APPENDIX A

Landscape, Survey and Results Figures

Legend

- Development Site
- 550m Buffer Area
- IBRA Regions and Subregion Areas
- Local Government Area
- Mitchell Landscape Area
- Native Vegetation Area
- Meandering Transects - September 2014
- Meandering Transects - October 2014
- Meandering Transects - January 2016
- Meandering Transects - May 2016
- Plot/Transect
- Rapid Assessment
- Fauna Survey Location

Stream Order:
- 1st Order
- 2nd Order
- 3rd Order
- 4th Order
- 5th Order
- 6th Order

Threatened Species:
- Eastern Bentwing-Bat (ecosystem and species credit)
- Grey-crowned Babbler (ecosystem credit)
- Grey-headed Flying-fox (ecosystem and species credit)
- Koala (species credit)
- Little Pied Bat (ecosystem credit)
- Varied Sittella (ecosystem credit)
- Yellow-bellied Sheath-tail Bat (ecosystem credit)
- Little Eagle (ecosystem credit)
- Magpie Goose (ecosystem credit)
- Pale-headed Snake (species credit)
- Turquoise Parrot (ecosystem credit)
- Black-striped Wallaby (species credit)
- Brown Treecreeper (ecosystem credit)
- Five-clawed Worm-Skink (species credit)
- Glossy Black-cockatoo (ecosystem credit)
- Square-tailed Kit (ecosystem credit)
- *Desmodium campylocaulon* (species credit)
- *Digitaria porrecta* (species credit)
- *Homopholis belsonii* (species credit)
- *Dichanthium setosum* (species credit)
- *Swainsona murrayana* (species credit)

Vegetation:
- Cleared/Non-native Vegetation
- Zone 1 - PCT-27 BVT-BR233, NA219-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion-Moderate - Good
- Zone 2 - PCT-35 BVT-BR120, NA117-Brigalow – Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion-Moderate - Good
- Zone 3 - PCT-39 BVT-BR130, NA129-Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion-Moderate - Good
- Zone 4 - PCT-52 BVT-BR191, NA187-Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion-Native Grassland
- Zone 5 - PCT-56 BVT-BR186, NA182-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW-Moderate - Good
- Zone 6 - PCT-56 BVT-BR186, NA182-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW-Derived Native Grasslands
- Zone 7 - PCT-71 BVT-BR127,NA126-Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and aeolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion-Moderate - Good
- Zone 8 - PCT-78 BVT-BR196, NA193-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion-Moderate - Good
- Zone 9 - PCT-135 BVT-BR284, NA271-Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion-Moderate - Good
- Zone 10 - PCT-413 BVT-BR346, NA348-Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion-Moderate - Good

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- IBRA Regions and Subregion Areas
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A1

