25	9.17	38.37	High
R141	10.00	6.67	7.69	6.25	5.00	35.61	High
R142	10.00	6.67	7.69	10.00	9.17	43.53	High
R143	10.00	6.67	3.08	5.00	9.17	33.91	Medium
R144	10.00	9.17	9.23	7.50	7.50	43.40	High
R145	7.50	3.33	3.85	6.25	6.67	27.60	Medium
R146	10.00	7.50	8.46	3.75	7.50	37.21	High
R147	10.00	9.17	10.00	6.25	8.33	43.75	High
R148	7.50	5.83	2.31	5.00	7.50	28.14	Medium
R149	10.00	8.33	3.85	5.00	6.67	33.85	Medium
*HQ	10.00	9.17	7.69	7.50	10.00	44.36	High
**LQ	5.00	4.17	0.00	1.25	2.50	12.92	Low
***CG	10.00	9.17	7.69	7.50	10.00	44.36	High

*HQ = high quality site
**LQ = low quality site
*** CG = site with unique stands of *Casuarina glauca* species


Precinct Boundary
Groundtruthed Vegetation
Austral
Leppington
Horningsea Park
West Hoxton
Middleton Grange
Elizabeth Hi
Forest Lawn Cemetery
Microsoft Bing © 2011 Microsoft Corporation
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Appendix K

Fauna Habitat Assessment Results

Habitat Feature	No. Encountered	Site No.	Species	Family	Common Name	Comments
Fauna sighting	1	1	*Tiliqua spp.*	Scincidae	Bluetongue	
Scat	1	1	*Oryctolagus spp.*	Leporidae	Rabbit	
Birds		1	*Manorina melanocephala*	Meliphagidae	Noisy Miner	
Fallen logs	3	2				1 hollow
Scat	2	2	*Oryctolagus spp.*	Leporidae	Rabbit	
Birds		2	*Manorina melanocephala*	Meliphagidae	Noisy Miner	
Hollow stumps	3	2				
Fallen logs	3	3				
Scat	1	3		Macropodidae	Wallaby	
Scat	1	3		Canidae	Dog	
Birds		3	*Manorina melanocephala*	Meliphagidae	Noisy Miner	
Birds		3	*Gymnorhina spp*	Cracticidae	Magpie	
Fauna sighting	4	3	*Pseudechis porphyriacus*	Elapidae	Red-bellied Black Snake	
Fauna sighting	>5	3			Skinks	Do not know species
Scat	1	4			Possum	Do not know species
Fauna sighting	1	4	*Vulpes vulpes*	Canidae	Fox	
Birds	>10	4	*Manorina melanocephala*	Meliphagidae	Noisy Miner	
Birds	2		*Grallina cyanoleuca*	Monarchidae	Magpie-lark	
Birds	1	4	*Corvus orru*	Corvidae	Torresian Crow	
Fauna sighting	>5	4			Skinks	Do not know species
Calls	1	4	*Litoria fallax*	Hylidae	Eastern Dwarf Tree Frog	
Tree hollows at base	2	5				
Fallen logs	6	5				

Habitat Feature	No. Encountered	Site No.	Species	Family	Common Name	Comments
Diggings	1	5	*Oryctolagus spp.*	Leporidae	Rabbit	
Hollow bearing trees	2	6				Small 5-10cm diametre
Fallen logs	3	6				
Hollow stumps	4	6				Old
Scat	1	6		Macropodidae	Wallaby	
Scat	1	6			Possum	Do not know species
Scat	1	6	*Oryctolagus spp.*	Leporidae	Rabbit	
Scat	1	6			Rat	Do not know species
Fauna sighting	1	6			dragon lizard	Small - do not know species
Fauna sighting	>5	6			Skinks	Do not know species
Birds		6	Malurus cyaneus	Maluridae	Superb Fairywren	
Fallen logs	2	7				
Hollow stumps	2	7				
Birds	>10	7			wrens	Do now know species

Site 1 = Shale Plains Woodland Site 2 = Shale Plains Woodland Site 3 = Alluvial Woodland Site 4 = Alluvial Woodland Site 5 = Shale Plains Woodland
Site 6 = Shale Transition Forest Site 7 = Alluvial Woodland

Appendix L

Relevant Legislation

Relevant Legislation and Regulations

The following Acts, Regulations and policies inform the manner in which biodiversity within the Austral and Leppington North precincts are required to be managed.

Japan – Australia Migratory Bird Agreement (JAMBA)

The JAMBA agreement is a bilateral agreement between Australia and Japan that provides for the protection and conservation of migratory birds.

There are no JAMBA listed birds in the study area for the development proposal to consider.

China – Australia Migratory Bird Agreement (CAMBA)

The CAMBA agreement is a bilateral agreement between Australia and China that provides for the protection and conservation of migratory birds.

Rostratula benghalensis australis (painted snipe), *Gallinago hardwickii* (Latham's snipe) and *Apus pacificus* (fork-tailed swift) are bird species listed in CAMBA that may occur in Austral and Leppington North precincts. Development proposals must abide by the laws and regulations under the Agreement.

Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

The *EPBC Act* provides a statutory framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the *EPBC Act* as matters of National Environmental Significance (NES) (DEWHA, 1999).

Cumberland Plain Woodland - Shale Plains Woodland, Sydney Coastal River Flat Forest – Alluvial Woodland and the Shale-Gravel Transitional Forest are all listed as critically Endangered Ecological Communities under the *EPBC Act*. Development proposals must normally abide by the regulations under the Act, noting that where Strategic Assessment under the EPBC Act has been undertaken, exemptions may apply.

Strategic Assessment under the Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

A Strategic Assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is a big-picture study of an area to assess how national environmental and heritage values can be protected.

The Strategic Assessment process allows for assessment and endorsement of a proposed broad-scale policy, plan or program.

Through Strategic Assessments, the Commonwealth Government works with partners -- such as state or local governments -- to ensure a policy, plan or program will adequately safeguard nationally protected matters for the long term.

Nationally protected matters of relevance to this study are considered to be:

• listed threatened species and ecological communities

• migratory species protected under international agreements

Strategic Assessments reduce red tape by addressing Commonwealth environmental concerns giving greater upfront clarity to developers, landholders, planners, industry, government and the community.

Once a strategic assessment is complete and approvals have been given, individual proponents will not have to seek approval under the EPBC Act from the Commonwealth Government, as long as they undertake their projects in accordance with the endorsed policy, plan or program.

The implications for this study are that within the Austral and Leppington North precincts, proposals do not need to be referred to the Commonwealth Government under the EPBC Act if the proposal is inside the Growth Centres, and in accordance with the endorsed Program, noting that:

- Any proposal to clear land that is **certified** under the Growth Centres Biodiversity Certification is in accordance with the endorsed Program.
- Any proposal to clear land that is **non-certified** must be in accordance with the Relevant Biodiversity Measures (RBMs) of the Growth Centres Biodiversity Certification.
- A number of RBMs apply to specific parcels of land or specific types of development, making it essential to check compliance against the RBMs for any proposal in the non-certified areas.
- The NSW *Threatened Species Conservation Act 1995* (TSC Act) continues to apply to land that is non-certified under the Growth Centres Biodiversity Certification.

Environmental Planning and Assessment Act 1979 (EP&A Act) and Assessment Regulation 2000 (EP&A Regulation)

The *EP&A Act* regulates the implementation and enforcement of planning powers. It establishes provisions for the making of Environmental Planning Instruments (EPIs) such as SEPPs and Local Environmental Plans (LEPs), including the State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (Growth Centres SEPP). The *EP&A Regulation* established additional provisions that provide further guidance on the requirements of the *EP&A Act*. Of particular significance to planning for Sydney's Growth Centres are clause 276 which establishes provisions with respect to the release of Precincts for urban development and clause 275 which requires an assessment of the consistency of certain proposed development with the relevant Growth Centre Structure Plan if a Precinct is released (Eco Logical, 2010).

The *EP&A Act* and the *2000 Regulation* set out amongst other things the:

- Requirements for rezoning land;

- Requirements regarding the preparation of environmental planning instruments;
- Matters for consideration when determining a development application; and,
- Approval permits and/or licences required from other authorities under other legislation.

Section 117 Directions of the *EP&A Act* require councils to address a range of matters when seeking to rezone land. While not directly relevant to the rezoning process adopted for the Growth Centres, these directions have been considered in planning for the Austral-Leppington North Precincts.

State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (Growth Centres SEPP)

The Growth Centres SEPP establishes the planning rules and objectives for the Growth Centres and Councils need to apply the SEPP when making decisions about land within the Growth Centres. In particular, the SEPP identifies areas of open space and environment conservation to be protected within the Growth Centres, and areas that are flood prone or major creek lands and transitional lands that need to be further assessed in the Precinct planning process.

Environmental Planning and Assessment Amendment (Sydney Region Growth Centres) Regulation 2006

The Growth Centres Regulation supports the Growth Centres SEPP. The Regulation makes provision for the release of precincts for residential, employment and other urban development in the North West and South West Growth Centres. In particular, it requires the Minister to prepare a Development Code and Infrastructure Plan to assist with the Precinct Planning process.

Threatened Species Conservation (TSC) Act 1995

The Act identifies threatened species and populations, Endangered Ecological Communities (EEC) and critical habitat, as well as key threatening processes. Approval is required in order to:

- Harm any animal or plant that is identified as a threatened species or is part of a threatened population or EEC;
- Damage critical habitat;or,
- Damage the habitat of any threatened species, population or EEC.

The Act also provides for the biodiversity certification of environmental planning instruments such as the Growth Centres SEPP. The Biodiversity Certification Order for the Growth Centres SEPP was gazetted by the Minister for Environment in December 2007.

While development on lands subject to Certification no longer requires assessment under the *TSC Act*, the Austral-Leppington development plan should consider and manage the presence of species, populations and communities listed under the *TSC Act*.

Threatened Species Conservation Amendment (Special Provisions) Act 2008

This Bill was introduced to Parliament in 2008. The object of this Bill is to amend the *TSC Act* to confirm that the Growth Centres SEPP has biodiversity certification under that Act. The Bill also amends the *Local Government Act 1993* to make it clear that, for local government rating purposes, where part of a parcel of land is the subject of a conservation agreement under the *National Parks and Wildlife Act 1974*, the rate payable on the whole parcel is to be proportionately reduced.

Fisheries Management Act 1994 (FM Act)

The *Fisheries Management Act 1994,* administered by the Industry and Investment NSW (I&I NSW) (formerly DPI) applies to any works within aquatic habitats. The *FM Act* aims to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. It defines 'fish' as any marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history. This includes insects, molluscs (eg. oysters), crustaceans, echinoderms, and aquatic polychaetes (eg. beachworms), but does not include whales, mammals, reptiles, birds, amphibians or species specifically excluded (eg. some dragonflies are protected under the *TSC Act* instead of the *FM Act*). Under this act, if any activity occurs that will block fish passage, then a permit under this Act will be required.

Water Management Act 2000 (WMA)

The *WMA* regulates construction activities in close proximity to waterways. Principles set out in the Act generally aim to preserve and/or restore water sources, floodplains, and water dependant ecosystems (including groundwater and wetlands). The Act also encompasses the protection of habitats, animals and plants which benefit from water or are potentially affected by managed activities.

One of the aims of the *WMA* is to protect riparian corridors. The ecological assessment completed will aid in identifying riparian zones in the study area that will need to be protected.

Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* was implemented to regulate the impacts and spread of weeds within NSW. The Act governs the control, classification and removal of weeds declared as noxious weeds. Land which is privately occupied requires implementation of appropriate noxious weed controls under Part 4 of the Act. Penalties apply if the occupier fails to comply.

Based on the results of the flora assessment, the restrictions of the *Noxious Weeds Act 1993* will apply to development within the Austral-Leppington North Precincts.

Planning for Bushfire Protection 2006 (PBP 2006)

PBP 2006 has been released and adopted since 1 March 2007 through the Environmental Planning and Assessment Amendment (Planning for Bush Fire Protection) Regulation 2007

and the Rural Fires Amendment Regulation 2007. This new version replaces Planning for Bush Fire Protection, 2001.

This new version of PBP applies to all "development applications" on land that is classified as "bush fire prone land" (BPL), identified on a council's BPL map. For development on BPL specific controls apply to residential/rural residential subdivision and "Special Fire Protection Purposes" (SFPPs) – those types of development specified in the legislation as requiring particular attention (including mandatory involvement of the Rural Fire Service) (NSW Rural Fire Service, 2006).

Protection of the Environment Operations Act 1997 (PoEO Act)

The *PoEO Act* provides a single licensing arrangement to replace the different licences and approvals under existing separate Acts relating to air pollution, water pollution, noise pollution and waste management.

The EPA is made the regulatory authority for:

- Activities listed in Schedule 1 to the Act and the premises where they are carried on;
- Activities carried on by a State or public authority; and,
- Other activities in relation to which a licence regulating water pollution is issued.

In nearly all other cases, the regulatory authority is the relevant local council.

The activities listed in Schedule 1 to the Act (generally activities with potentially significant environmental impacts) require a licence. Licences can also be issued to regulate water pollution from activities that are not in Schedule 1. Licences are on-going but subject to review at least once every 5 years and can be varied, suspended or revoked.

Catchment Management Authorities Act 2003 (CMA)

This Act establishes Catchment Management Authorities (CMAs) and their roles and responsibilities, including the development of catchment action plans.

The Hawkesbury-Nepean Catchment Management Authority (HNCMA) was formed under *Catchment Management Authorities Act*. The primary role of the HNCMA is to fund environmental projects on private land in areas of critical importance. It is a statutory authority with a board that reports directly to the Minister for Environment, Climate Change and Water.

Sydney Regional Environmental Plan (SREP) No 20 – Hawkesbury-Nepean River (No 2 – 1997)

SREP 20 seeks to protect the environment of the Hawkesbury-Nepean River system. Development within the catchment is required to consider the general and specific principles and controls listed in the SREP to ensure the impacts of future land use are considered in a regional context. Kemps Creek is a tributary of the Hawkesbury-Nepean River system. Precinct Planning must consider the impacts of the development on the health of the system.

State Environmental Planning Policy No.19 (SEPP 19) – Bushland in Urban Areas

SEPP 19 seeks to protect and preserve bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes. The policy is designed to protect bushland in public open space zones and reservations, and to ensure that bush preservation is given a high priority when local environmental plans for urban development are prepared.

The ecological assessment conducted will aid in identifying bushland in the study area that will need to be protected.

Growth Centres Development Code 2006

The Development Code sets out the processes to be followed during Precinct Planning. The Code helps to implement policies at the regional and neighbourhood levels by, amongst others:

- Providing guidance on the Precinct Planning Process;
- Promoting best practice urban design;
- Increasing housing choices;
- Providing local employment for locals;
- Providing facilities and services at a local level;
- Maintaining the natural environment and visual character of the topography;
- Integrating existing infrastructure; and,
- Providing, protecting and maintaining open space opportunities throughout entire Precincts.

Growth Centres Conservation Plan 2007

This Conservation Plan identifies the existing biodiversity values within the Growth Centres and proposes a suite of mechanisms to achieve positive conservation outcomes for Western Sydney, and more broadly, the Sydney Basin, within the context of streamlining the development assessment process and providing for the future urban growth of Sydney (Eco Logical, 2007).

The objectives of the Conservation Plan are to:

- Outline planning and offsetting proposals for the Growth Centres;
- Assess whether they will improve or maintain regional biodiversity values; and,
- Confirm the outcomes of the assessments under Section 126G of the *TSC Act* so that biodiversity certification may be granted to the Growth Centres SEPP by the Minister for the Environment, Climate Change and Water (Eco Logical, 2007).

Liverpool LEP 2008

This Plan aims to make local environmental planning provisions for land in Liverpool in accordance with the relevant standard environmental planning instrument under section 33A of the *EP& A Act*.

The particular ecologically relevant aims of this Plan are as follows, to:

- Foster economic, environmental and social well-being so that Liverpool continues to develop as a sustainable and prosperous place to live, work and visit;
- Concentrate intensive land uses and trip-generating activities in locations most accessible to transport and centres;
- Promote the efficient and equitable provision of public services, infrastructure and amenities;
- Conserve, protect and enhance the environmental and cultural heritage of Liverpool;
- Protect and enhance the natural environment in Liverpool, incorporating ecologically sustainable development;
- Minimise risk to the community in areas subject to environmental hazards, particularly flooding and bush fires; and,
- Promote a high standard of urban design that responds appropriately to the existing or desired future character of areas.

Camden LEP 2010

This Plan aims to make local environmental planning provisions for land in Camden in accordance with the relevant standard environmental planning instrument under section 33A of the *EP& A Act*.

The particular ecologically relevant aims of this Plan are as follows, to:

- Ensure Camden retains its valued traditional qualities, character and scenic landscapes while providing for sustainable urban growth;
- Ensure that new communities are planned and developed in an orderly, integrated and sustainable manner and contribute to the social, environmental and economic sustainability of Camden;
- Ensure natural assets within Camden are protected and enhanced;
- minimise the impact on existing and future communities of natural hazards such as bush fires and flooding;
- Ensure the agricultural production potential of rural land, and prevent the fragmentation of agricultural holdings;
- ensure that the recreation, cultural and social needs of all existing and future residents of Camden are appropriately planned for;

- Protect and restore the environmental values of land, including waterways and riparian land, as part of the natural systems; and,
- Conserve and enhance the built and landscape heritage of Camden.

Appendix M

Relevant Biodiversity Measures Consistency Report

Growth Centres Biodiversity Certification

Assessment of Consistency between the Relevant Biodiversity Measures of the Biodiversity Certification Order and Austral and Leppington North Precincts

August 2012

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1. Introduction

In July 2008 an amendment was made under Schedule 7 Part 7 to the *Threatened Species Conservation Act 1995* (TSC Act) to confer biodiversity certification on the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (Growth Centres SEPP). Compliance with the relevant biodiversity measures (RBMs) in the biodiversity certification order (dated 14 December 2007) is required to maintain the certification. The RBMs require (among other things) the retention of 2000 hectares of existing native vegetation within the Growth Centres and additional offsetting outside the Growth Centre boundaries.

This report has been prepared to fulfil the requirement of RBM 35 for an assessment of the consistency of proposed precinct plans with the biodiversity certification and the RBMs.

This report has been prepared in a table format and addresses all RBMs that are relevant to precinct planning. It is noted that many of the RBMs are not specific to precinct planning and have therefore not been included in the report.

A complete copy of the biodiversity certification order (including all relevant biodiversity measures) can be found on the Office of Environmental and Heritage website at http://www.environment.nsw.gov.au/biocertification/notcert.htm

Where the report indicates that precinct planning is inconsistent with the biodiversity certification, full justification for the inconsistency is provided as part of the ecological assessment for the precinct.

Definitions

Terms defined below appear in **bold** in the table. Where the terms are also defined in the Biodiversity Certification Order, the definitions provided are consistent with those in the Order.

- *Biodiversity Certification Maps* means the maps marked "North West Growth Centre – Biodiversity Certification" and "South West Growth Centre – Biodiversity Certification" dated November 2007 and included in Schedule 2 of the Biodiversity Certification Order.
- *Certified Area* means an area marked as a certified area on a biodiversity certification map.
- *Clearing* of existing native vegetation means any one or more of the following:
  a) cutting down, felling, thinning, logging or removing existing native vegetation in whole or in part,
  b) killing, destroying, poisoning, ringbarking, uprooting or burning existing native vegetation in whole or in part.
- *Existing Native Vegetation (ENV) means areas of indigenous trees (including any sapling) that:*
  a) had 10% or greater over storey canopy cover present,
  b) were equal to or greater than 0.5 ha in area, and
  c) were identified as "vegetation" on maps 4 and 5 of the draft Growth Centres Conservation Plan.
- *DECCW* means the Department of Environment, Climate Change and Water (which was the former Department of Environment and Climate Change, DECC, and is now the Office of Environment and Heritage (OEH)).
- *DoPI* means the Department of Planning and Infrastructure (which was the former Growth Centres Commission, GCC).
- *Minister* means the Minister administering the TSC Act.
- *Non-certified Area* means an area marked as a non-certified area on a biodiversity certification map.
- *Protection/Protected* in relation to land means land that is protected by a land use zoning under an environmental planning instrument or public ownership arrangements that provide for the protection of biodiversity values as a priority, or another arrangement that provides in perpetuity security for biodiversity on the subject land.
- *Relevant Biodiversity Measures* means the conditions in Schedule 1 of the Biodiversity Certification Order.
- *TSC Act* means the *Threatened Species Conservation Act 1995.*

2. Assessment

Table 1: Assessment of consistency between the relevant biodiversity measures of the Biodiversity Certification Order and Austral and Leppington North Precincts.

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
General				
4	Copies of all final reports, maps, reviews, plans and monitoring data referred to in the conditions of biodiversity certification must be held by the **DoPI** and made publicly available, either on request and/or by a mechanism that is broadly publicly accessible. This does not apply to material that is commercially sensitive or contains sensitive information regarding the location of threatened species, populations or ecological communities or their habitat.	All information required by the RBMs for the Austral and Leppington North Precincts will be publicly exhibited at a date yet to be determined, and an assessment of consistency (this report) will be updated where necessary after exhibition.	Yes	The following information will be publicly exhibited and available following gazettal: • This report in accordance with RBM 35; • Information required by RBM 8, as contained in this report; • Information as required by RBM 13 (**Figures 1-2** of **Annex A**);
Native vegetation to be retained within the Growth Centres				
6	A minimum of 2,000 hectares of **existing native vegetation** must be retained and **protected** within the Growth Centres, either within the **certified areas** and/or the **non-certified areas**, subject to conditions 7 to 13 below.	The draft Conservation Plan identifies: • 48 ha of ENV to be protected in the Austral Precinct (prior to the impact from the SWRL and excluding ENV in the Kemps Ck Nature Reserve); • 52 ha of ENV to be protected in the Leppington North	Yes	The Biodiversity Certification Map (**Figure 1** of **Annex A**) identifies ENV within the Precincts which is required to be retained. The draft precinct plan (based on the final ILP, at **Figure 1** of **Annex B)** protects 116.62ha of ENV within the Precincts through appropriate zoning of land, mapping of Existing Native Vegetation Areas on the Native Vegetation Protection Map and provisions that prohibit clearing of

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
		Precinct (prior to the impact from the SWRL); • 7.14ha of ENV in the Investigation Areas is to be protected. This is a total area of 107.14 ha of ENV that is required to be protected across the Precincts to maintain parity with the draft Conservation Plan. • 0.61 ha of ENV in the Investigation areas will be impacted by the South West Rail Link. Of this 0.61 ha, 0.52ha is on land which is currently non-certified and will be separately offset by TfNSW • When the non-certified ENV to be impacted (and offset) by the SWRL is taken into account, the target for protection of ENV to maintain the 2,000 hectares of ENV across the Growth Centres is 106.62 hectares. • The total area of ENV protected in the Precincts and investigation areas is 116.62ha		ENV as mapped. Changes to the non-certified land boundaries (**Annex E**) are also proposed, to be consistent with the ENV to be protected under the Precinct Plan.