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_016.dgn
20160718 15.59

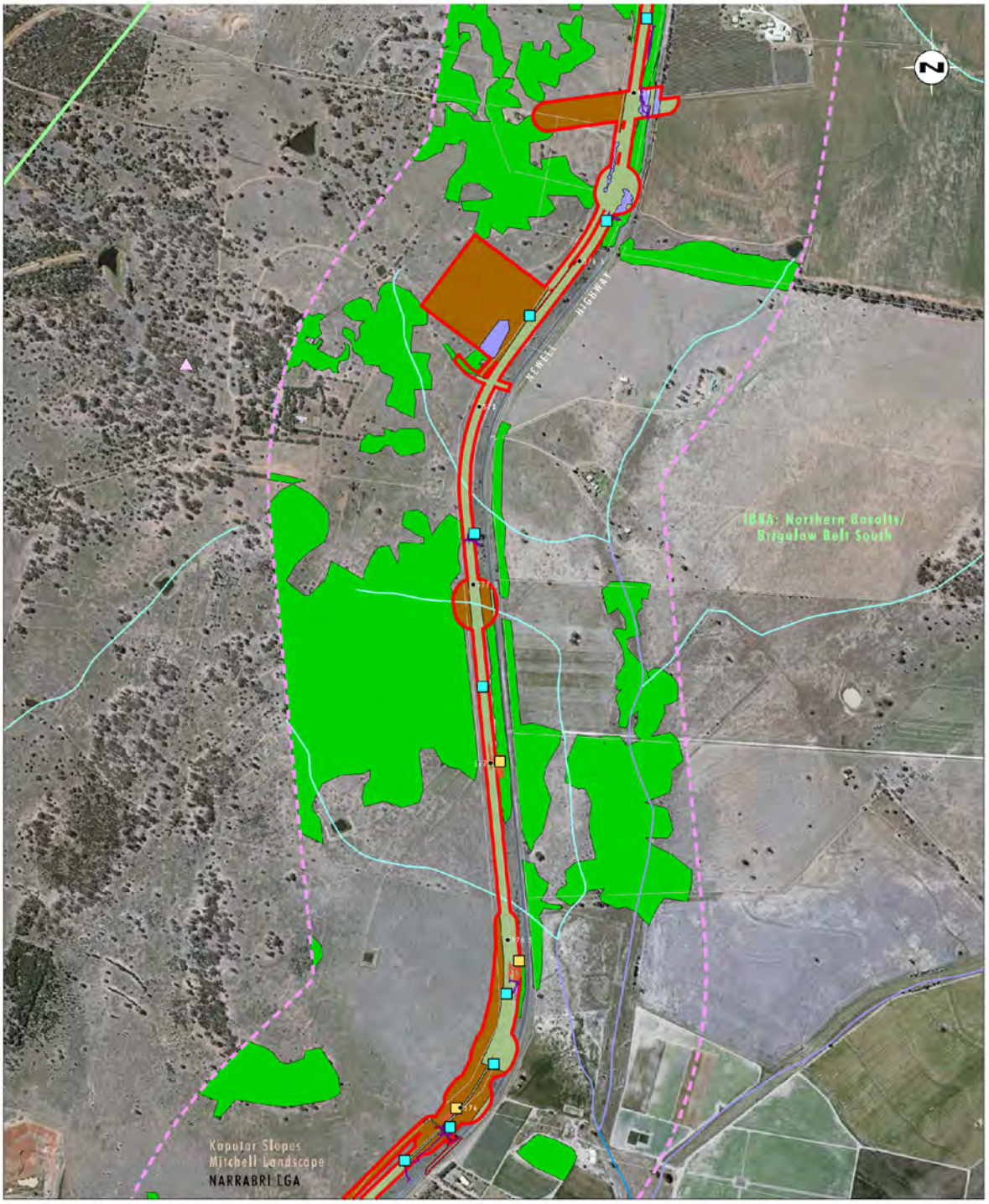


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- IBRA Regions and Subregion Areas
- Rail Line Chainage