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
Retention of existing native vegetation during precinct planning				
7	During the precinct planning process, the **DoPI** may determine to make areas of **existing native vegetation** within the **non-certified areas** available for development if the clearance of such vegetation is considered necessary for either the provision of essential infrastructure and/or to meet the required Development Parameters specified in the Growth Centres Development Code.	4.03ha of ENV on non-certified land will be removed as per the draft Precinct Plan (**Figure 1** and **Figure 2** of **Annex D**) to enable development parameters to be met and to allow for essential infrastructure.	Yes	The area of non-certified ENV to be removed will be more than offset by the protection of a total of 116.62ha of ENV across the Precincts, 10.00ha more than is required by the biodiversity certification order The total area of currently non-certified ENV proposed to be certified is 4.03ha. The total area of currently certified ENV proposed to be non-certified is 22.48ha. The calculations of protected ENV are based on ground-truthed ENV (see RBM 13) and this explains differences in totals when compared to the amount of ENV required to be protected.
8	In making a determination under condition 7, the **DoPI** must demonstrate by way of information provided during the public exhibition of the precinct plan (where that exhibition occurs after this order takes effect) that the **clearing** of any **existing native vegetation** in the **non-certified areas** will be offset by: (a) the **protection** of an equal or greater area of **existing native vegetation** elsewhere in the Growth Centres; and/or (b) the revegetation and/or restoration of an area of land elsewhere in the Growth Centres, subject to satisfying the following, (i) that the clearance of **existing native vegetation** in the **non-certified areas** will not affect the capacity to achieve overall improvement or maintenance of biodiversity values for threatened species, populations and ecological communities and their habitats, (ii) the revegetated and/or restored areas will be **protected**,	Offsetting of the impacts described for condition 7 will be achieved by the protection of an equal or greater area of ENV in accordance with condition 8(a) (as shown on **Figure 1** and **Figure 2** of **Annex D**).	Yes	The offsetting of impacts on non-certified ENV is required to enable the efficient development of the Precincts, including the provision of essential infrastructure. The 4.03ha of non-certified ENV to be cleared throughout the Precinct will be offset by the protection of an additional 10ha of ENV, above what is required under the draft Conservation Plan. The proposed offsets are in most cases connected with or adjacent to existing non-certified areas along the major creeks to form part of continuous vegetation and habitat

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
	(iii) the extent of revegetation and/or restoration compared to **clearing** of **existing native vegetation** must be undertaken at a ratio of at least 3:1 (to reflect the greater ecological risks relative to retaining **existing native vegetation**), (iv) areas subject to revegetation and/or restoration must be of a suitable boundary configuration and design to support long-term management, (v) revegetation and/or restoration of the proposed areas would not be undertaken under another scheme or regulatory requirement already in operation at the time that the **clearing** is approved (this includes but is not limited to any approvals, and associated conditions of such approvals, that may be required under the *Rivers and Foreshores Improvement Act 1948* and *Water Management Act 2000*), (vi) revegetation and/or restoration will be undertaken by suitably qualified and experienced persons using indigenous plant stock, and (vii) sufficient resources will be made available to undertake the revegetation and/or restoration and any necessary follow-up maintenance and monitoring for a minimum period of 5 years following the commencement of the revegetation and/or restoration.			links through the Precincts. The offset areas of ENV are to be protected through zoning controls, native vegetation protection provisions and changes to the boundaries of certified and non-certified land as described for RBM 6 above.
9	Revegetation and/or restoration may be partly counted towards meeting the overall requirement to **protect** 2,000 hectares of existing vegetation required in condition 6. The amount that may be counted shall be calculated by dividing the total area of revegetation and/or restoration required under condition 8b (iii) by 3. **Note:** for example, if 9 hectares of revegetation is undertaken then 3 hectares may be counted.	N/A	N/A	N/A

Retention of existing native vegetation shown in areas marked with red hatching				
12	Notwithstanding any other conditions of biodiversity certification, in the lands marked by a red hatching on the **biodiversity certification maps existing native vegetation** must not be **cleared** unless it is in accordance with a plan of management or unless such clearance has been agreed to by the **DECC**.	Part of the Kemps Creek Nature Reserve (covered by Condition 12) is within the Precinct boundary however the Precinct Plan does not apply to this land (as shown on the ILP at **Annex B**). An area that is subject to Condition 12 (but is not part of the Kemps Creek Nature Reserve), is within the Austral Precinct boundary and within the boundary of the draft Precinct Plan (see **Annex A, Figure 1**). No clearing of Existing Native Vegetation is proposed on this land as part of the Precinct Plan. These lands are proposed to be protected by maintaining the status of the land as non-certified, zoning areas that contain ENV as Environmental Conservation, and by applying the provision in the draft SEPP that prohibits clearing of vegetation on areas of ENV mapped under the SEPP.	Yes	Areas subject to condition 12 that are within the boundary of the draft Precinct Plan will be protected by the provisions of the draft SEPP.

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
Ground-truthing of existing native vegetation				
13	If new information becomes available after the biodiversity certification order took effect that demonstrates that the vegetation within an area does not otherwise meet the definition of **existing native vegetation**, then for the purposes of conditions 7 to 8 and condition 11 to 12 only the area of confirmed **existing native vegetation** shall be considered.	The mapping of ENV (identified on maps 4 and 5 of the draft *Growth Centres Conservation Plan*) generally corresponds with the findings of additional ground truthing investigations completed in 2010 and 2012 to inform the precinct planning process and only minor changes are recommended. **Figure 2** of **Annex A** provides the results of ground truthing of ENV conducted as part of Precinct Planning. The ground truthing has identified 14.81ha of ENV (in both certified and non-certified lands) that is no longer considered to meet the definition of ENV.	Yes	Mapping resulting from ground truthing is provided in **Figure 2** of **Annex A**. The draft conservation plan maps 107.14 ha of ENV within non-certified areas in the Precincts. Field surveys 101.58 Ha of ENV in non-certified areas. 43.6 Ha of additional high conservation value vegetation. (AHCVV) was identified in the Precincts as part of the Precinct Planning investigations. 17.4 Ha of this is in non-certified lands. For the purposes of conditions 7, 8, 11 and 12, only the area of confirmed ENV has been taken into account (as shown at **Annex C)**. A total of 3.37ha of ENV is in Kemps Creek Nature Reserve (see Condition 12). Because the Precinct Plan does not apply to this land and no impacts on this vegetation are proposed, this vegetation has been excluded from calculations of protected ENV in this report (as shown on Figure 1 of **Annex C**).

Assessment of consistency between Relevant Biodiversity Measures of the Biodiversity Certification Order and Austral and Leppington North Precincts

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
Additional conservation actions within the Growth Centres – native vegetation				
14	During or before the preparation of the relevant precinct plan(s) under the Growth Centres Development Code, a further detailed assessment must be undertaken of the areas adjoining or proximate to the Shanes Park Air Services Australia site marked in blue hatching on the **biodiversity certification maps**.	The study area does not adjoin the Shanes Park Air Services Australia site.	N/A	NA
15	The assessment referred to in condition 14 must examine whether the areas meet the criteria specified in Schedule 3.	The study area does not adjoin the Shanes Park Air Services Australia site.	NA	NA
16	Based on the outcomes of the assessment the **OEH** shall provide advice to the **Minister** on whether the areas should be included within the **certified areas** or the **non-certified areas** shown on the **biodiversity certification maps**.	The study area does not adjoin the Shanes Park Air Services Australia site.	NA	NA
Additional conservation actions within the Growth Centres – plants				
17	During or before the preparation of the relevant precinct plan(s) under the Growth Centres Development Code relating to the areas referred to in the table below, the following actions must be undertaken: ***Species*** *Acacia pubescens* ***Required action*** Potential populations at Cross Street, Kemps Creek and Thirty-second Avenue, Austral – as shown in black hatching on the **biodiversity certification maps**: • survey to confirm the presence of the species, and • if the species is present, provide for the **protection** of the area of suitable habitat for the species to the satisfaction of the **OEH**.	NA (the land that is subject to condition 17 is outside the Austral and Leppington North Precinct boundaries).	Yes	NA

<table>
<tr><th></th><th colspan="2">Relevant Biodiversity Measure</th><th>Austral and Leppington North Precincts - Comment</th><th>Consistent with RBMs and Schedule 7 Part 7 of TSC Act</th><th>Justification</th></tr>
<tr><td colspan="6">Additional conservation actions within the Growth Centres – animals</td></tr>
<tr><td>18</td><td colspan="2">During or before the preparation of the relevant precinct plan(s) under the Growth Centres Development Code relating to the area referred to in the table below, the following actions must be undertaken:</td><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td rowspan="3">N/A</td></tr>
<tr><td></td><td>Species
Green and Golden Bell Frog</td><td>Required action
Potential population at Riverstone – as shown in black hatching on the biodiversity certification maps:
Option 1
• survey to confirm the presence of the species, and
• if the species is present, provide protection of the area of suitable habitat for the species to the satisfaction of the OEH.
Option 2
• if the species is present at Riverstone but cannot be adequately protected to the satisfaction of the OEH, then:
a) undertake targeted survey to confirm the presence of the species elsewhere in the Growth Centres, and
b) if the species is present elsewhere in the Growth Centres, provide for the protection of an area(s) of suitable habitat for the species to the satisfaction of the OEH.</td></tr>
<tr><td></td><td colspan="2">Note: On completion of the above actions the Minister may decide that it is appropriate to amend the boundaries of the area subject to biodiversity certification, in accordance with condition 3.</td></tr>
</table>

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
Additional conservation actions within the Growth Centres – development sites				
19	Within twelve months of the biodiversity certification order taking effect, the **DoPI** (in consultation with the **OEH**) must put in place procedures so that all future precinct plans (excluding any plans that were publicly exhibited before the biodiversity certification order took effect), where practicable, provide for the appropriate re-use of: (a) native plants (including but not limited to seed collection) and the re-location of native animals from development sites, prior to development commencing; and (b) top soil from development sites that contain known or potential native seed bank. For the purposes of condition 19a and 19b appropriate uses may include, but are not limited to, application in revegetation or restoration works and landscaping in the Growth Centres.	These provisions are incorporated into the Development Control Plans (DCP) for the Precincts.	Yes	N/A
Future precinct plans				
35	During the preparation of future precinct plans (excluding any precinct plans already publicly exhibited before this order took effect) the **DoPI** must undertake and make publicly available an assessment of the consistency of the proposed precinct plan with the conditions of biodiversity certification. This may occur during or before any public exhibition of future draft precinct plans.	This assessment of consistency has been prepared to satisfy this RBM. This report will be publicly exhibited with the full precinct planning package.	Yes	This assessment addresses all RBMs applicable to the planning of the Austral and Leppington North Precincts.
Future threatened species listings or discoveries				
36	Where a preliminary determination is made under the Act to list a species, population or ecological community, and that species, population or ecological community may or is known to occur within the Growth Centres, then the **Growth Centres Commission** must (as soon as practicable) provide advice to the **OEH** on whether: (a) the species, population or ecological community is known or	The DoPI is not aware of any subsequent Preliminary determinations that would apply to the Austral and Leppington North Precincts.	Yes	N/A

	Relevant Biodiversity Measure	Austral and Leppington North Precincts - Comment	Consistent with RBMs and Schedule 7 Part 7 of TSC Act	Justification
	likely to be present in the Growth Centres; (b) it was considered during the preparation of the draft Growth Centres Conservation Plan by the **DoPI**; and (c) whether the SEPP, and related measures, provides adequate **protection** for the species, population or ecological community.			
37	Based on the information provided in accordance with condition 36, and any other relevant matters, the **OEH** shall advise the **Minister** on whether to formally review, maintain, modify, suspend or revoke the biodiversity certification of the SEPP if the species, population or ecological community is listed under the Act.	N/A	N/A	N/A

3. Conclusion

This report has undertaken an assessment of the consistency of the Austral and Leppington North Precincts planning with the biodiversity certification and the applicable relevant biodiversity measures.

It is concluded that the Austral and Leppington North Precincts planning is consistent with the biodiversity certification of the Growth Centres SEPP, as follows:

- Under the final Precinct Plan 116.62ha of ENV will be protected within the Austral and Leppington North Precincts and the investigation areas. This is approximately 10.00ha more than required under the Biodiversity Certification Order to contribute to the 2,000ha of ENV to be protected across the Growth Centres.
- ENV will be protected through a number of different zones under the draft Precinct Plan (refer to Figure 2 in **Annex C**), including Environmental Conservation, Public Recreation, and Infrastructure. The reasons for applying the proposed zones are discussed further below.
- Development controls are proposed in the draft SEPP to prohibit the clearing of protected ENV as shown on the Native Vegetation Protection Map.
- The 2010 and 2012 (post-exhibition) ground truthing surveys recorded 101.58 Ha of validated ENV in non-certified areas in the Precincts. Only ground-truthed ENV has been included in the calculation of the total area of ENV to be protected. Figure 2 of **Annex B** shows the results of the ground-truthing.

Amendments to the boundaries of certified and non-certified land are proposed as shown at **Annex E**. The boundary amendments are proposed to reflect the outcomes of Precinct Planning, and to ensure the protection of ENV to maintain consistency with the Certification.

Land use zones have been selected based on advice from the OEH in relation to appropriate zoning of land containing ENV, and with consideration of other land use planning factors, including the future ownership, acquisition and use of land in accordance with the draft Precinct Plan and the EP&A Act. While the use of Environment Protection zones is preferred by OEH, in many cases it is not possible to apply this zoning to land containing ENV because of restrictions on the ability of Council to acquire the land under section 94 of the EP&A Act. In accordance with the hierarchy of land use zones preferred by OEH, land use zones have been applied to ENV that is proposed to be protected as follows:

- Where ENV to be protected is on land that is currently in Council or State Government ownership, the E2 Environmental Conservation zone has been used. The exception to this is Craik Park, in the centre of the Precincts, which is an existing Council reserve that contains a sports field and remnant ENV. The RE1 Public Recreation zone has been applied to this land to enable continued use of the sports fields.
- Where ENV to be protected is within large land holdings (and the area of ENV comprises only small part of the total area of land in the one ownership) the E2 zone has been applied. This land is not proposed to be acquired by a public authority, but the

land owner may seek to dedicate the land to Council subject to Council agreement, and if this did occur, the ENV would be protected by the combination of zoning and public ownership. Regardless, the application of the E2 zone to land that is to remain in private ownership is consistent with OEH requirements for protection of ENV.

- Within flood affected land along Kemps Creek and Bonds Creek, and adjacent to a number of other unnamed watercourses, existing rural properties that partly contain ENV are proposed to have a "split" zoning, with the land containing ENV zoned E2 Environmental Conservation and the remainder of the property zoned for a purpose that enables some commercial return either through limited subdivision or construction of a dwelling, or continued agricultural production. Generally, where the existing rural lot is partly within and partly outside the 100 year ARI flood extent, the combination of E4 Environmental Living and E2 (for the land that contains ENV) has been used. This approach also applies to a property on the eastern side of the Precincts at Eighth Avenue, which contains patches of ENV that are linked to a large remnant to the north and east in land owned by the Sydney Catchment Authority. This enables limited subdivision and construction of dwellings on relatively large lots consistent with the flooding and vegetation constraints on the land. Where the existing rural lot is entirely affected by flooding (such as along the northern parts of the Kemps Creek floodplain) the RU6 Rural Transition zone and E2 zone (for the land that contains ENV) has been used. The Rural Transition zone will enable agricultural uses that do not cause significant amenity impacts for nearby residential areas. The ability to further subdivide this land is limited, with minimum lot size controls established to limit further subdivision of land that contains ENV. In both these situations, the land that contains ENV is anticipated to remain in private ownership.
- Where land that contains ENV is to be acquired as part of a larger acquisition for a public purpose (usually for public recreation or drainage) the RE1 Public Recreation and SP2 Infrastructure (drainage zones) have been used. These approaches have generally been applied along the larger watercourses (eg. Bonds Creek and Scalabrini Creek) where the creek channel and margins are to be acquired by Council as part of the drainage network or where ENV is located on land that is to be acquired for public parks and sporting fields (these are often located within floodprone land near the major creeks). Land in these zones will be acquired by the relevant Council

These zones, in combination with the existing native vegetation provisions (refer to Figure 3 in **Annex C**) and the proposed certification boundaries (refer to **Annex E**), will protect the ENV.

Annex A

Biodiversity Certification Map for Austral and Leppington North Precincts

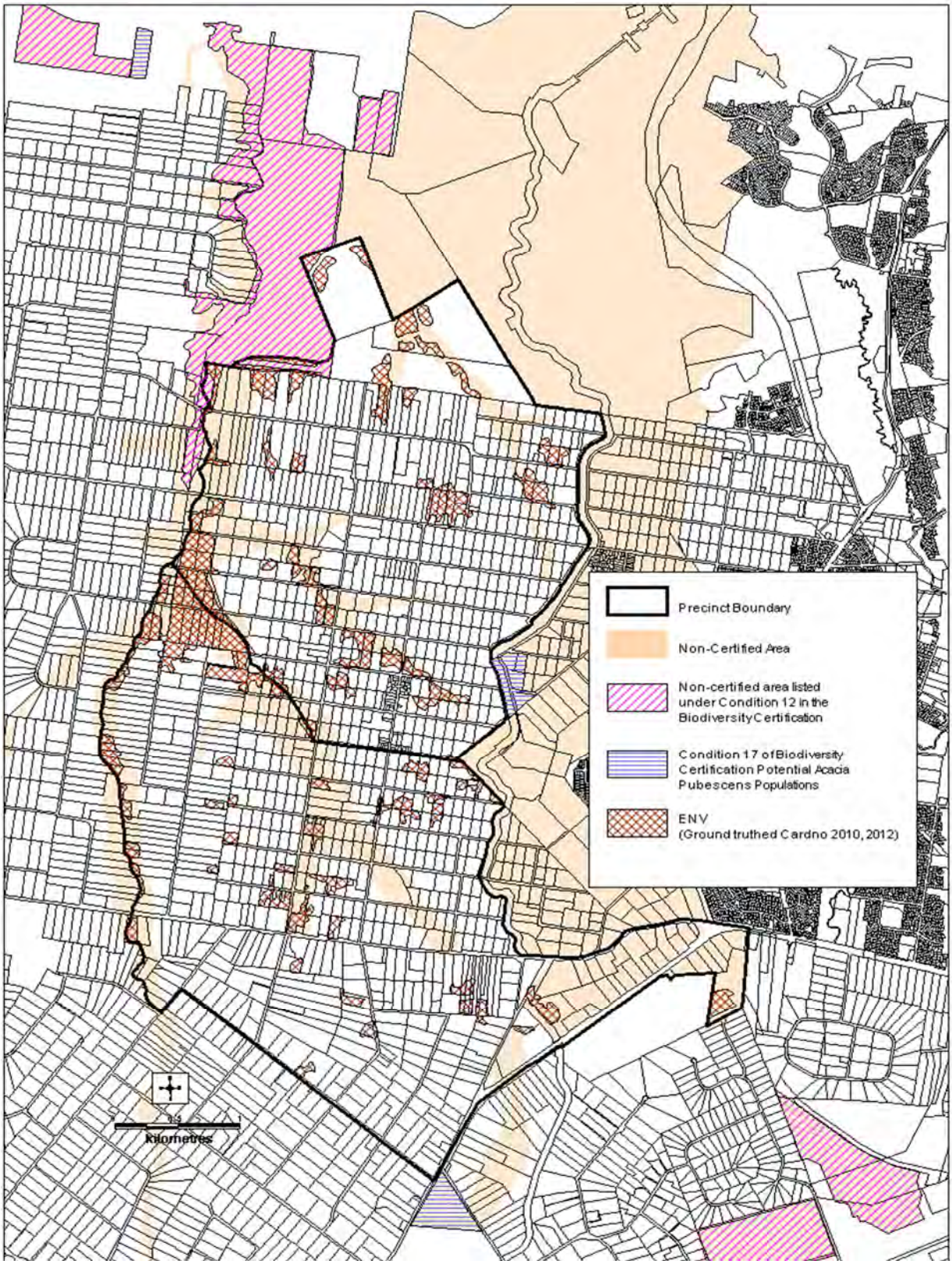

Figure 1: Austral and Leppington North Precincts – Biodiversity Certification Map showing Existing Native Vegetation (as confirmed by 2010 and 2012 ground truthing) and areas listed under Condition 12 and Condition 17 of the Biodiversity Certification.

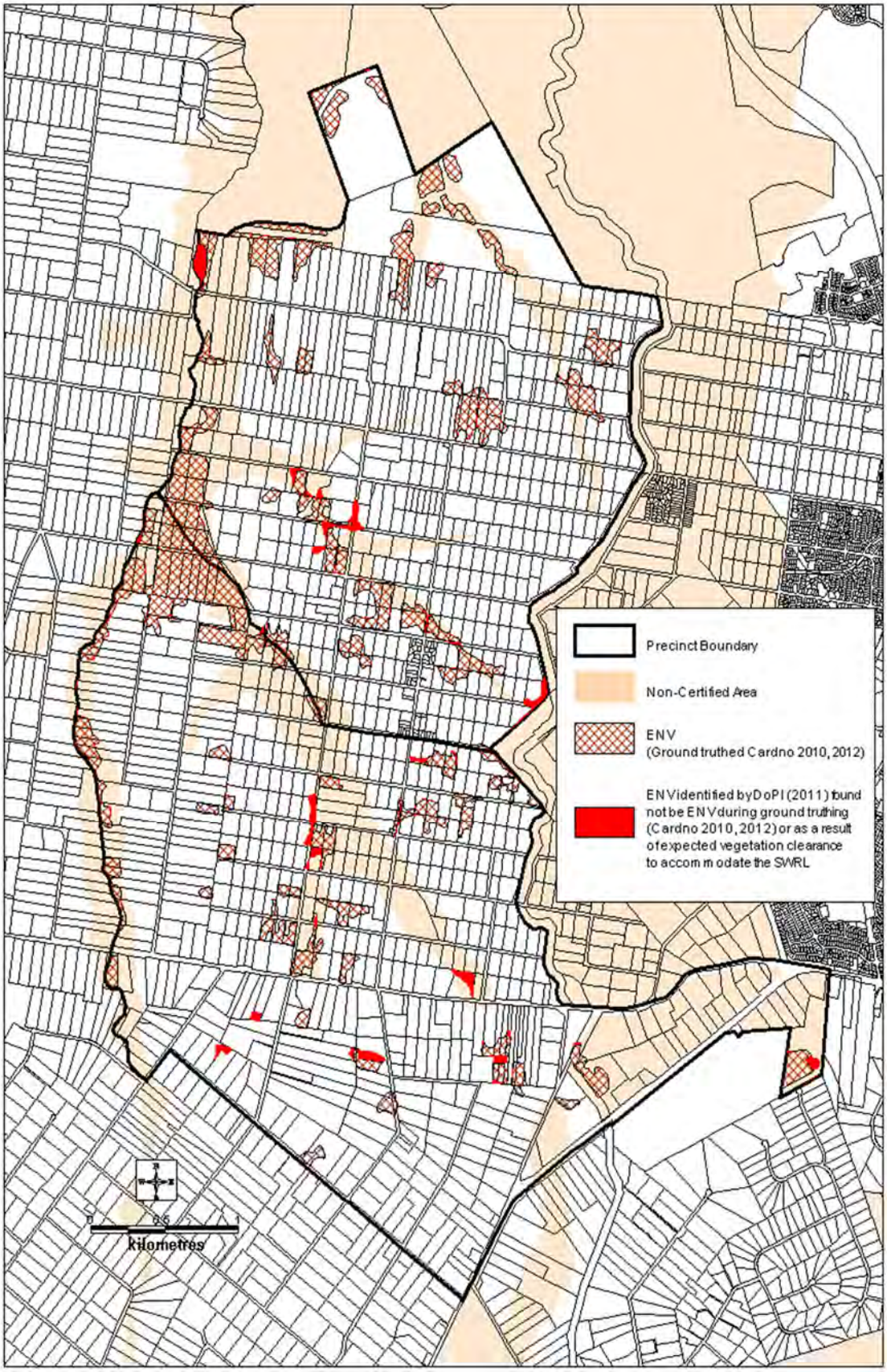

Figure 2 Existing Native Vegetation and vegetation areas found not to meet the criteria of ENV during ground truthing in 2010, 2012.

Annex B

Proposed Indicative Layout Plan for Austral and Leppington North Precincts

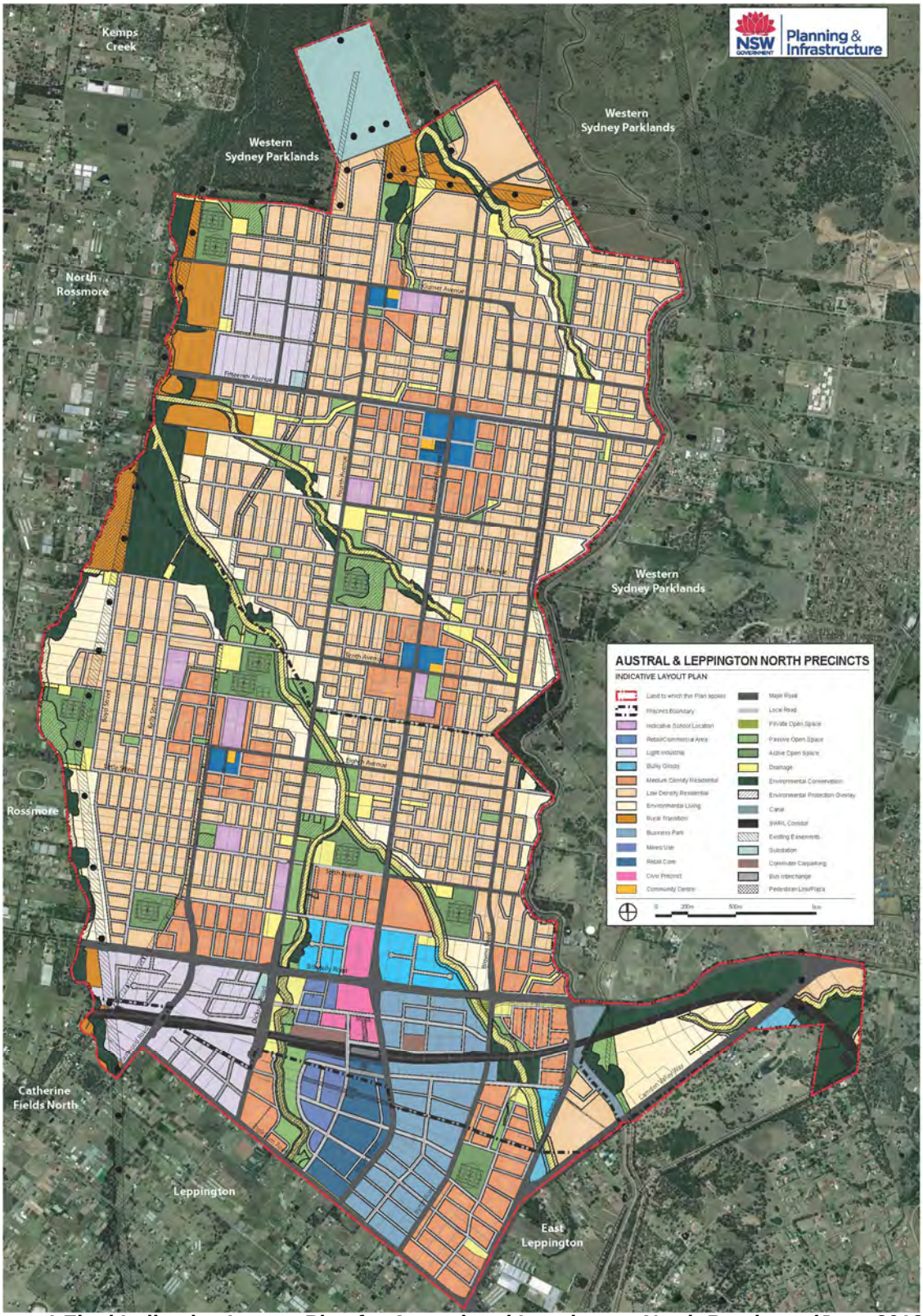

Figure 1 Final Indicative Layout Plan for Austral and Leppington North Precincts (June 2012).

Annex C

Proposed Protection Measures Plan for Austral and Leppington North Precincts

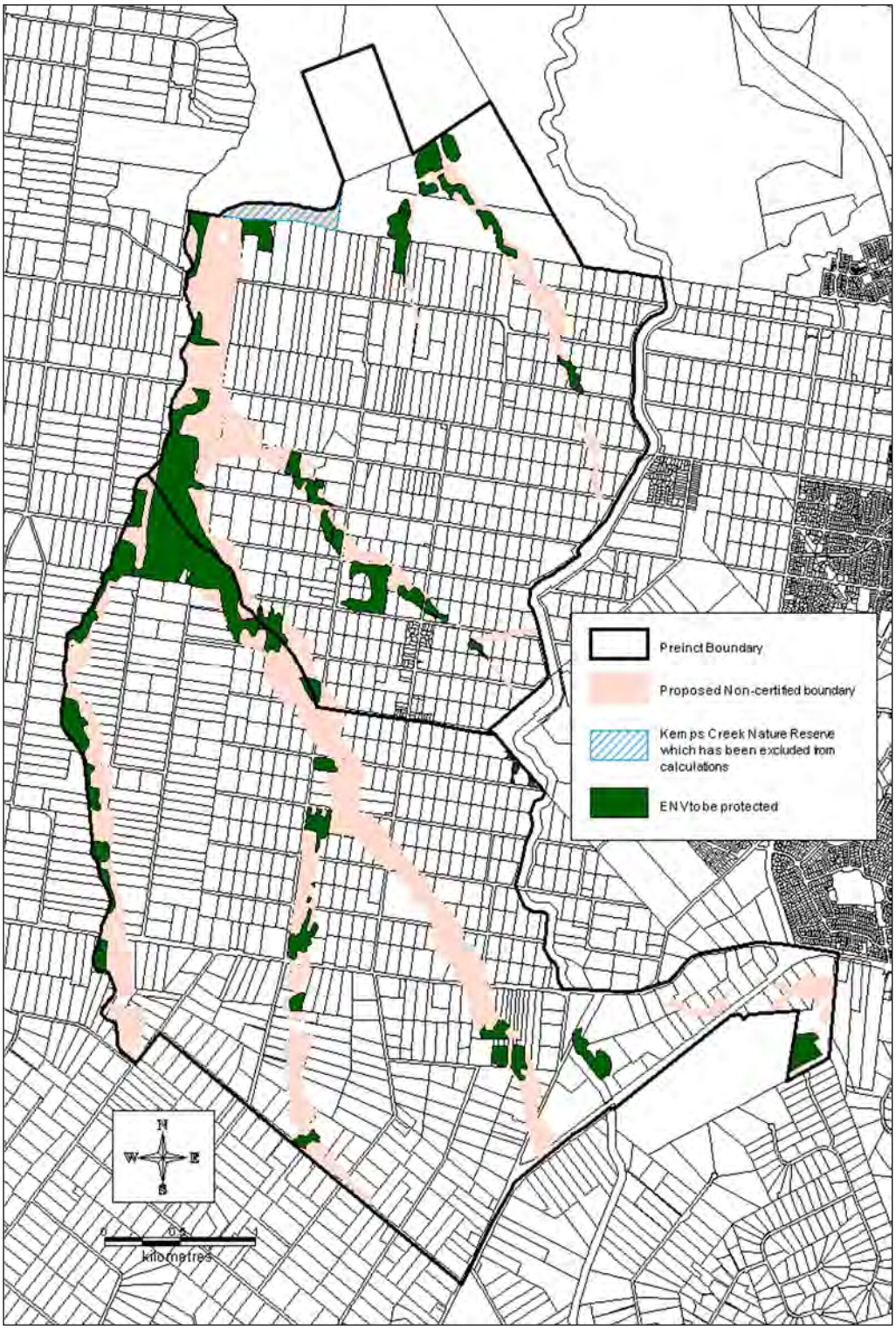

Figure 1 ENV to be protected

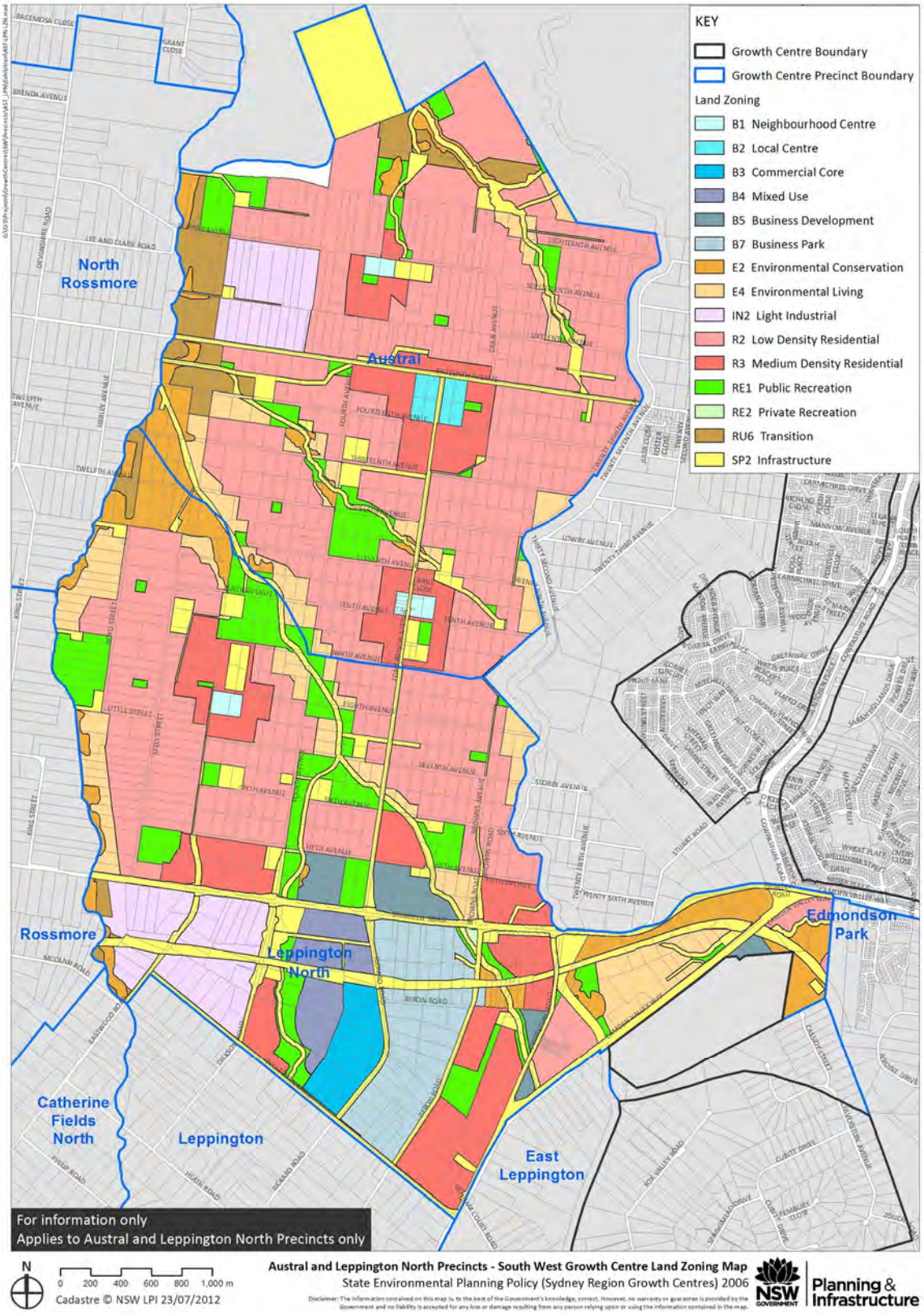

Figure 2 Land Zoning Map

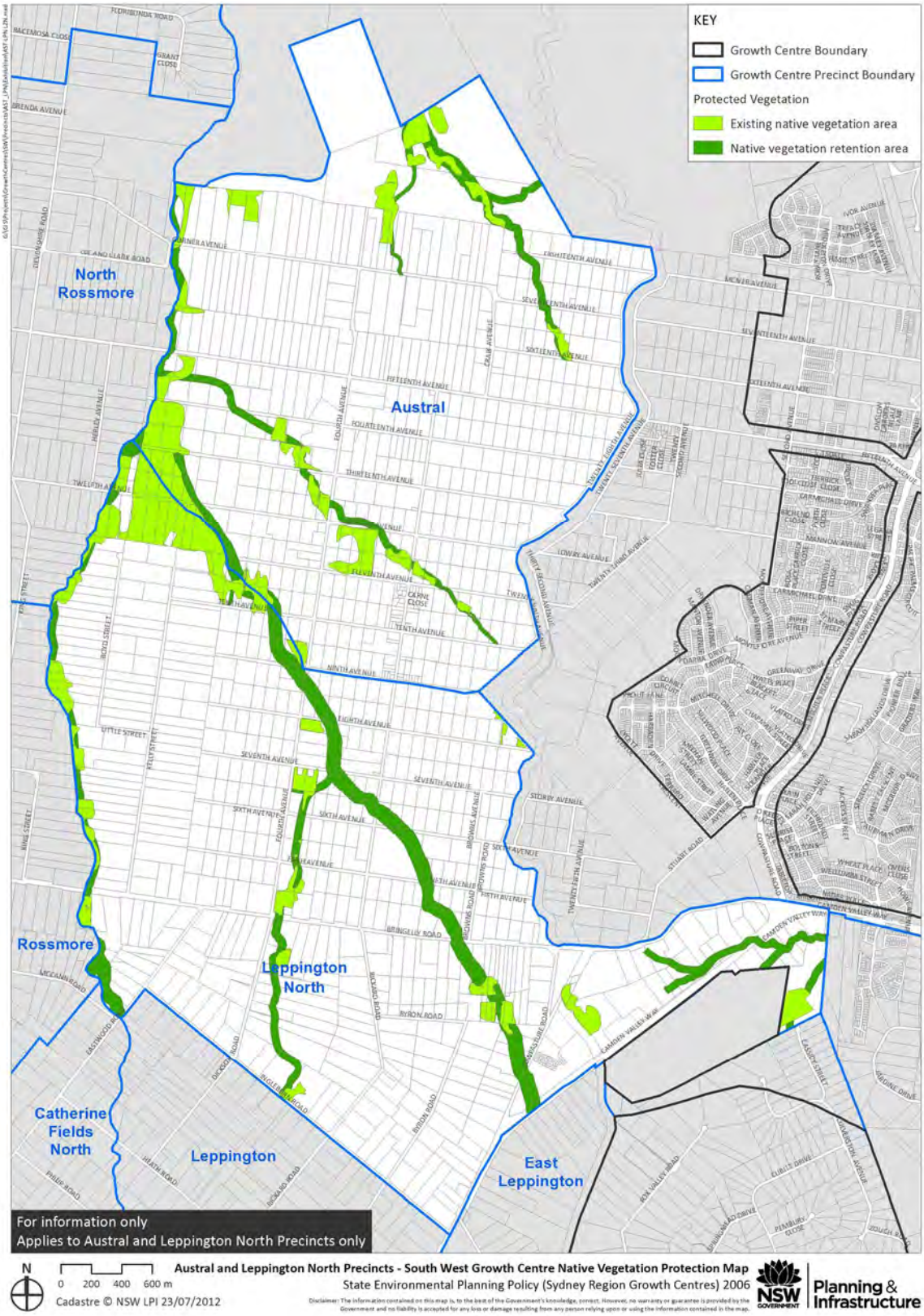

Figure 3 Native Vegetation Protection Areas Map

Annex D

Proposed Offsets Areas Precinct

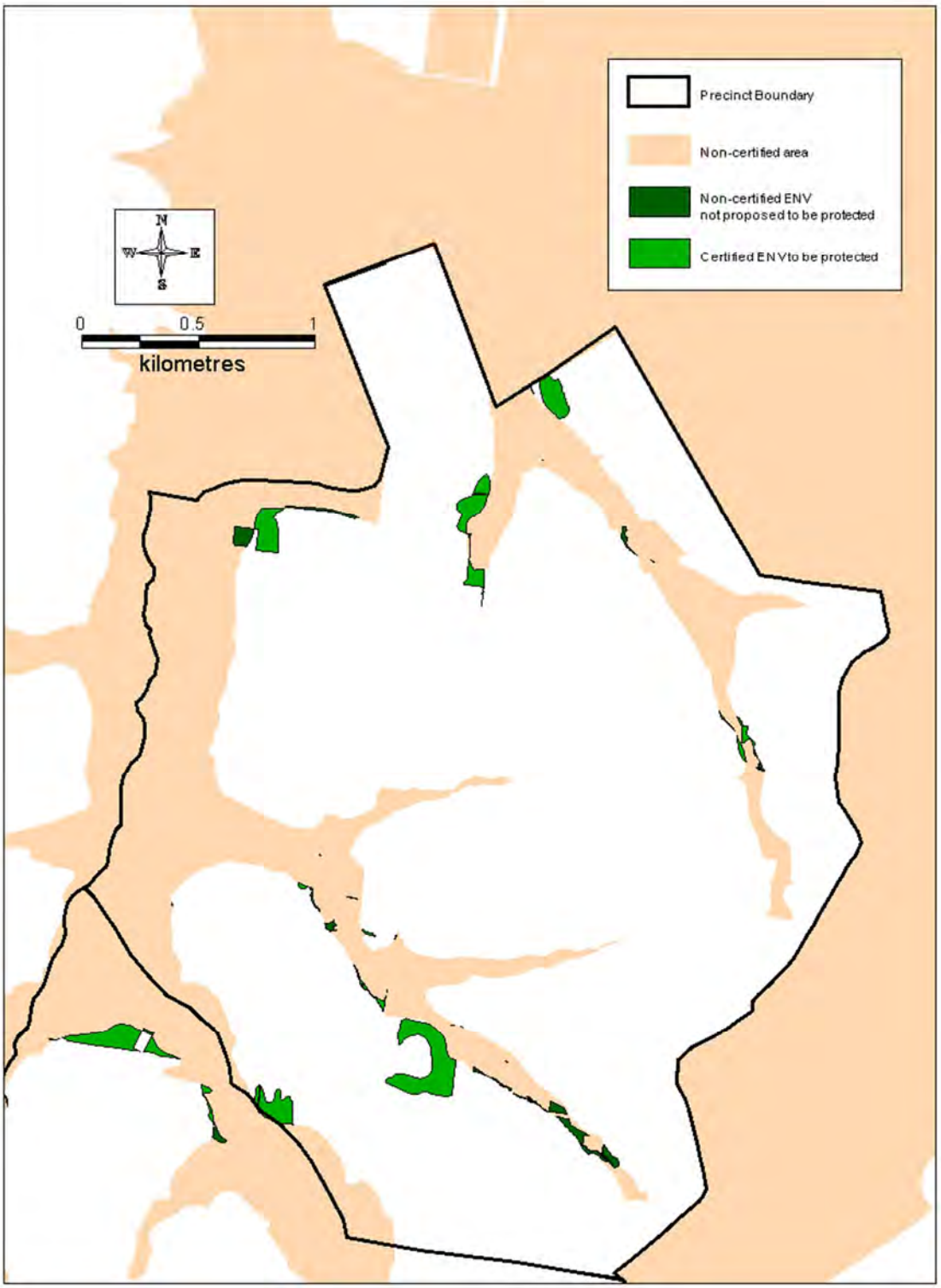

Figure 1: Certified ENV to be protected and Non-certified ENV not proposed to be protected in Austral

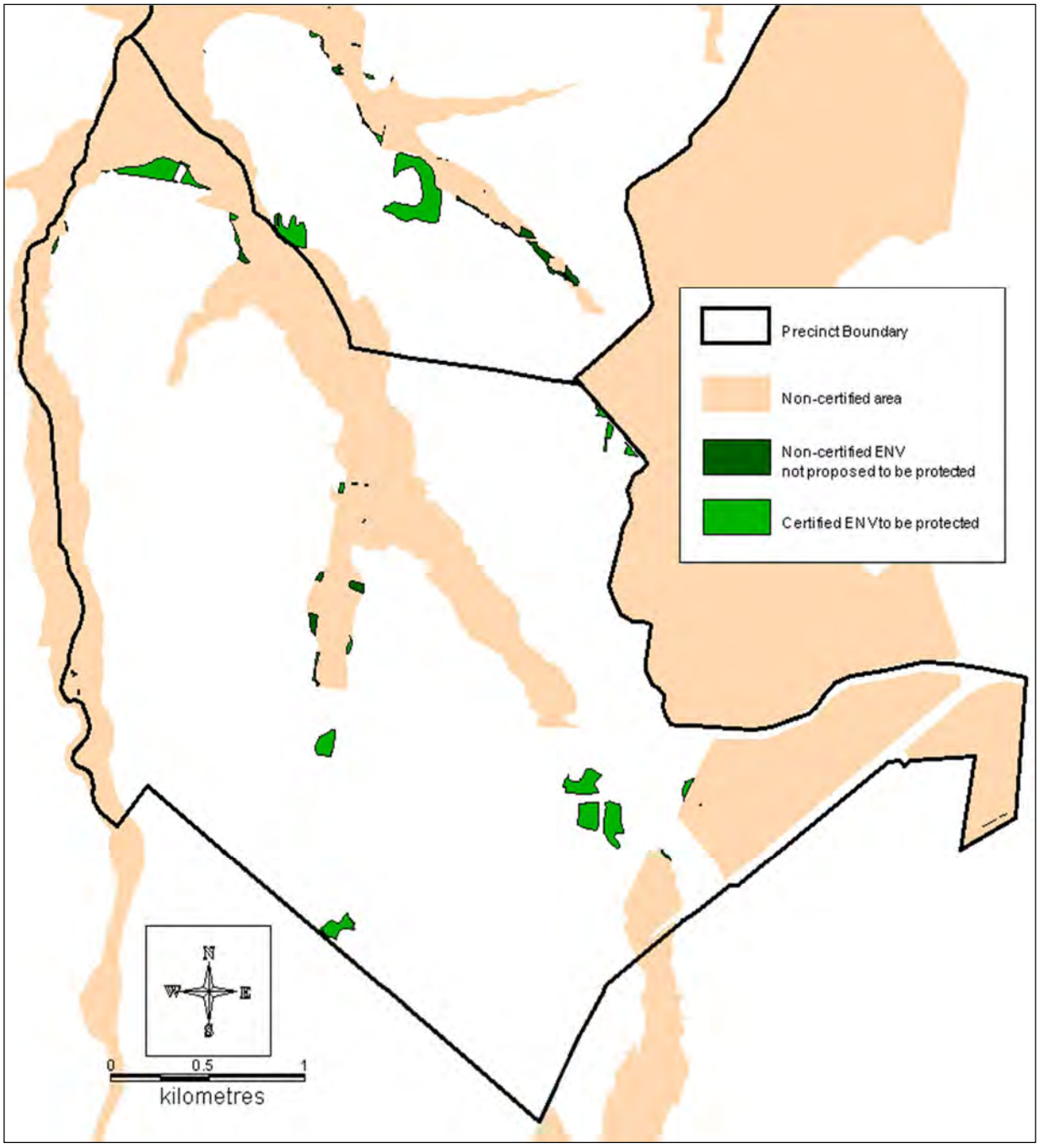

Figure 2: Certified ENV to be protected and Non-certified ENV not proposed to be protected in Leppington