FIGURE A2

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_017.dgn
20160718 16.00

umwelt

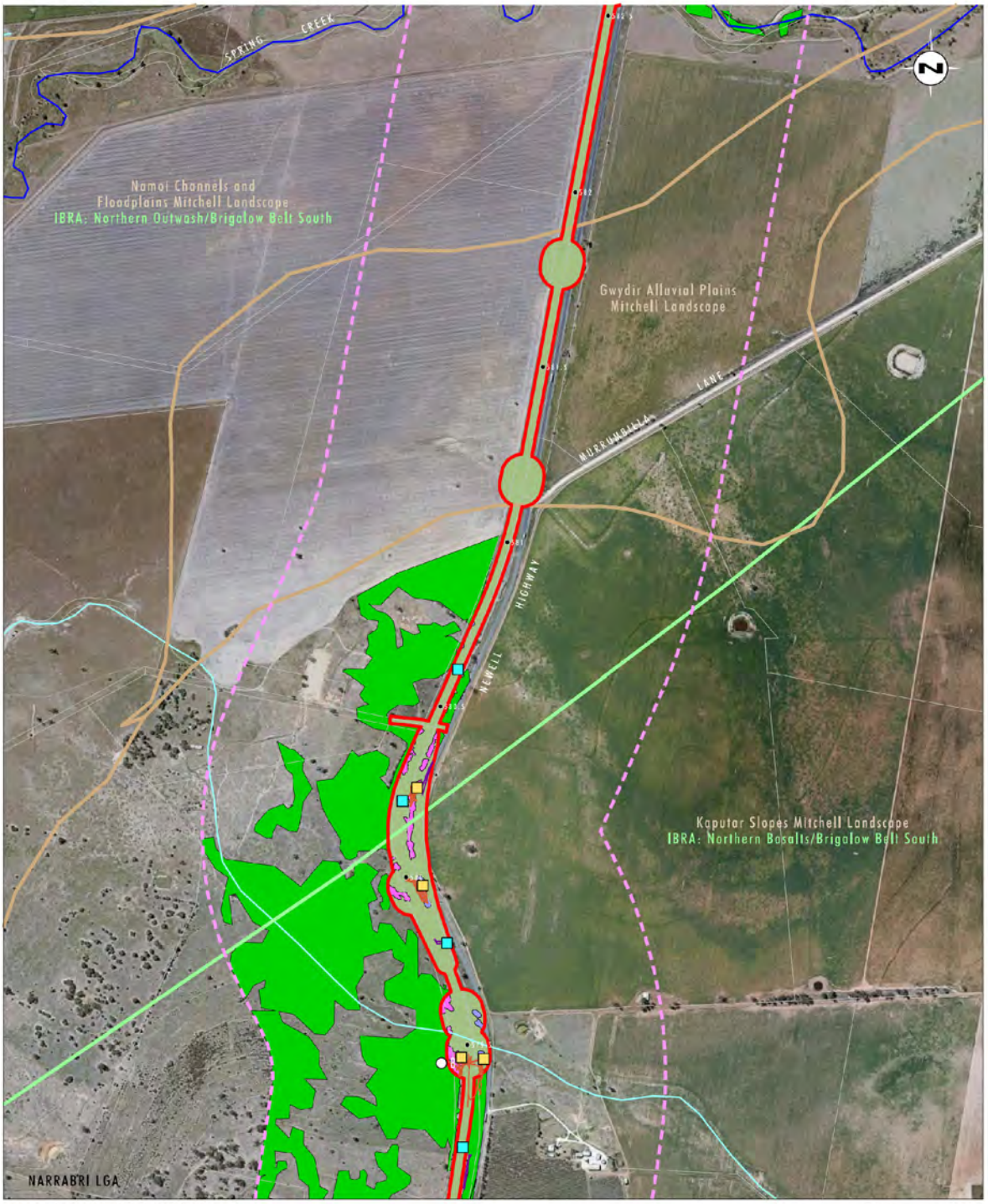


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- IBRA Regions and Subregion Areas
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A3