Annex E

Proposed Amendments to Biodiversity Certification Map

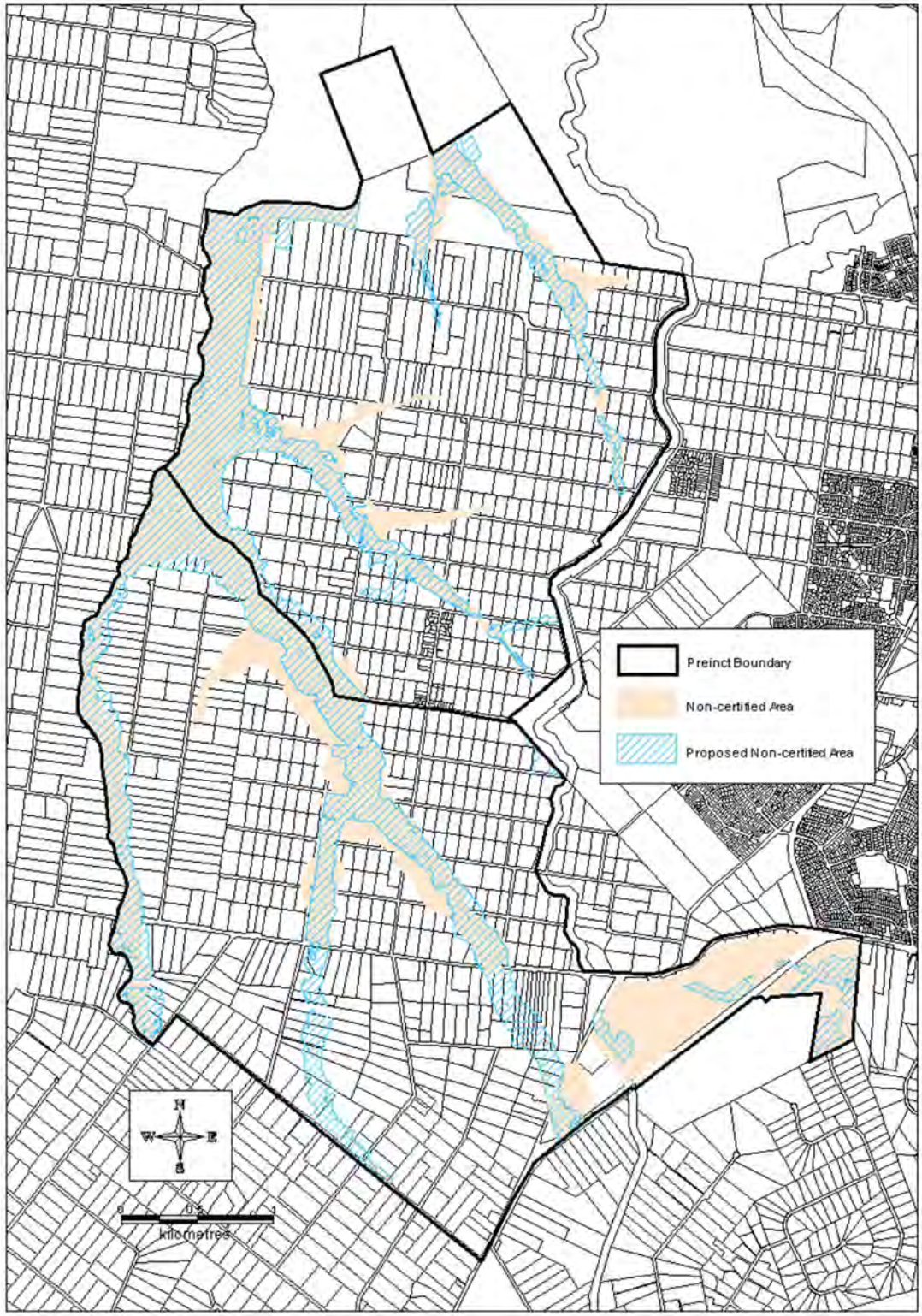

Figure 1: Proposed new boundaries of non-certified area and current non-certified area within the Austral and Leppington North precincts

Appendix N

Ecological Value Results

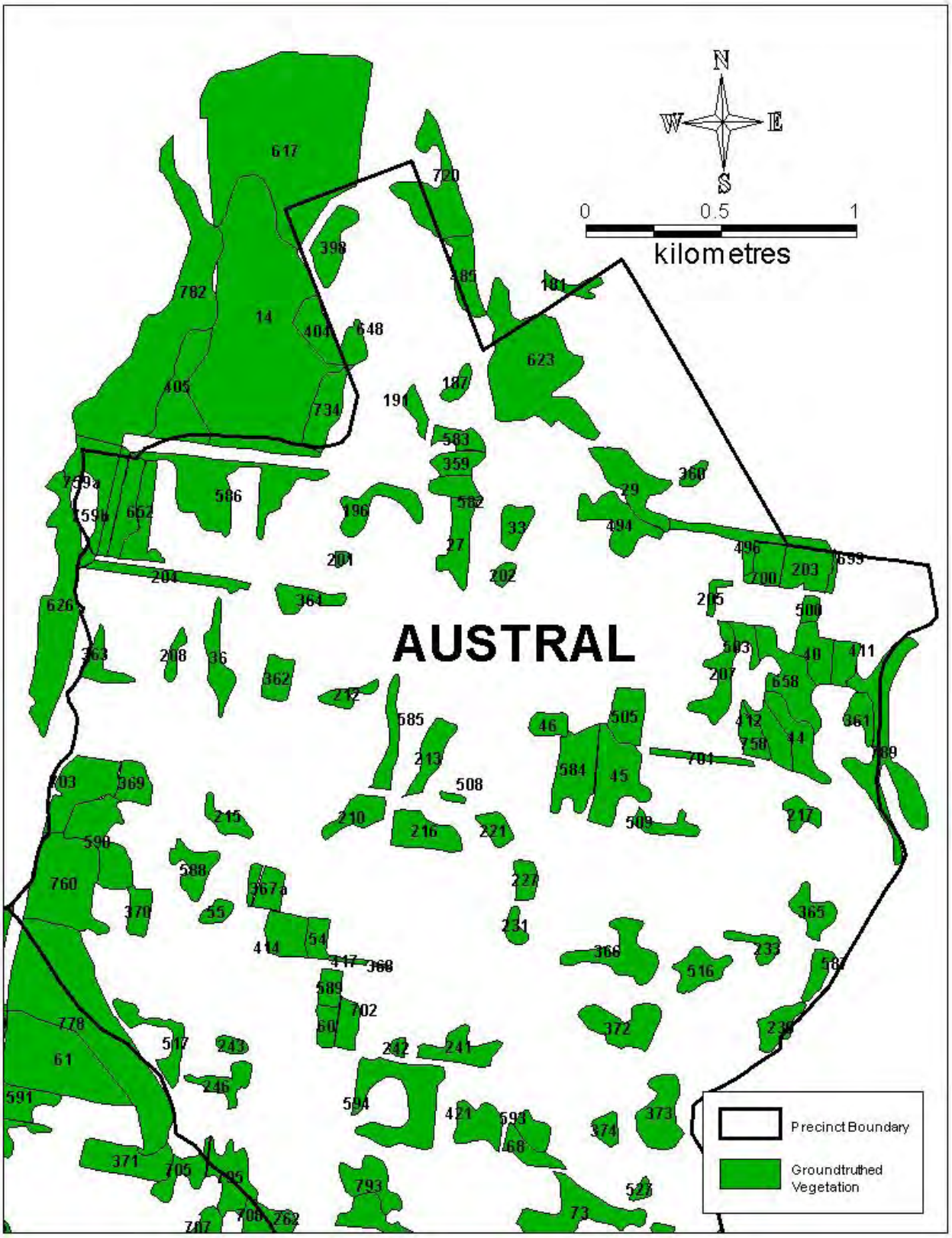

Figure 1 Location of Vegetation areas ground truthed in Austral (Site ID).

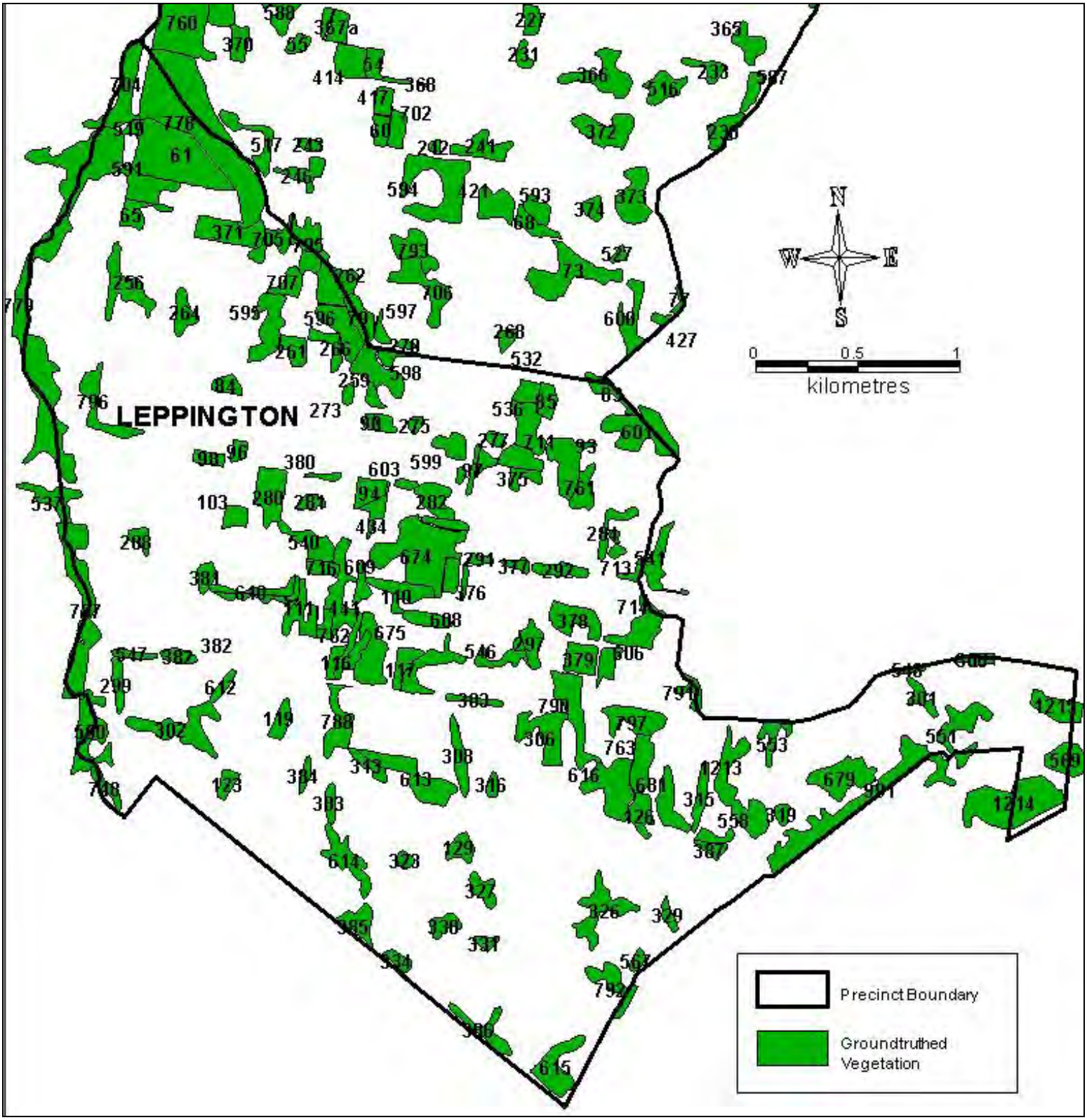

Figure 2 Location of Vegetation areas ground truthed in Leppington North (Site ID).

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
14	33.2750	Shale/Gravel Transition Forest	0.0089	49.60	50.00	49.71	149.31	115	125	389.308	High
27	2.6195	Shale Plains Woodland	0.0339	15.73	50.00	35.77	101.50	125	100	326.495	High
29	3.7733	Alluvial Woodland	0.0297	43.15	30.00	42.12	115.26	130	75	320.261	High
33	1.4157	Shale Plains Woodland	0.0342	14.11	33.85	29.23	77.19	100	50	227.190	Medium
36	2.1495	Shale Plains Woodland	0.0453	9.07	21.06	26.06	56.19	100	50	206.188	Medium
40	2.3129	Shale Plains Woodland	0.0294	40.73	29.55	37.02	107.30	100	50	257.296	Medium
44	2.6902	Shale Plains Woodland	0.0360	42.14	31.89	34.90	108.93	125	50	283.932	Medium
45	4.7785	Shale Plains Woodland	0.0230	28.23	16.19	46.83	91.24	100	25	216.239	Medium
46	1.1198	Shale Hills	0.0379	12.10	24.81	23.56	60.46	100	50	210.462	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
		Woodland									
54	1.1711	Alluvial Woodland	0.0404	11.49	37.88	22.60	71.97	80	75	226.973	Medium
55	0.7735	Shale Plains Woodland	0.0446	12.70	33.08	15.77	61.55	100	100	261.548	Medium
60	1.0693	Shale Plains Woodland	0.0423	8.06	32.18	19.71	59.96	100	50	209.956	Medium
61	9.9139	Shale Plains Woodland	0.0140	47.78	50.00	48.94	146.72	125	125	396.725	High
65	1.7761	Shale Plains Woodland	0.0442	22.18	28.08	24.71	74.97	100	50	224.966	Medium
68	1.4243	Alluvial Woodland	0.0457	30.04	37.69	22.02	89.75	80	25	194.752	Medium
73	5.3792	Shale Plains Woodland	0.0266	18.95	35.10	45.29	99.34	100	75	274.336	Medium
77	0.3973	Shale Hills Woodland	0.0913	10.69	12.92	2.12	25.72	100	25	150.721	Medium
79	1.9873	Alluvial Woodland	0.0307	38.91	35.87	34.52	109.30	100	125	334.296	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
83	1.5869	Shale Plains Woodland	0.0490	17.94	34.74	21.92	74.61	100	50	224.610	Medium
84	1.0293	Shale Plains Woodland	0.0401	10.08	21.12	20.87	52.07	100	50	202.068	Medium
85	1.3295	Shale Hills Woodland	0.0349	25.20	25.29	27.50	77.99	100	25	202.990	Medium
90	0.4323	Shale Plains Woodland	0.0616	5.85	30.10	5.00	40.94	100	25	165.943	Medium
93	0.1674	Shale Plains Woodland	0.1148	34.27	12.92	0.77	47.96	100	25	172.963	Medium
94	1.6385	Shale Plains Woodland	0.0327	6.45	30.74	31.54	68.73	100	100	268.727	Medium
96	0.7065	Shale Plains Woodland	0.0472	14.92	26.76	14.23	55.91	125	50	230.913	Medium
97	0.5571	Shale Hills Woodland	0.0986	24.60	12.92	3.75	41.27	100	25	166.267	Medium
98	0.8789	Shale Plains Woodland	0.0478	2.42	29.49	15.48	47.39	100	25	172.387	Medium
103	1.1544	Shale Plains Woodland	0.0377	11.29	36.22	24.33	71.84	100	25	196.835	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
110	2.4713	Shale Plains Woodland	0.0406	43.35	28.21	30.38	101.94	125	75	301.937	High
111	2.2952	Shale Plains Woodland	0.0482	29.84	34.62	25.38	89.84	100	75	264.839	Medium
116	0.8388	Alluvial Woodland	0.0570	40.52	39.49	10.87	90.88	75	100	265.877	Medium
117	1.4531	Shale Plains Woodland	0.0425	21.98	32.24	23.56	77.78	125	75	277.777	Medium
119	1.2329	Shale Plains Woodland	0.0400	0.20	36.35	23.17	59.72	100	100	259.721	Medium
123	0.9171	Shale Plains Woodland	0.0450	14.31	38.37	17.21	69.89	100	100	269.891	Medium
126	1.7956	Alluvial Woodland	0.0354	31.85	40.67	30.58	103.10	115	75	293.105	Medium
129	1.3727	Shale Plains Woodland	0.0352	3.43	38.43	27.69	69.55	100	75	244.549	Medium
181	0.9312	Shale Plains Woodland	0.0662	42.94	30.00	9.42	82.37	125	75	282.367	Medium
187	0.7656	Shale Plains Woodland	0.0520	40.32	12.92	12.50	65.74	100	25	190.743	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
191	0.8598	Shale Plains Woodland	0.0547	9.88	30.00	12.12	51.99	100	50	201.994	Medium
196	2.5254	Shale Plains Woodland	0.0397	33.06	38.37	31.35	102.78	125	75	302.776	High
201	0.2524	Shale Plains Woodland	0.0746	13.10	12.92	2.60	28.62	100	25	153.621	Medium
202	0.4958	Shale Plains Woodland	0.0545	12.30	12.92	8.75	33.97	100	25	158.968	Medium
203	2.6673	Shale Plains Woodland	0.0260	18.35	23.27	40.96	82.58	100	75	257.578	Medium
204	2.0214	Shale Plains Woodland	0.0641	45.16	12.92	18.46	76.54	100	25	201.543	Medium
205	0.4790	Alluvial Woodland	0.0872	26.21	12.92	3.46	42.59	62.5	25	130.091	Low
207	2.6148	Shale Plains Woodland	0.0409	28.83	29.55	30.58	88.96	100	25	213.959	Medium
208	0.6908	Shale Plains Woodland	0.0674	6.85	12.92	6.73	26.51	100	25	151.506	Medium
210	1.8780	Shale Hills Woodland	0.0348	23.19	28.01	31.83	83.03	100	50	233.025	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
212	1.0004	Shale Hills Woodland	0.0578	5.24	38.30	12.02	55.56	100	75	230.562	Medium
213	2.0335	Shale Hills Woodland	0.0385	23.59	35.74	29.52	88.85	100	100	288.845	Medium
215	1.2669	Shale Plains Woodland	0.0459	12.70	21.47	20.19	54.37	100	50	204.368	Medium
216	2.8153	Shale Plains Woodland	0.0260	24.40	26.76	41.44	92.60	100	75	267.600	Medium
217	1.1406	Shale Plains Woodland	0.0423	15.32	32.82	20.48	68.62	100	50	218.624	Medium
221	1.0673	Shale Plains Woodland	0.0394	13.31	12.92	21.83	48.05	100	25	173.053	Medium
227	1.0793	Shale Plains Woodland	0.0398	4.84	35.10	21.63	61.57	100	100	261.570	Medium
230	1.7142	Shale Plains Woodland	0.0349	4.44	36.35	30.58	71.36	100	75	246.359	Medium
231	0.7250	Shale Hills Woodland	0.0526	2.82	12.92	11.73	27.47	100	25	152.473	Medium
233	1.1275	Shale Plains Woodland	0.0510	6.65	12.92	16.54	36.11	100	25	161.112	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
241	2.3533	Shale Plains Woodland	0.0370	23.79	23.49	32.02	79.30	100	75	254.303	Medium
242	0.3509	Shale Plains Woodland	0.0656	29.03	23.49	4.04	56.56	100	75	231.564	Medium
243	0.5949	Shale Plains Woodland	0.0510	3.83	30.74	11.44	46.01	100	50	196.010	Medium
246	1.6359	Shale Plains Woodland	0.0493	44.35	32.24	21.83	98.43	100	125	323.425	High
256	3.4797	Shale Plains Woodland	0.0373	4.64	12.92	36.25	53.81	100	25	178.807	Medium
259	0.6875	Alluvial Woodland	0.0558	19.56	30.10	9.62	59.27	62.5	25	146.768	Low
261	1.4746	Shale Plains Woodland	0.0363	17.14	35.38	28.37	80.89	100	75	255.887	Medium
262	0.1494	Shale Hills Woodland	0.1215	26.81	36.92	0.58	64.31	125	75	264.315	Medium
264	1.5384	Shale Plains Woodland	0.0383	0.20	12.92	27.21	40.33	100	25	165.333	Medium
266	1.4109	Shale Plains Woodland	0.0509	34.88	12.92	19.62	67.41	100	25	192.414	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
268	0.0582	Shale Hills Woodland	0.2506	2.22	28.14	0.00	30.36	100	25	155.359	Medium
270	0.3113	Shale Hills Woodland	0.0865	16.33	12.92	2.31	31.56	100	25	156.558	Medium
273	0.5309	Shale Plains Woodland	0.0563	30.85	20.35	7.98	59.18	100	50	209.180	Medium
275	0.4861	Alluvial Woodland	0.0547	7.26	39.55	8.37	55.17	62.5	75	192.675	Medium
277	0.5880	Shale Hills Woodland	0.0489	28.63	12.92	12.50	54.05	100	25	179.049	Medium
280	3.3342	Shale Plains Woodland	0.0245	18.15	36.57	43.46	98.18	125	75	298.177	Medium
281	0.7766	Shale Plains Woodland	0.0506	22.38	35.51	13.37	71.26	100	100	271.257	Medium
282	2.2370	Alluvial Woodland	0.0300	35.48	29.01	35.96	100.45	115	75	290.452	Medium
284	1.3518	Shale Hills Woodland	0.0613	23.39	12.92	14.52	50.83	100	25	175.826	Medium
288	0.8883	Shale Plains Woodland	0.0478	0.20	12.92	15.77	28.89	100	25	153.891	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
291	0.5086	Alluvial Woodland	0.0609	35.89	36.92	6.54	79.35	62.5	75	216.849	Medium
292	1.4023	Shale Hills Woodland	0.0453	6.05	12.92	21.63	40.60	100	25	165.603	Medium
297	1.6430	Alluvial Woodland	0.0374	30.24	36.03	28.46	94.73	100	50	244.729	Medium
299	1.1730	Alluvial Woodland	0.0521	32.46	33.91	16.92	83.29	75	75	233.293	Medium
300	0.9730	Shale Plains Woodland	0.0517	0.00	12.92	14.62	27.54	100	50	177.535	Medium
301	1.1455	Shale Hills Woodland	0.0573	11.69	35.03	14.13	60.86	150	75	285.860	Medium
302	4.5328	Shale Plains Woodland	0.0329	25.60	34.20	40.87	100.67	125	75	300.669	High
303	0.7882	Shale Plains Woodland	0.0783	27.02	12.92	7.12	47.05	100	25	172.051	Medium
306	3.6532	Shale Plains Woodland	0.0323	16.13	34.84	40.19	91.16	100	50	241.161	Medium
308	1.8137	Shale Plains Woodland	0.0494	19.35	12.92	22.69	54.97	100	25	179.967	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
313	1.0473	Shale Plains Woodland	0.0527	23.99	31.06	14.81	69.86	100	50	219.857	Medium
315	1.4513	Shale Plains Woodland	0.0512	27.62	12.92	19.81	60.35	100	25	185.349	Medium
316	0.5570	Shale Plains Woodland	0.0549	5.04	17.02	9.04	31.10	100	50	181.098	Medium
319	0.5588	Shale Hills Woodland	0.0529	40.20	35.80	10.10	86.10	100	100	286.097	Medium
323	0.5560	Shale Plains Woodland	0.0491	0.20	12.92	11.83	24.95	100	25	149.949	Low
326	3.6029	Shale Plains Woodland	0.0386	7.66	32.12	35.58	75.35	100	75	250.354	Medium
327	1.3610	Shale Plains Woodland	0.0407	3.63	12.92	23.65	40.20	100	25	165.203	Medium
329	0.6970	Alluvial Woodland	0.0581	2.02	36.92	9.13	48.07	87.5	75	210.574	Medium
330	1.1160	Shale Plains Woodland	0.0424	1.81	36.22	20.00	58.03	100	100	258.032	Medium
331	0.6058	Shale Plains Woodland	0.0559	3.02	36.22	9.04	48.28	100	100	248.281	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
334	0.7620	Shale Plains Woodland	0.0492	5.44	34.42	13.65	53.52	100	25	178.520	Medium
359	1.4082	Shale Plains Woodland	0.0365	20.97	30.00	27.31	78.28	100	75	253.275	Medium
360	0.5399	Shale Plains Woodland	0.0575	11.69	30.00	7.79	49.48	100	50	199.482	Medium
361	1.3196	Shale Hills Woodland	0.0416	44.15	29.55	22.31	96.01	100	50	246.012	Medium
362	1.5774	Shale Plains Woodland	0.0315	6.85	30.87	32.21	69.93	100	50	219.932	Medium
363	1.5480	Alluvial Woodland	0.0463	37.30	28.08	22.60	87.97	62.5	75	225.471	Medium
364	1.6139	Shale Plains Woodland	0.0409	7.46	12.92	25.58	45.96	100	25	170.957	Medium
365	1.8387	Shale Plains Woodland	0.0350	3.23	42.34	31.25	76.82	100	100	276.816	Medium
366	3.6529	Shale Hills Woodland	0.0319	18.75	35.16	40.58	94.49	100	125	319.487	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
367a[1]	1.3790	Alluvial Woodland	0.0351	13.71	19.55	27.88	61.15	80	50	191.146	Medium
367b[1]	0.4935	Alluvial Woodland	0.0745	13.71	19.55	4.71	37.97	80	50	167.973	Medium
368	0.0676	Shale Hills Woodland	0.2072	1.61	12.92	0.19	14.73	100	25	139.725	Low
369	1.7236	Shale Plains Woodland	0.0306	29.23	26.83	33.46	89.52	100	100	289.522	Medium
370	1.4111	Shale Plains Woodland	0.0367	38.51	35.32	27.21	101.04	125	150	376.040	High
371	3.5819	Shale Plains Woodland	0.0257	43.75	21.06	43.94	108.75	125	25	258.750	Medium
372	3.3043	Shale Plains Woodland	0.0270	19.76	21.41	41.92	83.09	100	25	208.091	Medium
373	3.3293	Shale Hills Woodland	0.0248	4.03	33.14	43.17	80.35	100	75	255.346	Medium
374	0.9020	Shale Hills	0.0411	9.68	27.31	18.65	55.64	100	75	230.639	Medium

[1] The Connectivity Scores were assigned considering these vegetation areas as one. The area separating these two vegetation areas is minimal. If the two areas were considered as discrete communities, the difference between Connectivity Scores would

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
		Woodland									
375	1.1054	Shale Plains Woodland	0.0558	32.06	19.87	13.94	65.87	100	50	215.871	Medium
376	1.1498	Shale Plains Woodland	0.0395	38.71	32.53	22.98	94.22	100	100	294.223	Medium
377	0.6396	Shale Plains Woodland	0.0596	5.65	36.92	8.08	50.65	100	50	200.645	Medium
378	2.9246	Shale Plains Woodland	0.0295	27.82	25.93	40.10	93.85	100	25	218.848	Medium
379	2.1474	Shale Plains Woodland	0.0271	37.70	35.32	37.40	110.43	125	25	260.426	Medium
380	0.4360	Shale Plains Woodland	0.0937	21.17	12.92	2.31	36.40	100	25	161.397	Medium
381	1.0401	Shale Hills Woodland	0.0395	7.86	30.16	21.35	59.37	100	75	234.369	Medium
382	0.9881	Shale Plains Woodland	0.0430	5.24	25.84	18.37	49.45	100	50	199.447	Medium
383	0.8419	Shale Plains Woodland	0.0536	10.28	12.92	12.31	35.51	100	25	160.510	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
384	0.6216	Shale Plains Woodland	0.0656	10.48	12.92	6.83	30.23	100	25	155.231	Medium
385	1.9023	Alluvial Woodland	0.0359	11.09	42.69	31.15	84.93	62.5	100	247.435	Medium
386	1.9901	Shale Plains Woodland	0.0531	0.20	12.92	21.73	34.85	100	25	159.852	Medium
387	0.8363	Shale Hills Woodland	0.0499	15.93	35.80	13.94	65.67	100	75	240.671	Medium
398	2.6301	Shale Plains Woodland	0.0292	48.99	50.00	39.04	138.03	125	125	388.030	High
404	2.3531	Shale Hills Woodland	0.0295	47.18	50.00	37.21	134.39	125	125	384.389	High
405	5.1124	Alluvial Woodland	0.0245	49.19	50.00	46.35	145.54	105	125	375.540	High
411	1.3923	Shale Hills Woodland	0.0362	41.33	29.55	27.31	98.19	100	50	248.190	Medium
412	1.9159	Alluvial Woodland	0.0409	39.31	32.82	27.12	99.25	105	100	304.250	High
414	2.3070	Shale Plains Woodland	0.0262	14.72	30.93	38.37	84.01	100	50	234.013	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
417	0.2576	Shale Hills Woodland	0.1294	15.52	12.92	0.87	29.31	100	25	154.310	Medium
421	2.3823	Shale Plains Woodland	0.0286	30.65	37.40	38.27	106.32	125	100	331.318	High
427	0.4667	Shale Plains Woodland	0.0959	18.95	67.56	2.60	89.11	150	75	314.112	High
431	0.6933	Alluvial Woodland	0.0497	16.94	39.55	12.79	69.28	80	75	224.275	Medium
432	0.7026	Shale Plains Woodland	0.0631	20.77	19.87	7.98	48.62	100	50	198.619	Medium
434	1.1653	Alluvial Woodland	0.0660	40.12	21.83	12.21	74.16	80	25	179.159	Medium
437	0.9493	Alluvial Woodland	0.0788	39.52	38.59	8.65	86.76	100	75	261.760	Medium
441	0.9260	Alluvial Woodland	0.0660	25.00	34.78	9.42	69.20	75	25	169.199	Medium
485	2.4708	Shale Plains Woodland	0.0326	44.76	50.00	35.77	130.53	125	125	380.527	High
494	3.3034	Shale Plains Woodland	0.0308	22.78	40.80	39.33	102.91	125	75	302.911	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
496	2.6481	Shale Plains Woodland	0.0572	38.31	40.80	23.37	102.47	125	100	327.473	High
500	0.5692	Shale Plains Woodland	0.0533	35.28	29.55	10.00	74.83	100	50	224.834	Medium
503	0.8848	Alluvial Woodland	0.0658	33.27	32.82	9.04	75.13	100	100	275.125	Medium
505	2.3920	Shale Plains Woodland	0.0260	32.66	24.46	39.42	96.54	100	100	296.539	Medium
508	0.2509	Shale Plains Woodland	0.0924	20.56	12.92	1.25	34.73	100	25	159.735	Medium
509	1.2356	Shale Plains Woodland	0.0554	16.53	30.19	15.67	62.40	100	50	212.398	Medium
516	2.0780	Shale Plains Woodland	0.0319	26.61	24.10	34.52	85.23	100	75	260.235	Medium
517	2.1226	Shale Plains Woodland	0.0522	43.55	12.92	22.69	79.16	100	25	204.161	Medium
519	0.4690	Shale Plains Woodland	0.0641	48.39	43.75	5.38	97.52	100	100	297.522	Medium
527	0.4117	Shale Plains Woodland	0.0677	18.55	15.00	3.75	37.30	100	25	162.298	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
532	0.6765	Shale Plains Woodland	0.0501	1.41	28.14	12.31	41.86	100	25	166.860	Medium
536	2.9006	Shale Hills Woodland	0.0281	32.26	24.81	40.67	97.74	100	25	222.739	Medium
537	2.2788	Alluvial Woodland	0.0411	46.37	27.60	28.08	102.04	100	25	227.044	Medium
540	2.2477	Shale Plains Woodland	0.0366	31.65	21.06	31.54	84.25	125	75	284.249	Medium
541	2.9354	Shale Plains Woodland	0.0482	24.19	34.01	28.75	86.95	100	50	236.954	Medium
546	1.6799	Shale Plains Woodland	0.0585	27.22	35.45	18.08	80.74	100	75	255.743	Medium
547	0.8160	Shale Plains Woodland	0.0605	33.67	12.92	9.52	56.11	100	25	181.109	Medium
548	0.4415	Shale Plains Woodland	0.0839	6.75	12.92	3.08	22.75	100	50	172.748	Medium
550	4.2986	Alluvial Woodland	0.0364	46.17	43.53	38.37	128.06	125	100	353.060	High
551	3.3412	Shale Plains Woodland	0.0409	34.91	12.92	32.79	80.62	100	75	255.620	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
553	1.5228	Shale Hills Woodland	0.0540	17.42	36.63	18.94	73.00	100	100	272.999	Medium
558	0.8447	Shale Hills Woodland	0.0615	25.81	33.72	9.52	69.04	100	75	244.044	Medium
567	0.5351	Shale Plains Woodland	0.0555	12.50	36.63	8.46	57.60	100	100	257.596	Medium
569	2.5154	Shale Plains Woodland	0.0240	27.16	36.63	41.15	104.94	100	100	304.944	High
582	1.3492	Shale Plains Woodland	0.0367	31.25	30.00	26.15	87.40	125	50	262.404	Medium
583	1.2237	Shale Plains Woodland	0.0462	41.94	30.00	19.62	91.55	125	75	291.551	Medium
584	4.0210	Shale Plains Woodland	0.0249	27.42	31.35	44.81	103.57	125	125	353.573	High
585	1.8590	Shale Hills Woodland	0.0524	25.40	28.01	21.63	75.05	100	50	225.051	Medium
586	8.2150	Shale Plains Woodland	0.0289	49.40	32.60	45.10	127.09	125	100	352.088	High
587	1.1444	Shale Plains Woodland	0.0452	10.89	28.01	19.52	58.42	100	25	183.419	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
588	2.0160	Alluvial Woodland	0.0385	6.25	25.22	29.42	60.90	62.5	50	173.397	Medium
589	1.1151	Shale Hills Woodland	0.0382	21.57	36.35	23.08	81.00	100	100	280.996	Medium
590	4.5212	Shale Plains Woodland	0.0263	41.13	27.53	44.71	113.37	125	75	313.373	High
591	2.8013	Shale Plains Woodland	0.0307	46.57	12.92	38.46	97.95	100	25	222.951	Medium
593	1.2588	Shale Hills Woodland	0.0360	31.05	12.92	26.44	70.41	100	25	195.411	Medium
594	6.4552	Shale Plains Woodland	0.0277	29.44	50.00	45.10	124.53	125	100	349.532	High
595	3.4698	Shale Plains Woodland	0.0320	11.90	22.18	39.81	73.88	100	25	198.882	Medium
596	3.3832	Alluvial Woodland	0.0261	37.10	34.13	43.08	114.31	125	100	339.308	High
597	0.6699	Shale Hills Woodland	0.0824	32.86	12.92	5.48	51.26	100	25	176.264	Medium
598	0.8262	Shale Hills Woodland	0.0596	34.07	29.42	9.81	73.30	100	75	248.303	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
599	1.5320	Shale Hills Woodland	0.0344	8.87	24.10	30.00	62.97	100	75	237.974	Medium
600	2.3525	Shale Plains Woodland	0.0465	20.16	36.57	26.15	82.89	100	75	257.886	Medium
601	5.2056	Shale Plains Woodland	0.0237	8.67	36.63	46.73	92.03	100	125	317.035	High
602	0.2819	Alluvial Woodland	0.0776	17.54	12.92	2.60	33.06	62.5	25	120.556	Low
603	0.4469	Alluvial Woodland	0.0643	17.74	12.92	4.90	35.57	75	25	135.566	Low
604	0.8907	Alluvial Woodland	0.0586	35.69	38.30	10.87	84.85	100	75	259.852	Medium
605	0.4721	Shale Plains Woodland	0.0878	35.08	12.92	3.27	51.27	100	25	176.270	Medium
606	1.3339	Shale Plains Woodland	0.0438	39.11	25.16	21.54	85.81	100	75	260.812	Medium
607	2.6846	Shale Plains Woodland	0.0455	29.64	23.69	28.75	82.07	125	50	257.073	Medium
608	1.4358	Shale Plains Woodland	0.0391	39.72	12.92	25.96	78.60	100	25	203.599	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
609	1.0122	Alluvial Woodland	0.0509	43.95	26.41	15.38	85.75	100	100	285.747	Medium
610	2.3932	Shale Plains Woodland	0.0801	33.47	25.84	18.75	78.06	100	50	228.058	Medium
612	0.7314	Shale Plains Woodland	0.0609	35.89	12.92	8.85	57.65	100	25	182.653	Medium
613	4.2358	Shale Plains Woodland	0.0303	19.15	34.13	42.21	95.50	100	75	270.499	Medium
614	2.8500	Alluvial Woodland	0.0402	9.27	31.06	32.12	72.45	75	50	197.447	Medium
615	3.3695	Shale Plains Woodland	0.0292	13.91	23.97	41.44	79.33	100	50	229.328	Medium
616	4.6449	Alluvial Woodland	0.0228	26.41	40.67	46.83	113.91	115	75	303.911	High
617	31.4768	Shale/Gravel Transition Forest	0.0083	49.80	50.00	49.71	149.51	115	125	389.510	High
623	12.7041	Alluvial Woodland	0.0158	42.74	30.00	48.85	121.59	140	75	336.588	High
626	9.7228	Alluvial Woodland	0.0241	45.77	50.00	47.60	143.36	140	125	408.362	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
648	1.1325	Shale Hills Woodland	0.0391	46.98	50.00	22.88	119.86	125	125	369.860	High
652	2.5288	Shale Plains Woodland	0.0419	47.98	35.32	29.81	113.11	125	100	338.112	High
658	4.0749	Shale Plains Woodland	0.0308	40.93	31.89	41.73	114.55	125	50	289.549	Medium
674	9.0502	Shale Plains Woodland	0.0191	36.29	12.92	48.17	97.38	100	25	222.383	Medium
675	3.5928	Shale Plains Woodland	0.0303	41.53	32.34	41.35	115.22	125	25	265.218	Medium
679	4.0337	Shale Hills Woodland	0.0234	32.17	36.63	45.96	114.77	100	100	314.766	High
681	2.3736	Shale Plains Woodland	0.0355	24.80	35.03	33.37	93.20	100	75	268.196	Medium
699	0.2857	Shale Hills Woodland	0.1303	20.36	29.04	1.06	50.46	100	75	225.459	Medium
700	1.8313	Shale Plains Woodland	0.0320	19.96	39.97	33.17	93.10	100	50	243.101	Medium
701	0.9148	Alluvial Woodland	0.0894	34.68	12.92	7.60	55.19	62.5	25	142.694	Low

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
702	1.3480	Shale Hills Woodland	0.0381	28.43	26.06	25.38	79.87	100	25	204.870	Medium
703	4.3088	Alluvial Woodland	0.0235	41.73	37.53	46.25	125.52	105	150	380.516	High
704	3.9748	Shale Plains Woodland	0.0334	48.59	43.75	39.81	132.15	125	100	357.146	High
705	1.8119	Shale Plains Woodland	0.0484	45.36	37.82	23.17	106.36	125	100	331.356	High
706	3.4500	Shale Plains Woodland	0.0331	8.27	19.10	38.94	66.31	100	25	191.311	Medium
707	1.3983	Shale Plains Woodland	0.0383	36.49	25.38	25.67	87.55	100	100	287.550	Medium
708	3.0510	Alluvial Woodland	0.0248	33.87	36.92	42.50	113.29	125	100	338.294	High
709	3.2247	Alluvial Woodland	0.0280	34.48	34.42	41.35	110.25	87.5	75	272.745	Medium
710	1.2531	Shale Hills Woodland	0.0408	13.51	25.29	22.69	61.49	100	25	186.489	Medium
711	1.8538	Shale Plains Woodland	0.0316	31.45	35.32	33.65	100.43	125	50	275.426	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
712	0.2822	Shale Plains Woodland	0.0745	4.23	12.92	2.98	20.13	75	25	120.135	Low
713	0.4107	Shale Plains Woodland	0.0611	15.12	25.77	5.10	45.99	100	25	170.986	Medium
714	3.3205	Shale Hills Woodland	0.0299	36.09	28.30	40.38	104.77	125	75	304.775	High
716	1.0239	Shale Plains Woodland	0.0422	37.50	39.26	19.23	95.99	100	125	320.994	High
717	0.4530	Shale Plains Woodland	0.0762	26.01	20.77	3.85	50.62	100	50	200.623	Medium
718	1.0416	Alluvial Woodland	0.0545	28.02	35.61	14.13	77.77	87.5	50	215.268	Medium
720	5.5354	Shale Plains Woodland	0.0271	44.96	50.00	45.10	140.06	125	125	390.056	High
734	2.8664	Shale Plains Woodland	0.0296	47.38	50.00	39.62	136.99	125	125	386.994	High
758	1.4205	Shale Plains Woodland	0.0443	37.90	31.89	22.60	92.39	100	50	242.390	Medium
759a	3.5567	Alluvial Woodland	0.0339	48.79	25.99	38.94	113.73	130	100	343.726	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
759b	1.5125	Alluvial Woodland	0.0593	48.79	12.92	16.83	78.54	125	0	203.537	Medium
760	7.9178	Alluvial Woodland	0.0157	46.77	42.28	48.27	137.32	105	125	367.319	High
761	1.7331	Shale Hills Woodland	0.0366	17.34	22.79	29.52	69.65	100	25	194.646	Medium
762	1.0094	Shale Plains Woodland	0.0521	36.69	39.49	14.71	90.89	100	100	290.892	Medium
763	2.3526	Shale Plains Woodland	0.0302	36.90	31.41	36.63	104.94	125	100	329.940	High
777	2.4507	Shale Plains Woodland	0.0368	48.19	25.99	32.69	106.87	125	100	331.871	High
778	18.0367	Alluvial Woodland	0.0134	45.97	50.00	49.33	145.29	115	125	385.295	High
779	21.4404	Alluvial Woodland	0.0237	0.00	47.58	48.37	95.95	150	100	345.946	High
782	17.6023	Alluvial Woodland	0.0168	50.00	50.00	48.75	148.75	115	125	388.750	High
787	7.8242	Alluvial Woodland	0.0291	45.56	43.40	44.81	133.77	140	100	373.770	High

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
788	2.6525	Shale Plains Woodland	0.0405	38.10	44.36	31.35	113.81	150	100	363.810	High
789	7.6764	Shale Plains Woodland	0.0382	39.92	40.26	38.27	118.45	125	100	343.445	High
790	3.9215	Shale Plains Woodland	0.0344	42.54	39.78	39.13	121.45	150	100	371.451	High
791	1.0820	Shale Plains Woodland	0.0549	0.20	29.07	14.13	43.41	100	50	193.407	Medium
792	2.3255	Shale Hills Woodland	0.0438	21.37	12.92	27.50	61.79	100	25	186.791	Medium
793	2.5031	Shale Plains Woodland	0.0322	33.47	31.83	36.35	101.64	125	125	351.641	High
794	3.3814	Alluvial Woodland	0.0439	42.34	12.92	31.63	86.89	75	25	186.893	Medium
795	3.0677	Shale Plains Woodland	0.0334	22.58	38.24	37.69	98.51	100	75	273.510	Medium
796	2.9191	Shale Plains Woodland	0.0421	44.56	12.92	31.15	88.63	100	25	213.630	Medium
797	2.8565	Shale Plains Woodland	0.0322	21.77	12.92	37.69	72.39	100	25	197.387	Medium

Site ID (Note 1)	Area	Vegetation Type	Perimeter / Area Ratio	Connectivity Score	Structural Score	GeoSpatial Score	Functional Conservation Value	Threatened Species Value	Recovery Potential Value	Total Ecological Value	Vegetation Community Quality
798	3.3794	Shale Plains Woodland	0.0247	30.44	35.32	43.65	109.42	125	50	284.418	Medium
991	9.4840	Shale Plains Woodland	0.0326	46.20	12.92	42.60	101.72	100	75	276.716	Medium
1213	4.9868	Shale Hills Woodland	0.0340	39.62	36.63	40.58	116.83	150	125	391.829	High
1214	8.2336	Shale Plains Woodland	0.0166	37.61	36.63	48.27	122.52	100	125	347.517	High
1215	2.4018	Shale Plains Woodland	0.0291	0.00	36.63	38.27	74.90	100	100	274.904	Medium

Note 1: Site ID refers to sites shown in Figures 1 and 2 of this appendix. Only those sites wholly within the study site and assessed by Cardno during fieldwork are included within this table.

Appendix O

Water Quality Sampling Results

Water quality measurements taken *in situ* at 13 sites within the Study Area (Recorded by Cardno Ecology Lab 19/08/10).

Site	Waterway	Replicate	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	ORP (mV)	Dissolved Oxygen (% sat.)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)
1	Bonds Creek	1	10.82	3235	1.64	7.47	425	50.5	5.5	20.2	20.0	20.0
		2	10.81	3241	1.64	7.46	424	49.7	5.5	20.0	19.7	19.2
2	Bonds Creek	1	10.97	1887	0.89	7.68	423	71.2	7.8	8.4	8.6	8.6
		2	10.94	1889	0.89	7.67	423	67.9	7.4	8.1	8.4	8.6
3	Scalabrini Creek	1	11.78	2085	0.98	7.71	421	61.3	6.5	44.8	45.2	45.0
		2	11.77	2055	0.98	7.70	421	60.2	6.4	44.3	44.5	44.8
4	Kemps Creek	1	12.35	2687	1.31	7.77	427	82.1	8.7	15.8	16.0	15.1
		2	12.32	2678	1.31	7.76	425	75.0	7.9	14.6	13.9	14.2
5	Kemps Creek	1	12.04	3527	1.82	7.60	422	81.0	8.7	3.9	3.9	3.9
		2	12.02	3542	1.82	7.57	422	77.8	8.5	8.8	8.8	9.0
6	Bonds Creek	1	12.71	2459	1.18	7.62	407	59.5	6.1	6.0	6.3	6.4
		2	12.70	2470	1.21	7.61	407	57.9	6.0	6.0	6.0	6.3
7	Bonds Creek	1	14.09	2334	1.11	7.86	406	106.5	10.9	12.1	13.5	13.0
		2	14.08	2332	1.14	7.85	406	103.6	10.8	12.3	12.1	13.0
8	Bonds Creek	1	13.93	3094	1.56	7.87	419	99.4	10.1	8.1	7.4	7.2
		2	13.94	3094	1.56	7.85	419	97.3	10.0	7.4	8.6	7.7
9	Unnamed	1	13.99	944	0.37	7.52	404	50.3	5.1	21.6	22.5	21.2
		2	13.98	640	0.37	7.91	402	48.1	5.0	21.6	21.1	21.3
10	Unnamed	1	14.09	980	0.39	7.66	409	92.2	9.4	39.7	39.2	38.4
		2	14.08	981	0.39	7.65	409	85.0	8.6	38.3	38.7	38.7
11	Bonds Creek	1	15.20	3317	1.68	7.81	418	79.8	7.9	6.7	6.3	6.7
		2	15.19	3318	1.70	7.81	418	76.8	7.5	6.7	6.5	7.0
12	Kemps Creek	1	13.10	3366	1.71	7.62	422	64.8	6.7	12.3	12.8	12.8
		2	13.08	3369	1.71	7.61	422	60.1	6.2	12.8	12.8	11.8
13	Unnamed	1	15.27	2169	1.05	7.73	421	74.2	7.5	2.8	2.6	2.8

Appendix P

Threatened Aquatic Species Likelihood of Occurrence

The table below presents a summary of the ecological characteristics of the threatened aquatic species identified as potentially occurring on site and a subsequent likelihood of occurrence.

Species	Ecology*	Likelihood of Occurrence
Macquarie Perch (***Macquaria australasica***)	Macquarie perch is listed as endangered under the EPBC Act and as vulnerable under the FM Act. There are two distinct populations of Macquarie perch in NSW, a western form found in the Murray-Darling Basin, and an eastern form found in south-eastern coastal NSW, including the Hawkesbury-Nepean catchment (DPI 2005). Macquarie perch have also been translocated into a number of river systems. Macquarie perch usually inhabit the upper reaches of clear, freshwater courses containing deep, rocky pools with upstream riffle and pool sequences for spawning (DPI 2005). They migrate upstream to spawn in October - November and their eggs settle and develop in the gravel and cobble found in riffle habitat. The distribution of the eastern form can also be a function of interactions with other species. For example, if Australian bass are found in a watercourse then typically Macquarie perch will generally only be found upstream of the bass population (McDowall 1996). Macquarie perch is threatened by: ▪ Changes in water quality associated with agriculture and forestry; ▪ Modification of natural river flows and temperatures as a result of the construction of dams and weirs; ▪ Spawning failures resulting from cold water releases from dams; ▪ Competition from introduced fish species;	Given the altitude, presence of instream barriers, modifications to the natural flow regimes and the degraded state of the aquatic habitat the chance of Macquarie perch occurring within the Study Area is considered extremely low.

Species	Ecology*	Likelihood of Occurrence
	▪ Diseases, such as epizootic haematopoietic necrosis, which is carried by redfin perch; and ▪ Over-fishing in the past. Australian bass are relatively common within the lower elevation reaches of the Hawkesbury – Nepean system, the furthest downstream record of Macquarie perch from the Nepean River, however, is from just below Pheasants Nests Weir (60 km south at 160 m AHD).	
Australian Grayling (***Prototroctes maraena*****)**	Australian grayling is listed as vulnerable under the *EPBC Act* and as a protected species by the *FM Act*. Australian grayling (*P. maraena*) prefer watercourses with low turbidity and gravel substrata, and occupy lowland rivers through to high elevation reaches at 1000 m AHD (McDowall 1996). Grayling occur in streams and rivers on the eastern and southern flanks of the Great Dividing Range from Sydney southwards to the Otway Ranges in Victoria, and in Tasmania (McDowall 1996, DPI 2006). The species has an amphidromous life cycle; newly-hatched larvae are photo tactic and swim to the surface where they are swept downstream to estuarine/marine waters. They only migrate back to adult freshwater habitats at the age of 6 months. Populations are therefore very susceptible to barriers to passage. Adults suffer heavy post-spawning mortality so it is possible after a few years without juvenile recruitment, that local populations will become extinct (Morris *et al*., 2001). Threats to Australian grayling include:	It is extremely unlikely that Australian grayling inhabit the Study Area. The Hawkesbury – Nepean drainage system represents the northern extent of the grayling's historical distribution. Despite considerable sampling within the region, the species has not been recorded from the catchment since the 1950s (Morris *et al*. 2001). It is likely that river regulation and habitat degradation are responsible for its disappearance.