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_018.dgn
20160718 16.03

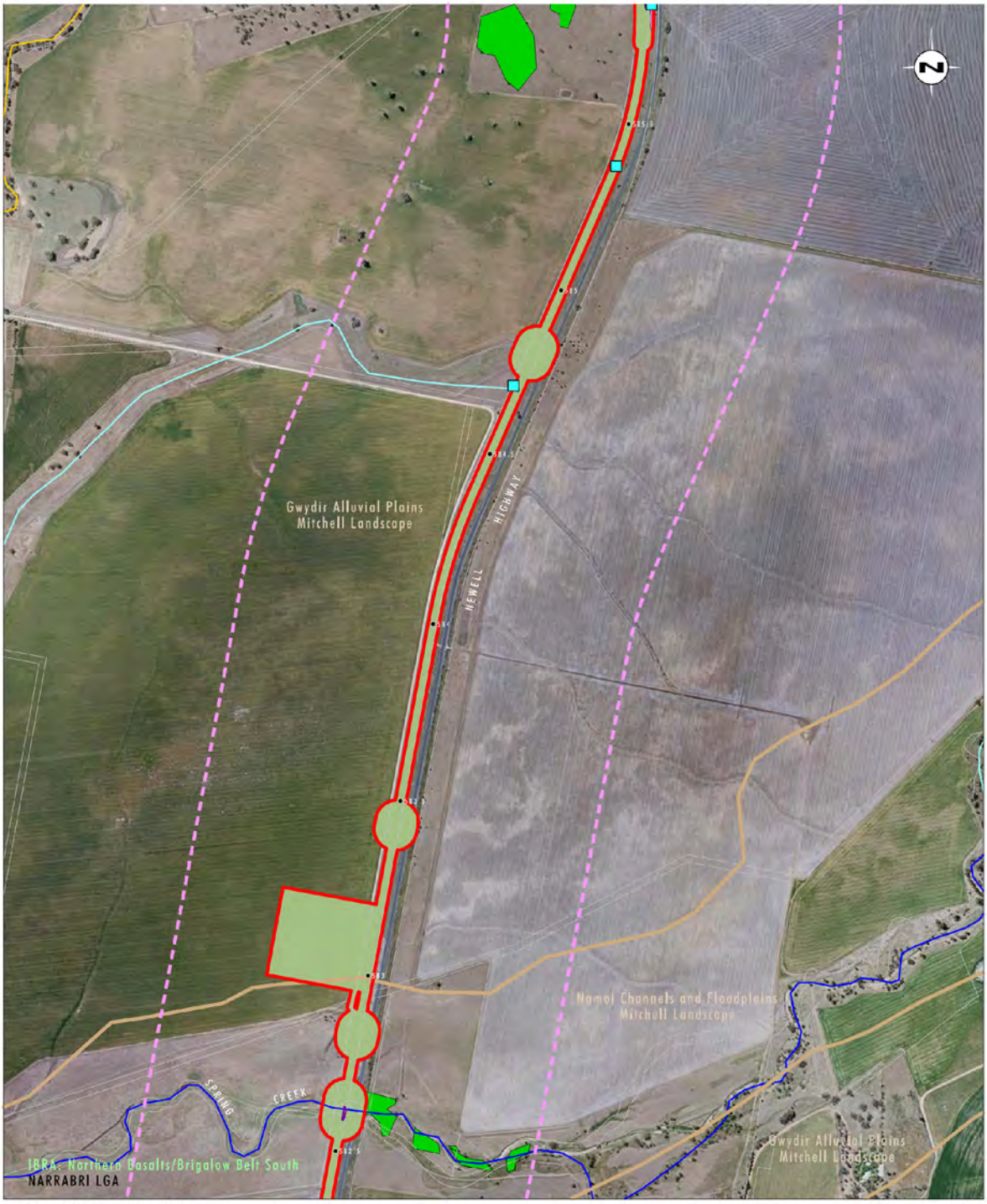


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A4

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_019.dgn
20160718 16.03

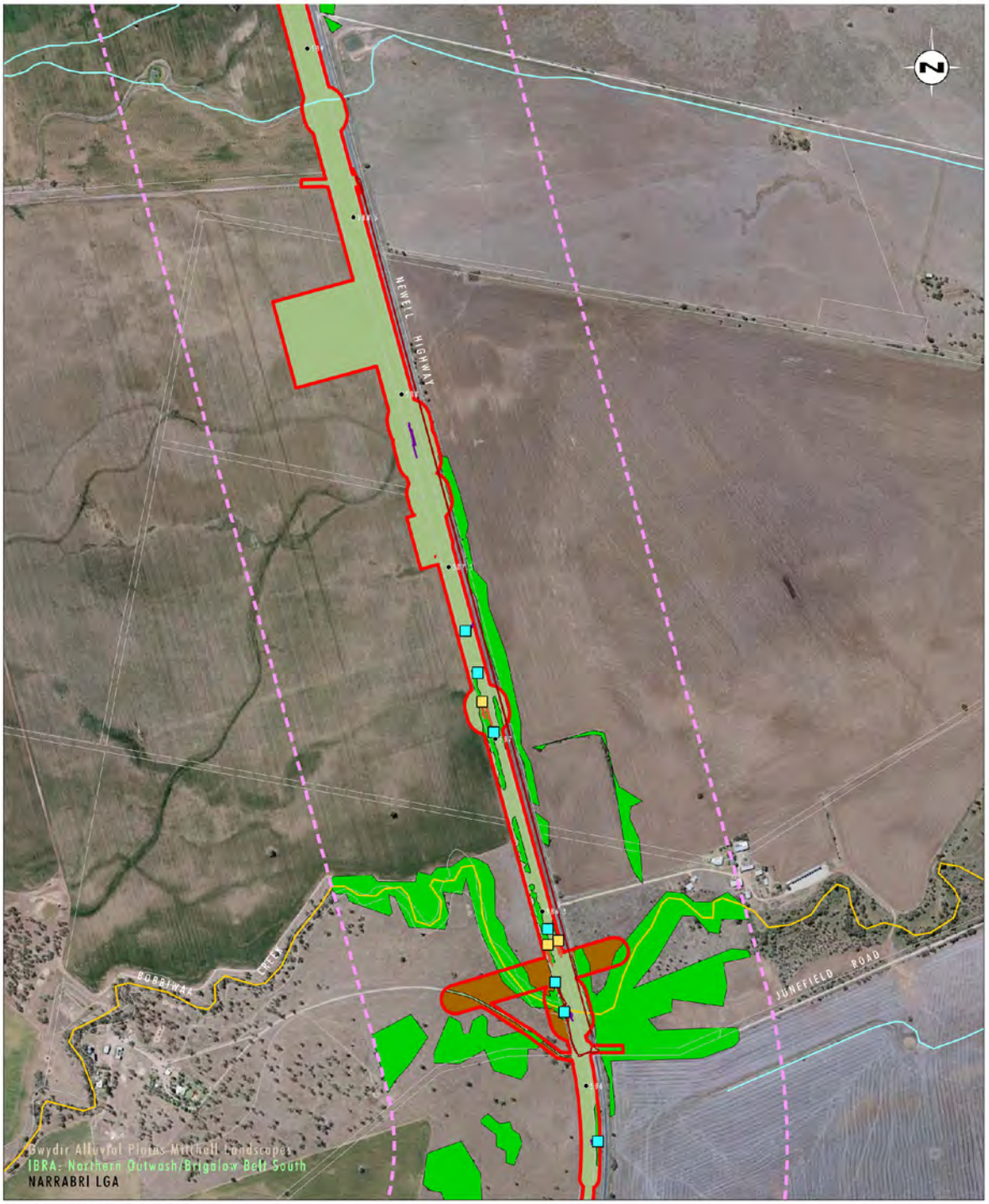