Species	Ecology*	Likelihood of Occurrence
	▪ Construction of weirs and dams, which prevent downstream and upstream migration; ▪ Land clearing that degrades water quality and causes siltation; ▪ Smothering of gravel beds by fine sediment; ▪ Competition from the introduced brown trout.	
Southern (Giant) Barred Frog **(*Mixophyes iterates*)**	The southern barred frog is listed as endangered by the *EPBC Act*. The southern barred frog is a large, dark coloured frog that grows to 115 mm. Its historical distribution ranged from Belli Creek, south-east Queensland south to Warrimoo, in NSW's Blue Mountains (DSEWPC 2010a). It has suffered severe population declines in the southern portion of its range in the Sydney Basin and there are no recent records from the Blue Mountains. There are no records of southern barred frog from the Study Area. The Southern Barred Frog occurs along shallow rocky streams in rainforest, wet sclerophyll forest and farmland riparian strips, between 100 and 1000m or in deep, slow moving streams with steep banks in lowland areas (DSEWPC 2010). Populations have been found in disturbed areas with vegetated riparian strips on cattle farms and in regenerated logged areas. Threats to the southern barred frog include: ▪ Upstream clearing; ▪ Changes to flow regimes;	The degraded aquatic and riparian habitat within the Study Area is unlikely to support a viable population of southern barred frog.

Species	Ecology*	Likelihood of Occurrence
	▪ Degradation of water quality; ▪ Disturbance to riparian vegetation; ▪ Feral animals and domestic stock; and ▪ Weed invasion. Disturbance to riparian vegetation is particularly important and chytridiomycosis (infection with the chytrid fungus) may also have contributed to the decline of the species (DSEWPC 2010). Regional degradation of water quality, riparian vegetation and aquatic habitat has contributed to the disappearance of southern barred frog from the southern section of its range.	
Green and Golden Bell Frog **(*Litoria aurea*)**	The green and golden bell frog is listed as vulnerable under the *EPBC Act* and as endangered under the *TSC Act*. The green and golden bell frog ranges from 45 to 100 mm in length and has olive to emerald green colouration with brassy brown to gold splotches. The species is found mainly along coastal lowland areas of eastern NSW and Victoria. Its distribution ranges from Yuraygir National Park near Grafton, in northern NSW and south to Lakes Entrance in south-eastern Victoria. Since 1990, green and golden bell frogs have been recorded at approximately 50 locations in NSW, including the metropolitan areas of NSW, including some with disturbed habitats (DECC 2005a). There are no recorded populations from the Study Area but the species is known from the Cumberland sub-catchment of the Hawkesbury – Nepean Catchment Management Region	Potential habitat for this species occurs within the Study Area, however it has been degraded considerably. Mosquitofish were also highly abundant at every site surveyed, and are known to predate on this species. Although the possibility of the green and golden bell frog occurring within the Study Area is considered low, it is recommended that appropriate targeted surveys be carried out as a precautionary measure.

Species	Ecology*	Likelihood of Occurrence
	and the adjacent Sydney Metro Catchment Management Area. The green and golden bell frog inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as mosquitofish (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. In NSW, the species commonly occupies disturbed habitats, and breeds largely in ephemeral ponds Major threats identified for the Green and Golden Bell Frog include (DEWHA 2009): ▪ habitat loss, fragmentation or degradation (including siltation, changes to aquatic vegetation diversity or structure reducing shelter, increased light and noise, grazing, mowing, fire); ▪ reduction in water quality (e.g. pollution, siltation and erosion); ▪ changes to hydrology (e.g. changes to drainage patterns or timing, duration or frequency of flood events); ▪ predation by exotic animals (e.g. mosquitofish, cats and foxes); ▪ disease (e.g. infection with chytrid fungus resulting in chytridiomycosis); and ▪ introduction or intensification of public access to Green and Golden Bell Frog habitats. Predation by Gambusia holbrooki (plague minnow)' has been listed as a key	

Species	Ecology*	Likelihood of Occurrence
	threatening process on Schedule 3 of the TSC Act as it has been implicated in the decline of a number of threatened Litorid frog species, including the green and golden bell frog. Breeding and persistence of populations has also been observed at locations where mosquitofish are present, suggesting that certain site conditions may reduce the impact of their predation (White and Pyke 2008).	
Growling Grass Frog **(*Litoria raniformis*)**	The growling grass frog, also known as the southern bell frog in NSW, is listed as vulnerable under the *EPBC Act* and as vulnerable under the *TSC Act*. The growling grass frog is one of the largest frog species in Australia, reaching up to 104 mm (DECC 2005b). It was historically distributed across a large area of south-east Australia, including NSW, Victoria, Tasmania and South Australia. In NSW, growling grass frog was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. The species has experienced a pronounced decline in NSW and is currently only known to exist in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Adults are usually found close to or in water or very wet areas in woodlands, shrublands, and open and disturbed areas. Eggs and tadpoles are found in permanent lakes, swamps, dams, and lagoons with still water.	The growling grass frog has not been recorded from the Study Area, and indeed, the Study Area appears to be outside the historical and existing range of the species. The identification of this species as potentially being present within the Kemps Creek catchment by the DSEWPC Environmental Reporting Tool may reflect an error in the database. The growling grass frog is considered unlikely to occur within the Study Area.
Giant Burrowing Frog	The giant burrowing frog is listed as vulnerable under the EBPC Act and	Giant burrowing frogs have not been observed in

Species	Ecology*	Likelihood of Occurrence
(*Heleioporus australicus*)	vulnerable under the *TSC Act*. The giant burrowing frog is a large, powerfully-built species that grows to approximately 10 cm in length. It is confined to the eastern slopes of the Great Dividing Range and coastal regions, and ranges from Wollemi National Park in NSW, south to Walhalla in the central highlands of eastern Victoria (DSEWPC 2010b). The species appears to exist as two distinct populations: the northern population is confined largely to the sandstone geology of the Sydney Basin and extends as far south as Ulladulla, and the southern population occurring from north of Narooma through to Walhalla, Victoria (DECC 2005c). The current taxonomy of this species is under investigation. The giant burrowing frog has been found from near sea level up to 1000 m, from the coast to almost 100 km inland. They are found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based (DECC 2005c). The frog spends 95 % of its time in burrows below the soil surface or in the leaf litter, but immediately before or after heavy rain move into nearby pools in first or second order streams to breed. Threats to the giant burrowing frog include: ▪ habitat loss through clearing for residential, agricultural and urban infrastructure development; ▪ reduction of water quality generally in the vicinity of urban development; ▪ climate change; ▪ disease (chytrid fungus);	the Study Area and the nearest record is 15 km to the west in the relatively undisturbed Gulguer Nature Reserve and the Bents Basin Conservation Area that borders the Nepean River. The Study Area has been substantially modified for small-scale agriculture and low-density residential purposes, resulting in degraded aquatic and riparian habitat and is potentially dominated by clay-based soils. As such the likelihood of the occurrence of giant burrowing frog within the Study Area is considered low, either due to a lack of suitable habitat or the highly modified nature of their preferred habitat.

Species	Ecology*	Likelihood of Occurrence
	▪ fragmentation of populations and consequent susceptibility to stochastic events; and ▪ forest disturbance associated with forestry operations.	
Tall Knotweed **(*Persicaria elatior*)**	Tall knotweed is listed as vulnerable under the *EPBC Act* and as vulnerable under the *TSC Act*. Tall knotweed grows on sandy, alluvial soil in swampy areas and riparian herblands along watercourses and lake edges. Associated plant species include *Melaleuca linarifolia*, *M. quinquenervia*, *Pseudognaphalium luteoalbum*, *Persicaria hydropiper* and *Floydia praealta*. Knotweed has been recorded in the North Coast, Central Coast, and South Coast botanical subdivisions of NSW (DEWHA 2008a). There are two records of the species from the Hawkesbury – Nepean drainage system and both are from the upper parts of the catchment at Picton Lakes and the upper Avon River catchment. Major threats to tall knotweed include localised disturbance from clearing, track maintenance and changes to hydrology (DECC 2005d).	Neither tall knotweed, nor its commonly associated plant species, were observed at any of the proposed works sites during targeted surveys. The likelihood of the occurrence of tall knotweed within the Study Area is considered low due to a lack of suitable habitat.
Red-crowned toadlet **(*Pseudophryne australis*)**	The red-crowned toadlet is listed as vulnerable under the *TSC Act*. The red-crowned toadlet is a small frog, usually measuring less than 30 mm long. The species is confined to the Sydney Basin, ranging from Pokolbin in the north to the Nowra area in the south, and west to Mt Victoria in the Blue Mountains (DECC 2005e). Red-crowned toadlets are found under rocks and in dense vegetation or leaf	It is considered unlikely that red-crowned toadlet inhabit the Study Area as their preferred habitat is either absent or significantly degraded. The Study Area contains relatively few distinct ridges and it has a relatively low-gradient geography and the geology is dominated by Wianamatta Shales (not Sandstone formations). Moreover, the riparian

Species	Ecology*	Likelihood of Occurrence
	litter beside ephemeral creeks and in wet drainage lines located below ridges in open forests (usually on Hawkesbury and Narrabeen Sandstones). The species is quite localised, as populations are restricted largely to the immediate vicinity of suitable breeding habitat. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks (DECC 2005e). The eggs are laid in moist leaf litter, from where they are washed by heavy rain; a large proportion of the development of the tadpoles takes place in the egg. Breeding of red-crowned toadlets has not been observed in mildly polluted waters or those with a pH outside the range 5.5 to 6.5. Outside of the breeding period they are found under rocks and logs on sandstone ridges and forage amongst leaf-litter. Threats to red-crowned toadlet include: ▪ climate change; ▪ clearing of habitat, particularly along ridges; ▪ reduction in water quality flowing from ridges, particularly near urban areas; ▪ high frequency fire, resulting in changing vegetation structure and composition; ▪ collection of bush rock; and ▪ disease (chytrid fungus).	vegetation and bank structure along the waterways within the Study Area is highly degraded. Water quality is low at most sites, with conductivity levels outside the ANZECC and ARMCANZ threshold limits and pH levels at all sites surveyed are outside the preferred breeding range of the red-crowned toadlet.

Species	Ecology*	Likelihood of Occurrence
Sydney Hawk Dragonfly **(*Austrocordulia leonardi*)**	Historically the Sydney hawk dragonfly (*Austrocordulia leonardi*) was known from only a few sites, one of which was the Nepean River at Maldon Bridge near Wilton, which is located approximately 60 km south of the study area. Numbers of the Sydney hawk dragonfly have declined at the Maldon Bridge site, but it has since been recorded in the upper Hawkesbury-Nepean catchment at O'Hares Creek. This dragonfly spends most of its life as an aquatic larva, with adults emerging from the water and living for only a few weeks or months. The larvae appear to have specific habitat requirements and have been found only under rocks in deep, cool, shady pools (DPI 2007b). This species is threatened by: ▪ River regulation and changes in flows that cause the disappearance of natural deep pools; ▪ Habitat degradation associated with removal of riparian vegetation, drainage works and sedimentation; ▪ Water pollution and sedimentation due to land clearing, waste disposal and stormwater runoff from urban, industrial and agricultural development in the catchment; and ▪ Chance events such as natural disasters (drought) that eliminate the remaining local populations.	The Sydney hawk dragonfly was not identified from macroinvertebrate samples taken during the current survey. Given previous dragonfly sampling has failed to find specimens in the area and the considerable local disturbance to waterways, it is considered highly unlikely that the species occurs in the Study Area.
Adam's emerald	Adam's emerald dragonfly has only been collected at four localities in NSW,	Adam's emerald dragonfly was not collected in the

Species	Ecology*	Likelihood of Occurrence
dragonfly **(*Archaeophya adamsi*)**	one of which was Bedford Creek in the Lower Blue Mountains. Bedford Creek flows into Erskine Creek which eventually discharges into the Nepean River downstream of the Warragamba River and Nepean River confluence. The aquatic larvae of Adam's emerald dragonfly were found in small creeks with gravel or sandy bottoms, in narrow, shaded riffle zones with moss and rich riparian vegetation (DPI 2009). Adam's emerald dragonfly larvae live for 7 years or so and undergo various moults before metamorphosing into adults. Adult dragonflies generally fly away from the water to mature before returning to breed. Males congregate at breeding sites and often guard a territory. Females probably lay their eggs into the water (DPI 2009). Threats to this species include: ▪ Habitat degradation resulting from the loss of riparian vegetation and drainage works; ▪ Water pollution and siltation due to land clearing, waste disposal and stormwater runoff from urban, industrial and agricultural development in the catchment; ▪ Chance events such as natural disasters.	Study Area during the current survey. Given the species' rarity, the absence of suitable habitat within the Study Area and the considerable disturbance within the catchment, it is considered extremely unlikely that Adam's emerald dragonfly inhabits the Study Area or that suitable habitat for them occurs in the Study Area. Protected Species and Habitats
Stuttering Frog **(*Mixophyes balbus*)**	Stuttering Barred Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. It is thought to have disappeared from Victoria and to have undergone considerable range contraction in NSW, particularly in south-east NSW. It is the only *Mixophyes* species that occurs in south-east NSW and in recent surveys it has only been recorded at three	The degraded aquatic and riparian habitat within the Study Area does not represent core habitat for this species is unlikely to support a viable population of stuttering frog.

Species	Ecology*	Likelihood of Occurrence
	locations south of Sydney. The Dorrigo region, in north-east NSW maintains the largest populations (DECC, 2005f). The species is typically found within rainforest, and wet, tall open forest on the eastern side of the dividing range. As such they prefer thick lead litter and dense understorey vegetation. Breeding occurs within streams with eggs laid on rock shelves or riffles in small, flowing streams. Threats to this species include: ▪ Modification and loss of habitat. ▪ Changes to natural water flows and water quality. ▪ Predation of eggs and tadpoles by introduced fish. ▪ Disease - chytrid fungus.	
Heath Frog **(*Litoria littlejohni*)**	Littlejohn's Tree Frog is confined to eastern New South Wales and north-east Victoria. The Frog occurs in scattered locations between the Watagan Mountains, New South Wales, to Buchan in Victoria. Despite its very large distribution there are very few records of Littlejohn's Tree Frog, and it is one of the least known frogs in New South Wales (DEWHA 2008b). The species is not associated with any specific vegetation types. However it is known to inhabit forest, coast woodland and heath from 100 – 950m above sea level. Breeding is typically done within standing water such as dams or pools.	The degraded aquatic and riparian habitat within the Study Area does not represent core habitat for this species is unlikely to support a viable population of heath frog.

Species	Ecology*	Likelihood of Occurrence
	Land clearance is considered to be a significant threat to this species, with most sightings occurring only in relatively undisturbed forest and un-polluted water supplies. The species is considered to be susceptible to the chytrid fungus.	

*all references are provided in Section 9 of the main document to which this is an appendix.

Appendix Q

Strategic Assessment Consistency Report

Growth Centres Strategic Assessment Program

Assessment of Consistency between the Commitments of the Strategic Assessment Program and the Austral and Leppington North Precincts

August 2012

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1. Introduction

In December 2011 the Federal Government endorsed the Sydney Growth Centres Strategic Assessment Program Report and in February 2012 approved the classes of actions in the Growth Centres that if undertaken in accordance with the approved program do not require separate approval under the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The Program includes a range of commitments for matters of national environmental significance protected under the EPBC Act. The commitments are drawn from the analysis in the Supplementary Assessment Report and Draft Strategic Assessment Report (Part B), and build upon the Relevant Biodiversity Measures for the Growth Centres Biodiversity Certification.

This report has been prepared to assess of the consistency of proposed precinct plans with the commitments of the Strategic Assessment Program and to satisfy the evaluation and reporting requirements for the Program. Consistency with the Strategic Assessment Program is required to ensure proposals in the Growth Centres benefit from the Commonwealth approval.

This report has been prepared in a table format and addresses all commitments that are relevant to precinct planning. It is noted that some of the commitments are not specific to precinct planning and have therefore not been included in the report.

The Strategic Assessment Program can be viewed in full at http://www.growthcentres.nsw.gov.au/strategicassessment-94.html

Where the report indicates that precinct planning is inconsistent with the Biodiversity Certification or the Strategic Assessment Program, full justification for the inconsistency is provided as part of the ecological assessment for the precinct.

Both the Growth Centres Biodiversity Certification Relevant Biodiversity Measures and Strategic Assessment require a consistency report be prepared and publicly exhibited when the precinct plan is exhibited.

The draft Austral and Leppington North Precinct Plan was publicly exhibited from 26 October to 2 December 2011, prior to the Sydney Growth Centres Strategic Assessment Program coming into effect. Therefore, a consistency report was not part of the public exhibition. This report has been prepared since exhibition and is based on the final Precinct Plan (the final Indicative Layout Plan is at **Annex B**).

Definitions

Terms defined below appear in **bold** in the table. Where the terms are also defined in the Biodiversity Certification Order, the definitions provided are consistent with those in the Order.

- Biodiversity Certification Maps means the maps marked “North West Growth Centre – Biodiversity Certification” and “South West Growth Centre – Biodiversity Certification” dated November 2007 and included in Schedule 2 of the Biodiversity Certification Order.
- *Certified Area* means an area marked as a certified area on a biodiversity certification map.
- *Clearing* of vegetation means any one or more of the following:

  a) cutting down, felling, thinning, logging or removing native vegetation in whole or in part,

  b) killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation in whole or in part.
- *Commitments* means the commitments set out in section 4 of the Sydney Growth Centres Strategic Assessment Program Report.
- *DECCW* means the Department of Environment, Climate Change and Water (which is now the Office of Environment and Heritage).
- *EPBC Act* means Environmental Protection and Biodiversity Conservation Act 1999
- *GCC* means the Growth Centres Commission constituted under the *Growth Centres (Development Corporations) Act 1974* (which is now the Department of Planning and Infrastructure).
- *Minister* means the Minister administering the EPBC Act.
- *Protection or Protected* in relation to land means land that is protected by a land use zoning under an environmental planning instrument or public ownership arrangements that provide for the protection of biodiversity values as a priority, or another arrangement that provides in perpetuity security for biodiversity on the subject land.
- *Relevant Biodiversity Measures* means the conditions in Schedule 1 of the Biodiversity Certification Order.
- *TSC Act* means the *Threatened Species Conservation Act 1995.*

2. Assessment

Table 1: Assessment of consistency between the commitments of the Strategic Assessment Program and the Austral and Leppington North Precincts.

	Commitment	Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
Review of Zoning				
3	Review the provisions of the Environment Conservation and Public Recreation - Regional zones in the Growth Centres SEPP to confirm they are adequate for conservation purposes. Note this commitment is being undertaken for the Growth Centres as one exercise as does not need to be addressed separately for each precinct.	Undertake a review of the zone objectives, permitted land uses and development controls to ensure the conservation values of the land are adequately protected.	Yes	
Threatened Ecological Communities				
4	Retention and protection of a minimum 998 ha of CPW within the Growth Centres, including a minimum of 363 ha of HMV CPW. i) Retention and protection of CPW in the following areas of the Growth Centres: a) 138 ha within Flood Prone Land to be protected through the vegetation clearing controls under the Growth Centres SEPP or through zoning and/or development controls following completion of precinct planning. b) 424 ha within Environment Conservation and Public Recreation – Regional zoning to be protected. • RBM 12 which states that clearing of these areas is not	The total area of Commonwealth listed CPW as mapped in the Strategic Assessment in the precincts is 88 ha. Of this 2.65 ha is in the Kemps Creek Nature Reserve and 3.35 ha is within the former Western Sydney Parklands Area. The Kemps Creek Nature Reserve area has been excluded from all further calculations, and the Western Sydney Parklands Area is addressed under condition 4i)c) below. Of the 138 hectares of CPW to be protected across the Growth Centres, 22.13ha is within the Austral and Leppington North Precincts. None of the CPW in the Precincts is HMV CPW. This is the 'target' amount of CPW to be protected to maintain consistency with condition 4(i)(a) of the Strategic Assessment.	Yes	**Annex A** contains a map showing the current boundaries of non-certified land in the Precincts, and ENV that is required to be protected. **Annex D** highlights ENV in non-certified areas that is proposed to be impacted by the Precinct Plan, and ENV in certified areas that is proposed to be protected by the Precinct Plan. **Annex E** shows

	Commitment	Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
	permitted unless it is in accordance with a Plan of Management endorsed by DECCW; • the zoning and vegetation clearing controls under the Growth Centres SEPP; and • the Growth Centres Conservation Fund which provides funding to acquire the land.	Cardno's groundtruthing identified 121.84 ha of CPW in the precincts which is mapped as ENV. Of this 3.03 ha is in Kemps Creek Nature Reserve and 6.39 ha is within the former Western Sydney Parklands area. (These areas are based on vegetation community mapping as per the strategic assessment). Using the Ground-truthed mapping of CPW, under the Precinct Plan, 39.62 ha of CPW is to be protected. Of this: • 24.55ha of CPW that is currently non-certified is to be protected. • 15.07ha of CPW is to be protected in currently certified areas. • 3.17ha of CPW that is currently non-certified is proposed to be cleared.		proposed amendments to the certified/non-certified land boundaries to ensure protection of ENV as proposed by the Precinct Plan. The Land Zoning Map and Native Vegetation Protection Map give effect to provisions in the Precinct Plan that will protect the 39.62 hectares of ENV in the Precincts. Protection measures are further described in the **Conclusion** of this report.
	c) 280 ha to be protected within existing reserved areas including the Westlink M7 Motorway Offsets area, the Kemps Creek Nature Reserve, and the Western Sydney Parklands.	A small part of the Kemps Creek Nature Reserve (which is subject to RBM 12 and condition 4(i)(c) of the Strategic Assessment) is within the Austral Precinct (refer to Figure 1 and **Annex A**). There is 3.03ha of ground truthed CPW mapped within this part of the Precinct. The Precinct Plan does not apply to this land (see **Annex B**) and there will be no impacts on it. Therefore, this vegetation is not included in the calculations in this report. In the former Western Sydney Parklands, there is 3.39 ha of Commonwealth listed CPW while ground truthed CPW, classified as ENV, shows 6.39 ha. All of the 6.39 ha of CPW ENV will be		Some ENV within the former Western Sydney Parklands area will be impacted by the South West Rail Line construction. These impacts have been separately assessed and offset in accordance with the Minister's Conditions of Approval for the project. ENV to be protected within this area takes into account the impacts of the rail line. The protection measures

	Commitment	Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
		protected by the Precinct Plan.		maps at **Annex C** identify ENV that is proposed to be protected in the former Parklands area. **Annex E** shows proposed amendments to the certified/non-certified land boundaries.
	d) 79 ha to be protected within protected zones within Edmondson Park. e) 77 ha to be retained within non-certified and transitional lands. These areas will be retained subject to the confirmation of the presence of the community through survey at the precinct planning stage. ii) If for any reason the above targets cannot be achieved then the NSW Government will ensure that 998 ha of CPW is protected within the Growth Centres through the measures contained in either RBM 8a or 8b.	Not Applicable	Not Applicable	Not Applicable
5	Assessment of 14 ha HMV CPW within Marsden Park & Marsden Park Industrial Precincts to confirm its presence and if present protect, shown in red hatching on the **Biodiversity Certification maps** a) Assessment of the HMV CPW in accordance with RBM 14 and 15. b) Based on the outcomes of the assessment, DECCW will advise the NSW Minister for the Environment whether the area should be protected in accordance with RBM 16.	Not Applicable	Not Applicable	Not Applicable

	Commitment	Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
Shale Sandstone Transition Forest (SSTF)				
8	Retention and protection of a minimum of 58 ha of SSTF within the Growth Centres. i) Retention and protection of SSTF in the following areas of the North West Growth Centre: a) 5.5 ha within Flood Prone Land to be protected through the vegetation clearing controls under the Growth Centres SEPP. b) 5.5 ha within Public Recreation – Regional zoning to be protected. • RBM 12 which states that clearing of these areas is not permitted unless it is in accordance with a Plan of Management endorsed by DECCW; • the zoning and vegetation clearing controls under the Growth Centres SEPP; and • the Growth Centres Conservation Fund which provides funding to acquire the land. c) 0.5 ha within the Westlink M7 Motorway Offsets area to be protected through maintenance of the existing conservation area (purchased by the RTA for transfer to DECCW as part of the Westlink M7 Motorway offsets). d) 46.5 ha within the E3 Environmental	There is no mapped Shale Sandstone Transition Forest in the Austral and Leppington North Precincts.	Not Applicable	Not Applicable

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
	Management zone in North Kellyville to be protected under the existing native vegetation and native vegetation retention controls under the North Kellyville Precinct Plan.				
Additional conservation actions within the Growth Centres – plants					
11. and 12. *15. and 30.*	During or before the preparation of the relevant precinct plan(s) under the Growth Centres Development Code relating to the areas referred to in the table below, the following actions must be undertaken:		While RBM 17- *Acacia pubescens* refers to areas in the Austral Precinct, the area mapped under this condition is adjacent to the Austral Precinct, within the Western Sydney Parklands and Sydney Catchment Authority Upper Canal. As the land covered by this condition is not in the Precincts, this condition is not relevant to this report.	Not Applicable	
	Species	***Required action***			
	Acacia pubescens	Known populations at Kemps Creek and Austral – as shown in red hatching on the **Biodiversity Certification maps**: • survey to confirm the presence of the population in the Kemps Creek and Austral precincts, and • if the species is present and the population is identified as significant relative to the adjacent property by DECCW, provide for the **protection** of the area of suitable habitat for the species to the satisfaction of the **DECCW**.			
	Dillwynia tenuifolia	Retention and protection of habitat supporting the four important			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
	Pultenaea parviflora	populations of *Dillwynia tenuifolia* and *Pultenaea parviflora* known to occur within the Growth Centres through acquisition of land for environmental conservation. a) Protection of the Marsden Park North population within Environment Conservation zoning in accordance with the measures outlined in commitment 8.b) b) Protection of the population within the Air Services Australia site at Shanes Park (noting that at the time of finalising the Program the site is still under care of the Commonwealth) through: • RBM 12 which states that clearing of these areas is not permitted unless it is in accordance with a Plan of Management endorsed by DECCW; and • the zoning and vegetation clearing controls under the Growth Centres SEPP. c) Protection of the majority of the large population within Kemps Creek in accordance with the measures outlined in commitment 15.b) above. d) Protection of the large population that occurs within the Westlink M7 Motorway			
27. *17.*					

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
18. and 19. *23. 24. and 25.*		offset adjacent to the Colebee Precinct through maintenance of the existing conservation area (purchased by the RTA for transfer to DECCW as part of the Westlink M7 Motorway offsets).			
	Pimelea spicata	Potential populations at Denham Court Road within the East Leppington Precinct - as shown in red hatching on the **Biodiversity Certification maps**: • survey to confirm the presence of population, and • if the population is present and identified as significant relative to adjacent property by DECCW, provide for the **protection** of the area of suitable habitat for the species to the satisfaction of the **DECCW**.			
20.	*Grevillea parviflora subsp. parviflora* *Persoonia nutans*	Retention and protection of habitat supporting the population known to occur within the Growth Centres through acquisition of land in Kemps Creek. a) Protection of the majority of the large population within Kemps Creek through: • RBM 12 which states that clearing of these areas is not permitted unless it is in			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
		accordance with a Plan of Management endorsed by DECCW; and • the zoning and vegetation clearing controls under the Growth Centres SEPP. Potential populations at Kemps Creek Precinct - as shown in red hatching on the **Biodiversity Certification maps**: • survey to confirm the presence of population, and • if the species is present and population is identified as significant relative to adjacent property by DECCW, provide for the **protection** of the area of suitable habitat for the species to the satisfaction of the **DECCW**.			
22.	*Micromyrtus minutiflora*	Retention and protection of habitat supporting the two important populations known to occur within the Growth Centres. a) Protection of the Marsden Park North population within Environment Conservation zoning through: • RBM 12 which states that clearing of these areas is not permitted unless it is in accordance with a Plan of Management			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
14.		endorsed by DECCW; • the zoning and vegetation clearing controls under the Growth Centres SEPP; and • the Growth Centres Conservation Fund which provides funding to acquire the land. b) Protection of the population within the Air Services Australia site at Shanes Park (noting that at the time of finalising the Program the site is still under care of the Commonwealth) through: • RBM 12 which states that clearing of these areas is not permitted unless it is in accordance with a Plan of Management endorsed by DECCW; and • the zoning and vegetation clearing controls under the Growth Centres SEPP.			
	Persoonia hirsuta	Potential habitat at North Kellyville – as shown in red hatching on the **Biodiversity Certification maps**: • survey to confirm the presence of the species, and • if the species is present,			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
		provide for the **protection** of the habitat within the Precinct through zoning as E3 Environmental Management and existing native vegetation or native vegetation retention development controls.			
	Darwinia biflora	Known populations at North Kellyville - as shown in red hatching on the **Biodiversity Certification maps**: • survey to confirm the extent of the populations, and • provide for the protection and ongoing management of key populations within the Precinct through zoning as E3 Environmental Management and existing native vegetation controls.			
	Note: On completion of the above actions the **Minister** may decide that it is appropriate to amend the boundaries of the area subject to biodiversity certification, in accordance with condition 3.				
Additional conservation actions within the Growth Centres – animals					
During or before the preparation of the relevant precinct plan(s) under the Growth Centres Development Code relating to the area referred to in the table below, the following actions must be undertaken:			Commitments in relation to the Swift Parrot and Grey-Headed Flying Fox are relevant and have been satisfied for the Austral and Leppington North Precincts by the protection of 116.62 hectares of ENV across the Precincts, this is 10 hectares more ENV than is required to maintain parity with the 2,000 hectares of ENV across the Growth Centres	Yes	116.62 hectares of ENV will be protected in the Austral and Leppington North Precincts, this is 10 hectares more ENV than is required to maintain parity with the target identified in the draft
	Species	***Required action***			
32.	*Swift Parrot*	Protection of potential habitat for the Swift Parrot within the Growth			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
34. and 35.		Centres. a) Protection of 2,000 ha native vegetation within the Growth Centres through: • RBM 6 which requires a minimum of 2,000 ha of existing native vegetation to be retained; and • the relevant development controls under the Growth Centres SEPP that relate to the retention of native vegetation.	in accordance with RBM 6. This will include any existing potential habitat for the Swift Parrot and Grey-headed Flying Fox found within this area.		Growth Centres Conservation Plan. Refer to the Maps in Annex B and C which show the Indicative Layout Plan and zoning. The Maps at Annex D shown ENV that is proposed to be protected, including currently non-certified ENV proposed to be cleared and currently certified ENV that is to be protected.
36. *38.*	*Green and Golden Bell Frog*	Potential population at Riverstone – as shown in red hatching on the **Biodiversity Certification maps**: a) Incorporation of habitat protection and enhancement features (as per the agreed concept design) in the Riverstone Precinct Development Control Plan for the trunk drainage land. b) Inclusion of provisions in the Riverstone Precinct Plan and Development Control Plan to require the design and assessment of development on subject lands to be consistent with any recovery plan for the species and the Best Practice Guidelines for Green and Golden Bell Frog			

	Commitment		Austral and Leppington North Precincts – Comment	Consistent with Commitment	Justification
		Habitat (DECC 2008b). Retention of major drainage lines and associated vegetation throughout the Growth Centres through Growth Centres SEPP development controls for major creeks and flood prone areas.			
	Large-eared Pied Bat	Retention of potential roosting habitat and immediately adjacent potential foraging habitat along Cattai Creek in North Kellyville through development controls associated with the E3 Environmental Management and E4 Environmental Living zones.			
	Grey-headed Flying Fox	Protection of potential habitat for the Grey-headed Flying Fox within the Growth Centres. b) Protection of 2,000 ha native vegetation within the Growth Centres through: • RBM 6 which requires a minimum of 2,000 ha of existing native vegetation to be retained; and • the relevant development controls under the Growth Centres SEPP that relate to the retention of native vegetation.			
	Note: On completion of the above actions the **Minister** may decide that it is appropriate to amend the boundaries of the area subject to biodiversity certification, in accordance with condition 3.				

3. Conclusion

This report has undertaken an assessment of the consistency of the Austral and Leppington North Precinct Plan with the Strategic Assessment and the applicable commitments.

It is concluded that the Austral and Leppington North Precinct Plan is consistent with the Strategic Assessment of the Growth Centres SEPP, as follows:

- 116.62 hectares of ENV will be protected by the Precinct Plan, 10 hectares more than is required under the Biodiversity Certification.
- 24.55 hectares of CPW ENV that is currently non-certified will be protected by the Precinct Plan.
- 3.17 hectares of non-certified CPW ENV is proposed to be cleared to enable efficient urban development of the Precincts and to ensure that essential infrastructure can be constructed. To more than offset these impacts, 15.07 hectares of CPW ENV that is currently certified will be protected by the Precinct Plan and by amendments to the boundaries of certified and non-certified land.
- The total area of ENV (that is also Cumberland Plain Woodland as mapped under the Strategic Assessment Program) protected by the Precinct Plan is 39.62 hectares. This is 17.49 hectares more than the amount of CPW ENV (22.13 hectares) that is currently on non-certified land. The 39.62 hectares of CPW ENV will be protected by a combination of zoning, vegetation clearing controls and amendments to the boundaries of non-certified land. The proposed zoning of protected ENV is explained below.
- Amendments to the certification maps are proposed to ensure that all ENV that is protected by the Precinct Plan is also on non-certified land (see **Annex E**).

Land use zones have been selected based on advice from the OEH in relation to appropriate zoning of land containing ENV, and with consideration of other land use planning factors, including the future ownership, acquisition and use of land in accordance with the draft Precinct Plan and the EP&A Act. While the use of Environment Protection zones is preferred by OEH, in many cases it is not possible to apply this zoning to land containing ENV because of restrictions on the ability of Council to acquire the land under section 94 of the EP&A Act. In accordance with the hierarchy of land use zones preferred by OEH, land use zones have been applied to ENV that is proposed to be protected as follows:

- Where ENV to be protected is on land that is currently in Council or State Government ownership, the E2 Environmental Conservation zone has been used. The exception to this is Craik Park, in the centre of the Precincts, which is an existing Council reserve that contains a sports field and remnant ENV. The RE1 Public Recreation zone has been applied to this land to enable continued use of the sports fields.
- Where ENV to be protected is within large land holdings (and the area of ENV comprises only small part of the total area of land in the one ownership) the E2 zone has been applied. This land is not proposed to be acquired by a public authority, but the land owner may seek to dedicate the land to Council subject to Council agreement, and if this did occur, the ENV would be

protected by the combination of zoning and public ownership. Regardless, the application of the E2 zone to land that is to remain in private ownership is consistent with OEH requirements for protection of ENV.

- Within flood affected land along Kemps Creek and Bonds Creek, and adjacent to a number of other unnamed watercourses, existing rural properties that partly contain ENV are proposed to have a "split" zoning, with the land containing ENV zoned E2 Environmental Conservation and the remainder of the property zoned for a purpose that enables some commercial return either through limited subdivision or construction of a dwelling, or continued agricultural production. Generally, where the existing rural lot is partly within and partly outside the 100 year ARI flood extent, the combination of E4 Environmental Living and E2 (for the land that contains ENV) has been used. This approach also applies to a property on the eastern side of the Precincts at Eighth Avenue, which contains patches of ENV that are linked to a large remnant to the north and east in land owned by the Sydney Catchment Authority. This enables limited subdivision and construction of dwellings on relatively large lots consistent with the flooding and vegetation constraints on the land. Where the existing rural lot is entirely affected by flooding (such as along the northern parts of the Kemps Creek floodplain) the RU6 Rural Transition zone and E2 zone (for the land that contains ENV) has been used. The Rural Transition zone will enable agricultural uses that do not cause significant amenity impacts for nearby residential areas. The ability to further subdivide this land is limited, with minimum lot size controls established to limit further subdivision of land that contains ENV. In both these situations, the land that contains ENV is anticipated to remain in private ownership.
- Where land that contains ENV is to be acquired as part of a larger acquisition for a public purpose (usually for public recreation or drainage) the RE1 Public Recreation and SP2 Infrastructure (drainage zones) have been used. These approaches have generally been applied along the larger watercourses (eg. Bonds Creek and Scalabrini Creek) where the creek channel and margins are to be acquired by Council as part of the drainage network or where ENV is located on land that is to be acquired for public parks and sporting fields (these are often located within floodprone land near the major creeks). Land in these zones will be acquired by the relevant Council.

Annex A

Biodiversity Certification Map for the Austral and Leppington North Precincts

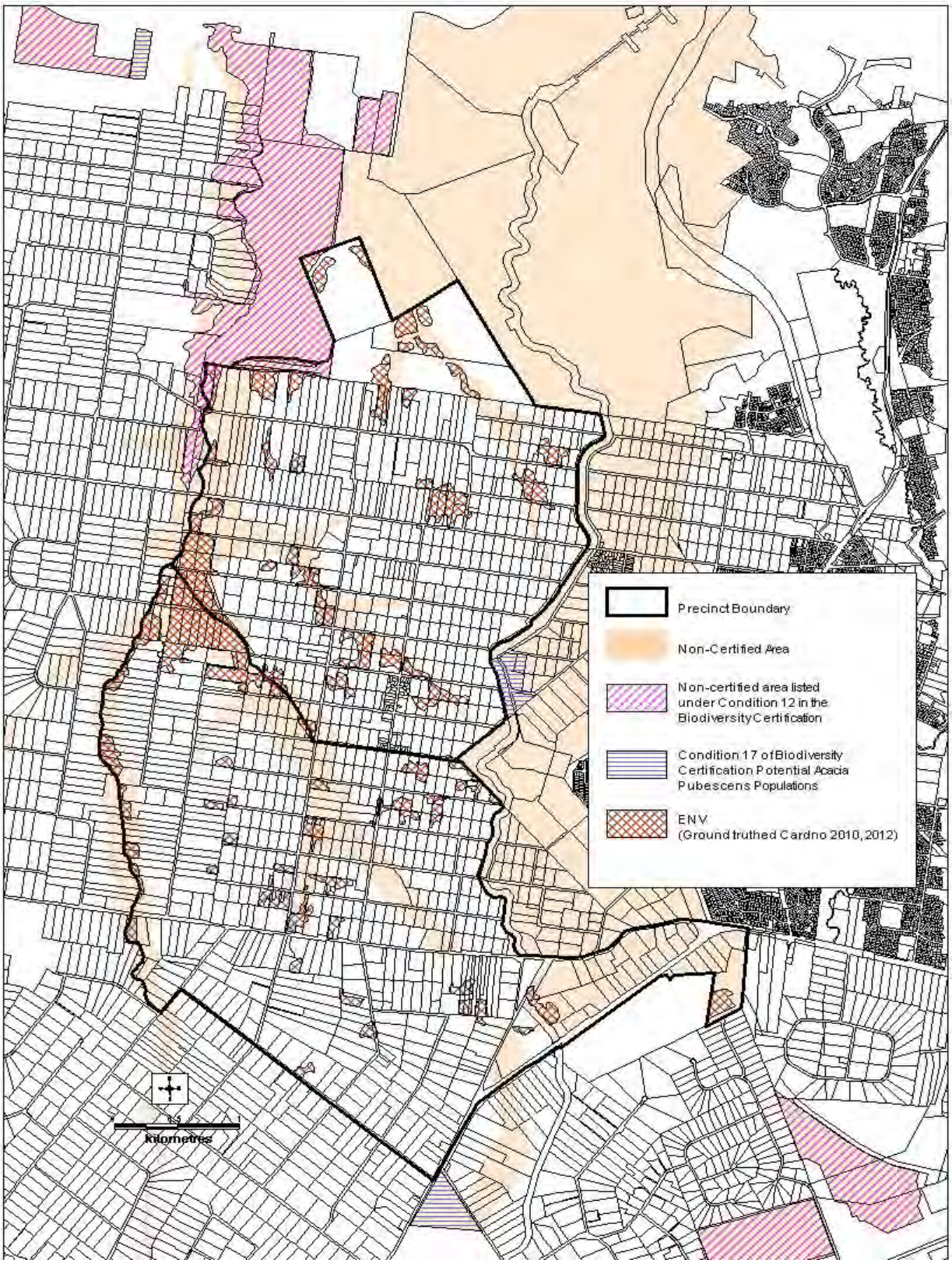

Figure 1: Austral and Leppington North Precincts – Biodiversity Certification Map showing Existing Native Vegetation (as confirmed by 2010 and 2012 ground truthing) and areas listed under Condition 12 and Condition 17 of the Biodiversity Certification.

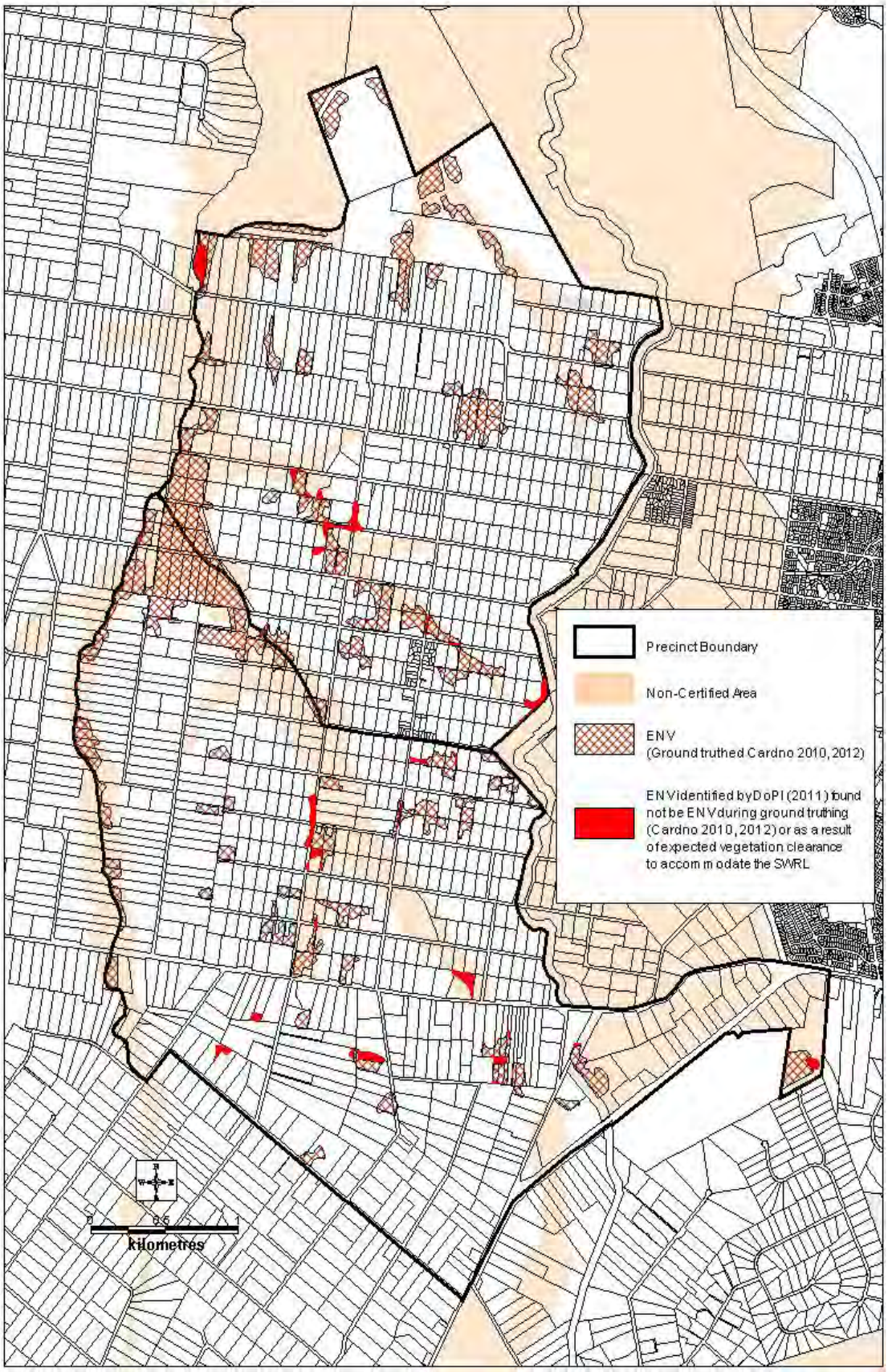

Figure 2 Existing Native Vegetation and vegetation areas found not to meet the criteria of ENV during ground truthing in 2010, 2012.

Annex B

Indicative Layout Plan for the Austral and Leppington North Precincts

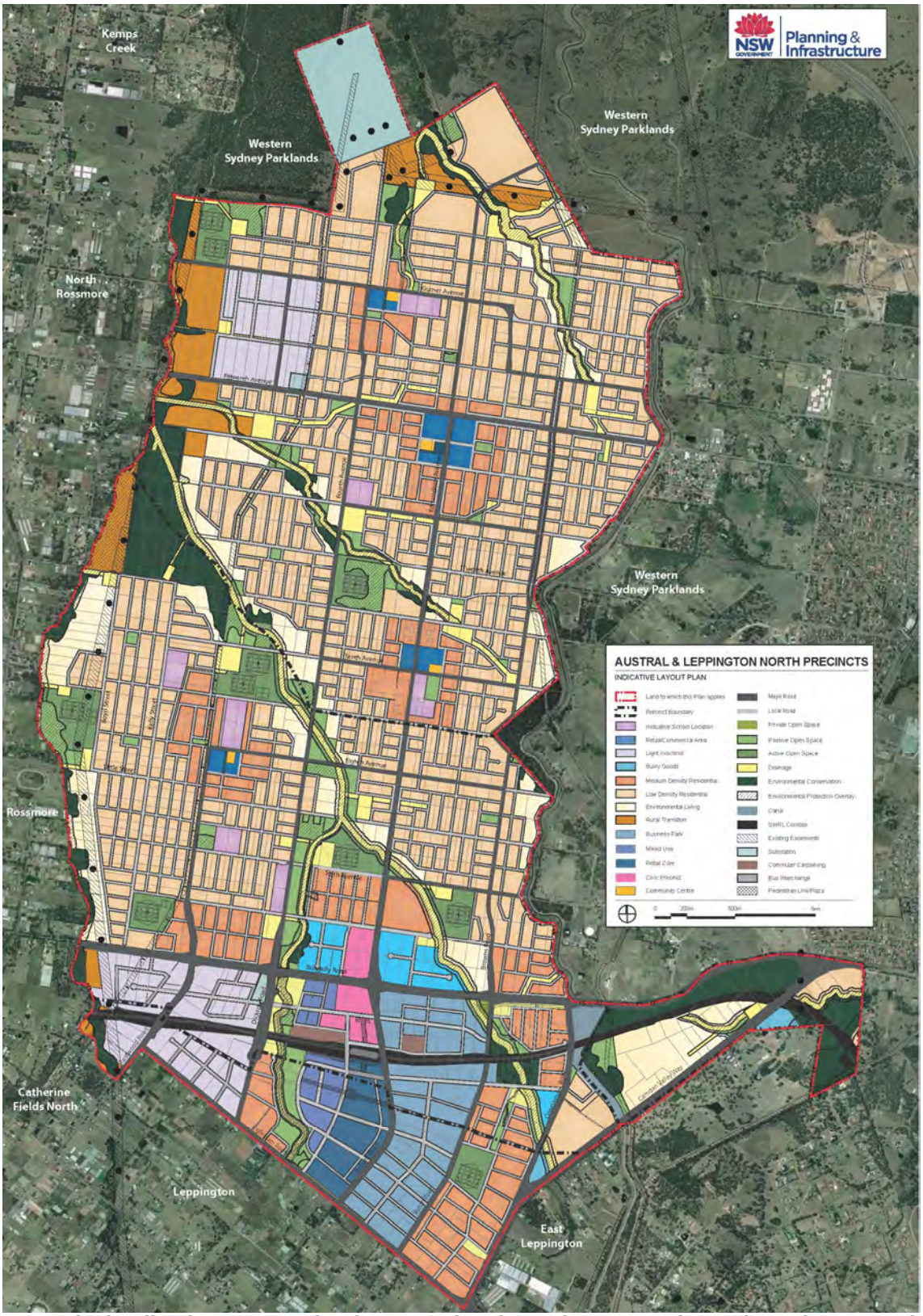

Figure 1 Final Indicative Layout Plan for Austral and Leppington North Precincts (June 2012).

Annex C

Proposed Protection Measures Plan for the Austral and Leppington North Precincts

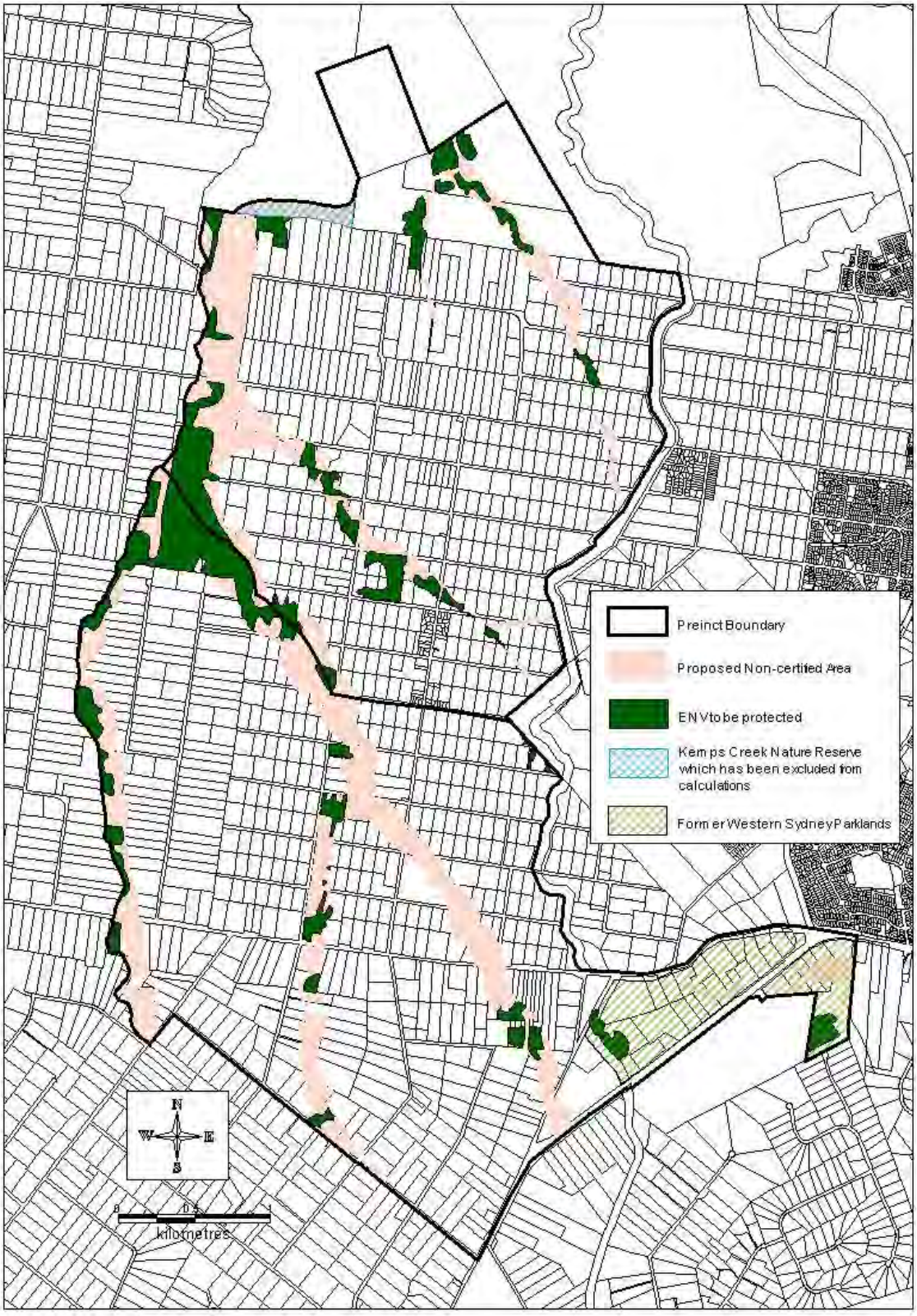

Figure 1 ENV to be protected

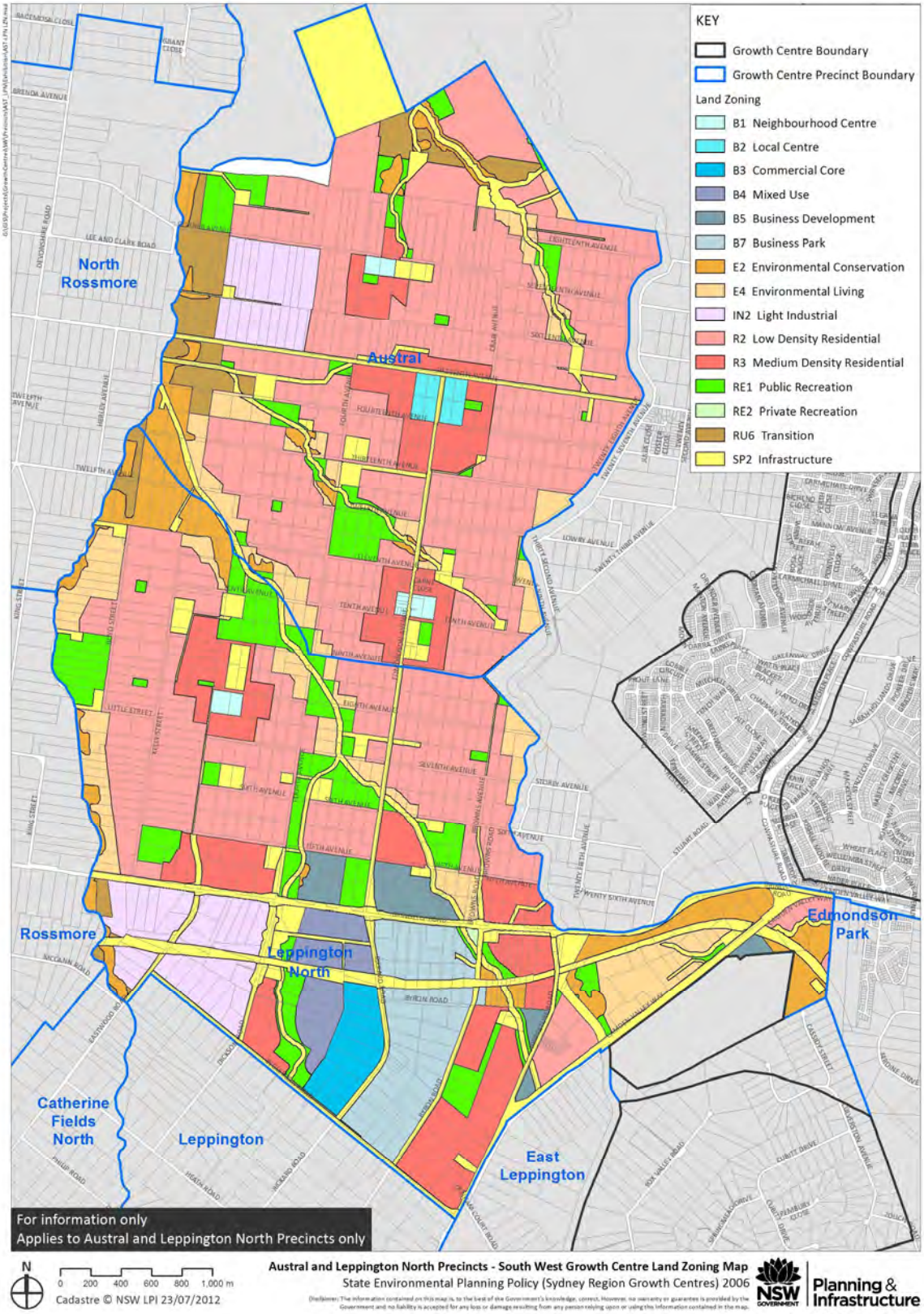

Figure 2 Land Zoning Map

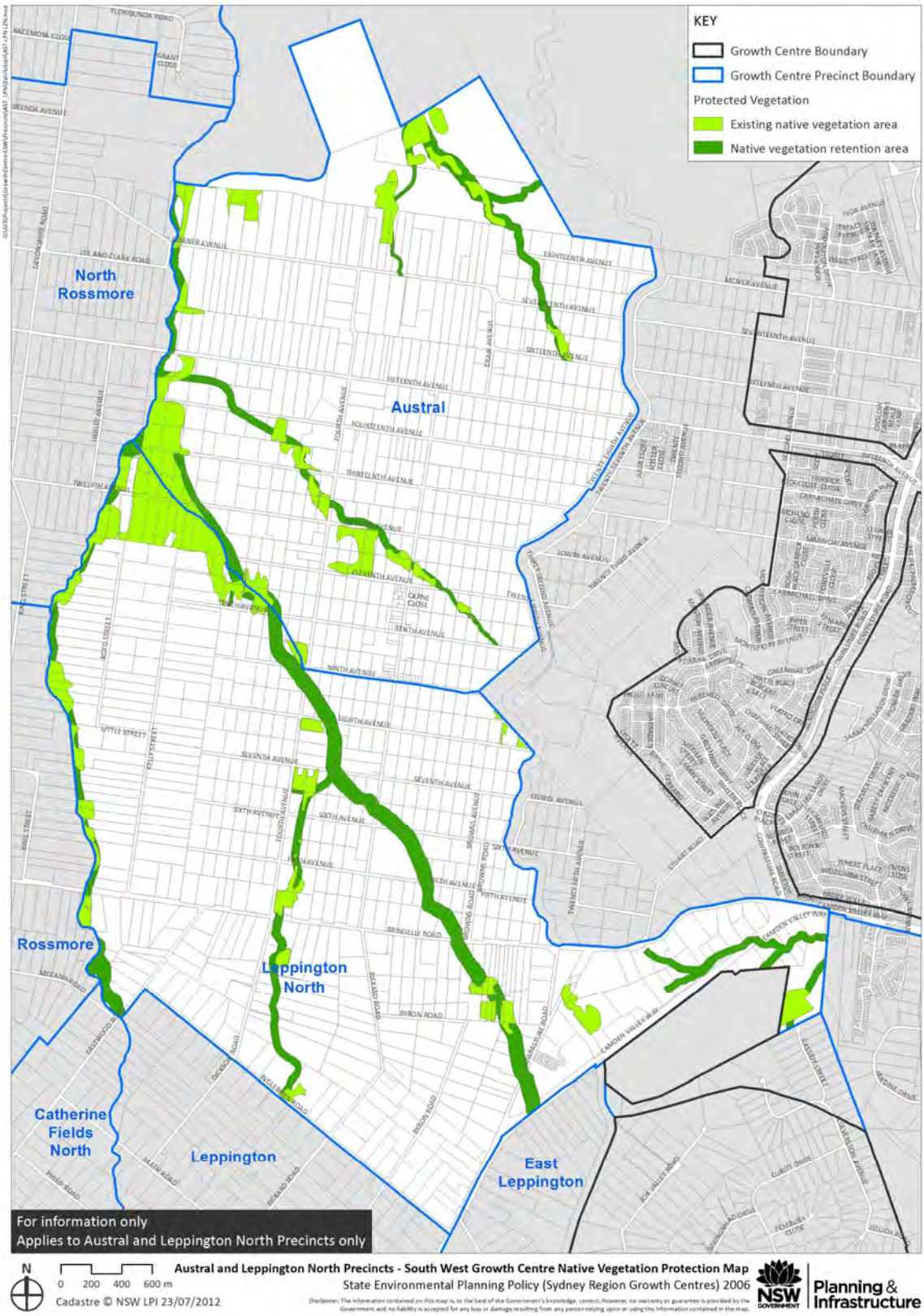

Figure 3 Native Vegetation Protection Areas Map

Annex D

Proposed Offsets Areas the Austral and Leppington North Precincts

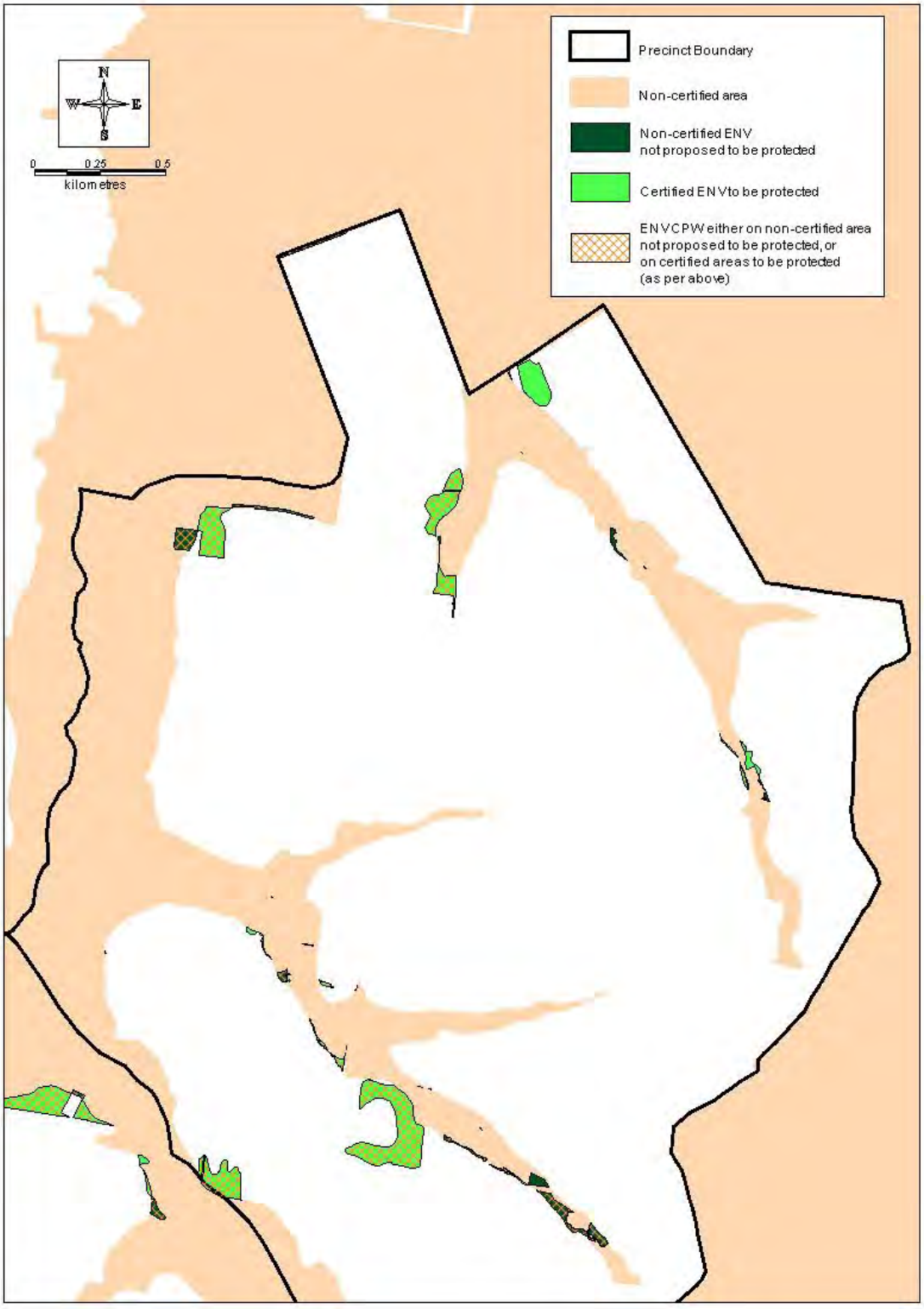

Figure 1: Certified ENV to be protected and Non-certified ENV not proposed to be protected in Austral

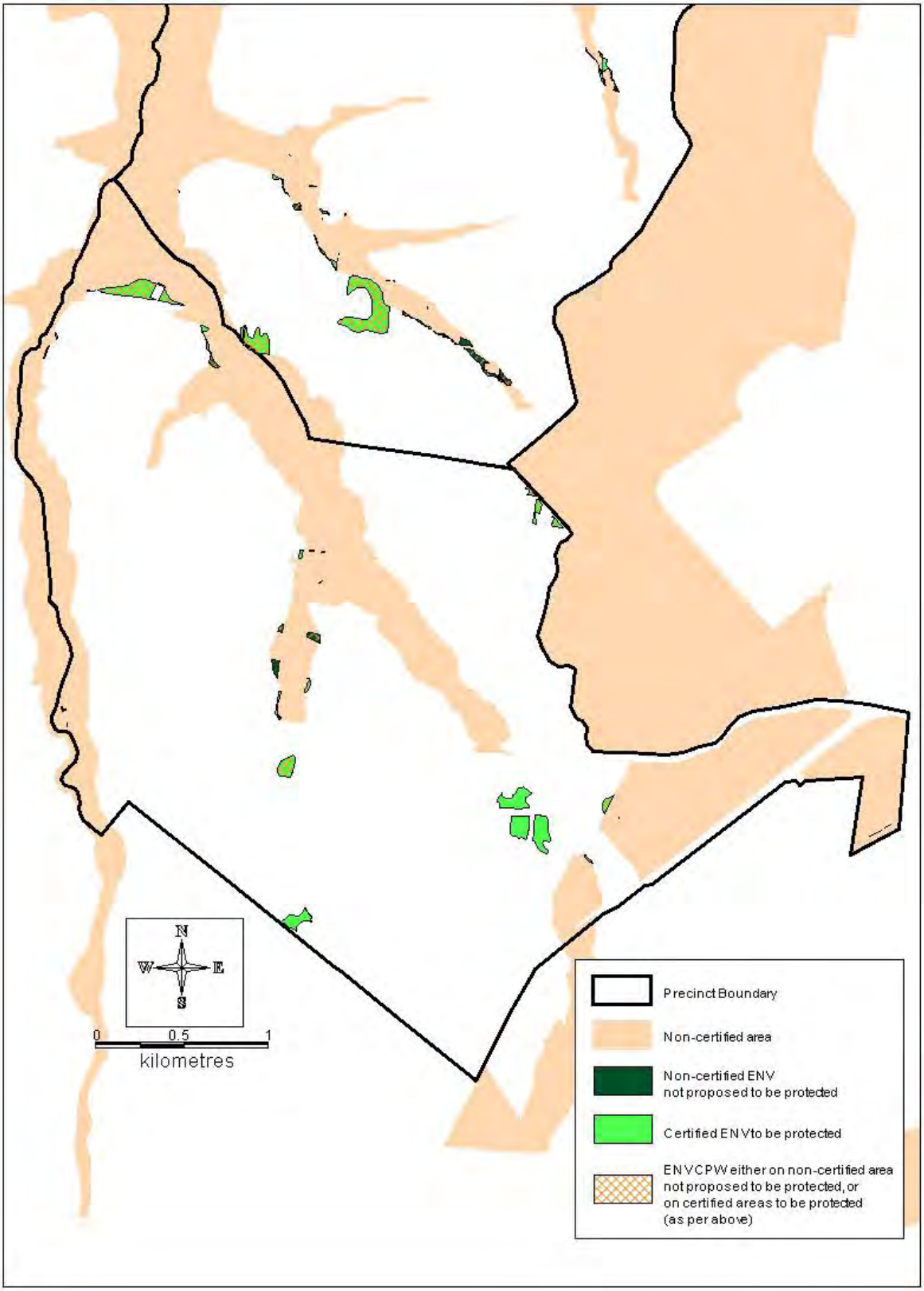

Figure 2: Certified ENV to be protected and Non-certified ENV not proposed to be protected in Leppington

Annex E

Proposed Amendments to Biodiversity Certification Map

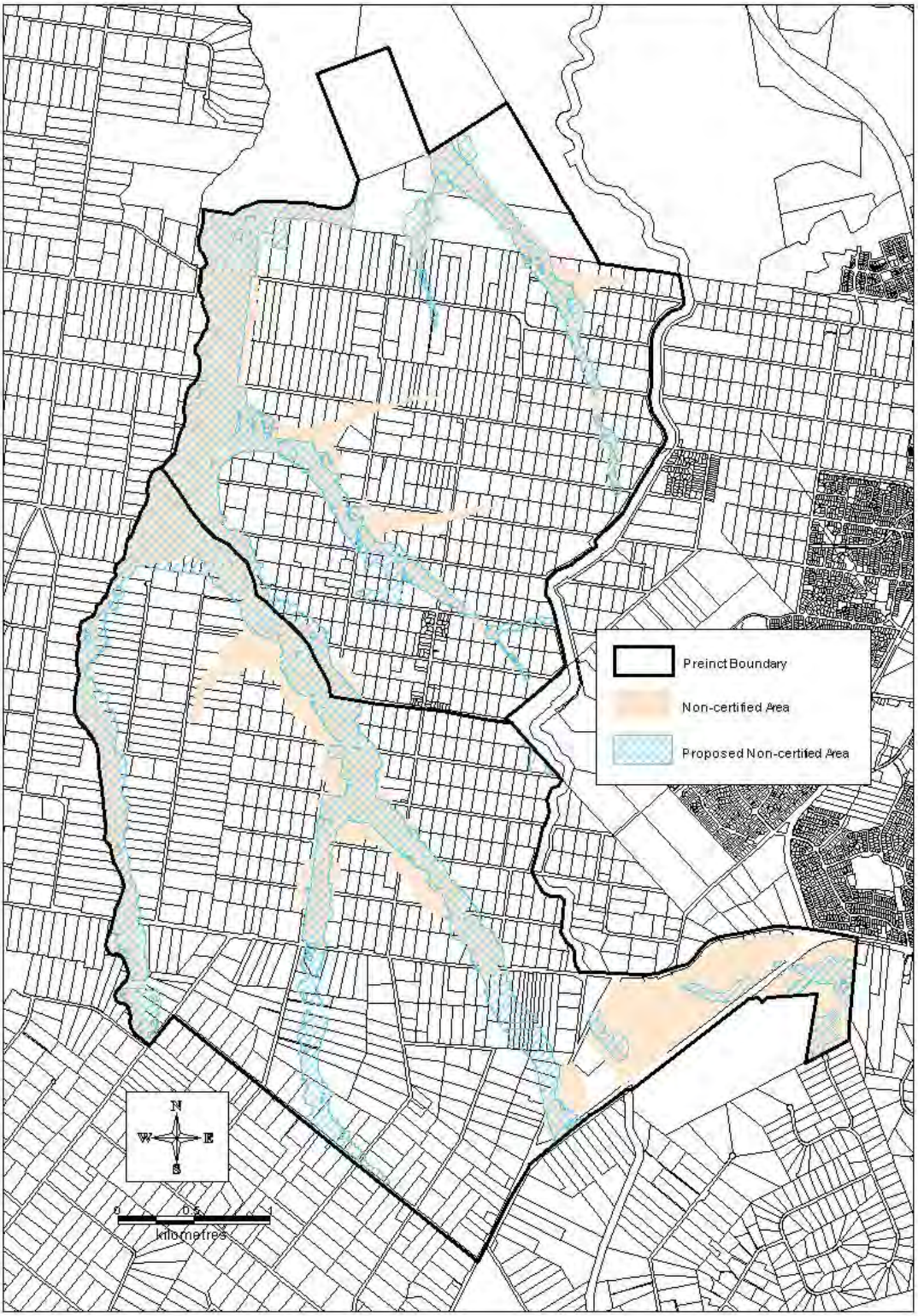

Figure 1: Proposed new boundaries of non-certified area and current non-certified area within the Austral and Leppington North precincts