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A5

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_020.dgn
20160718 16.04

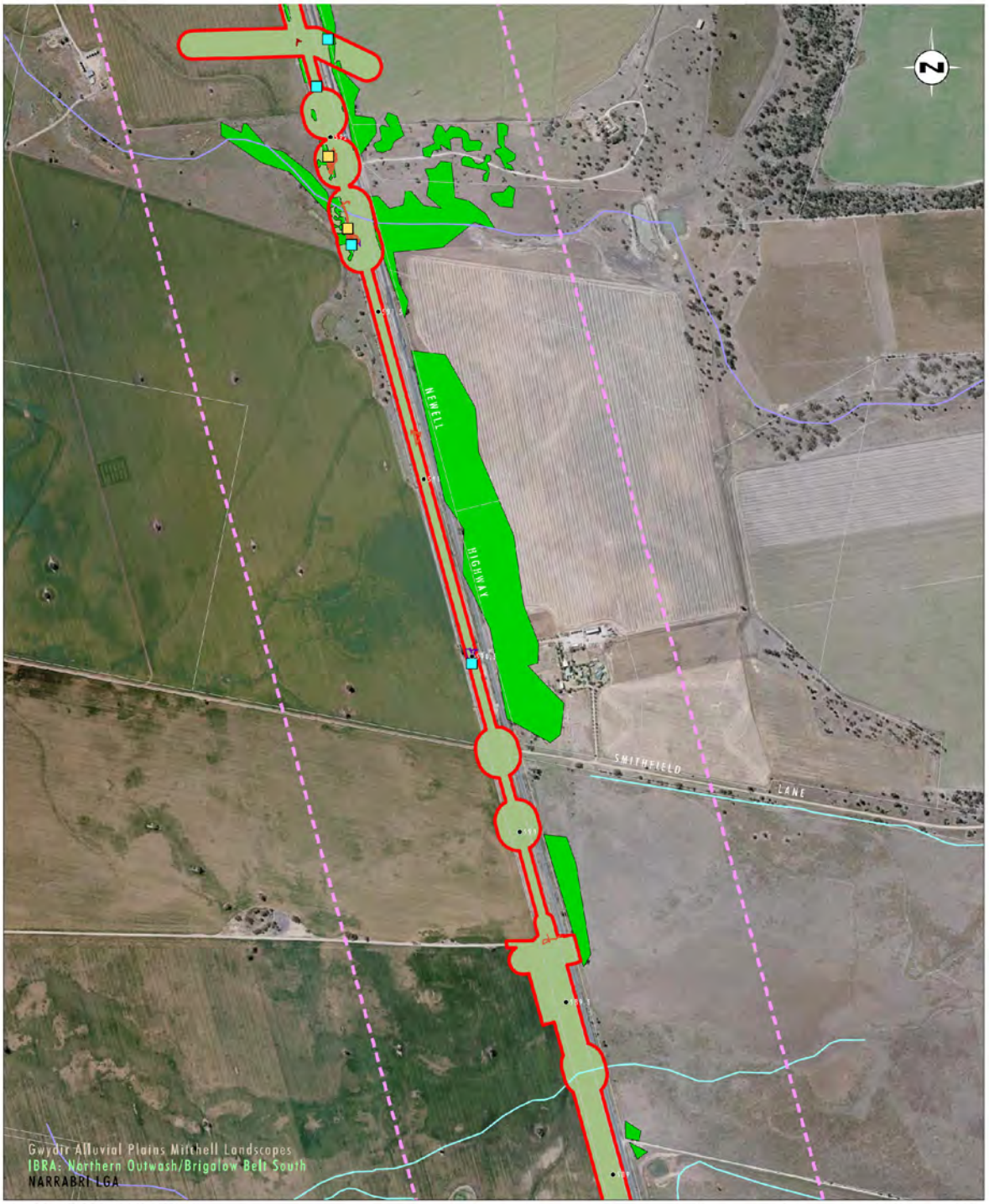


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A6

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_021.dgn
20160718 16.04

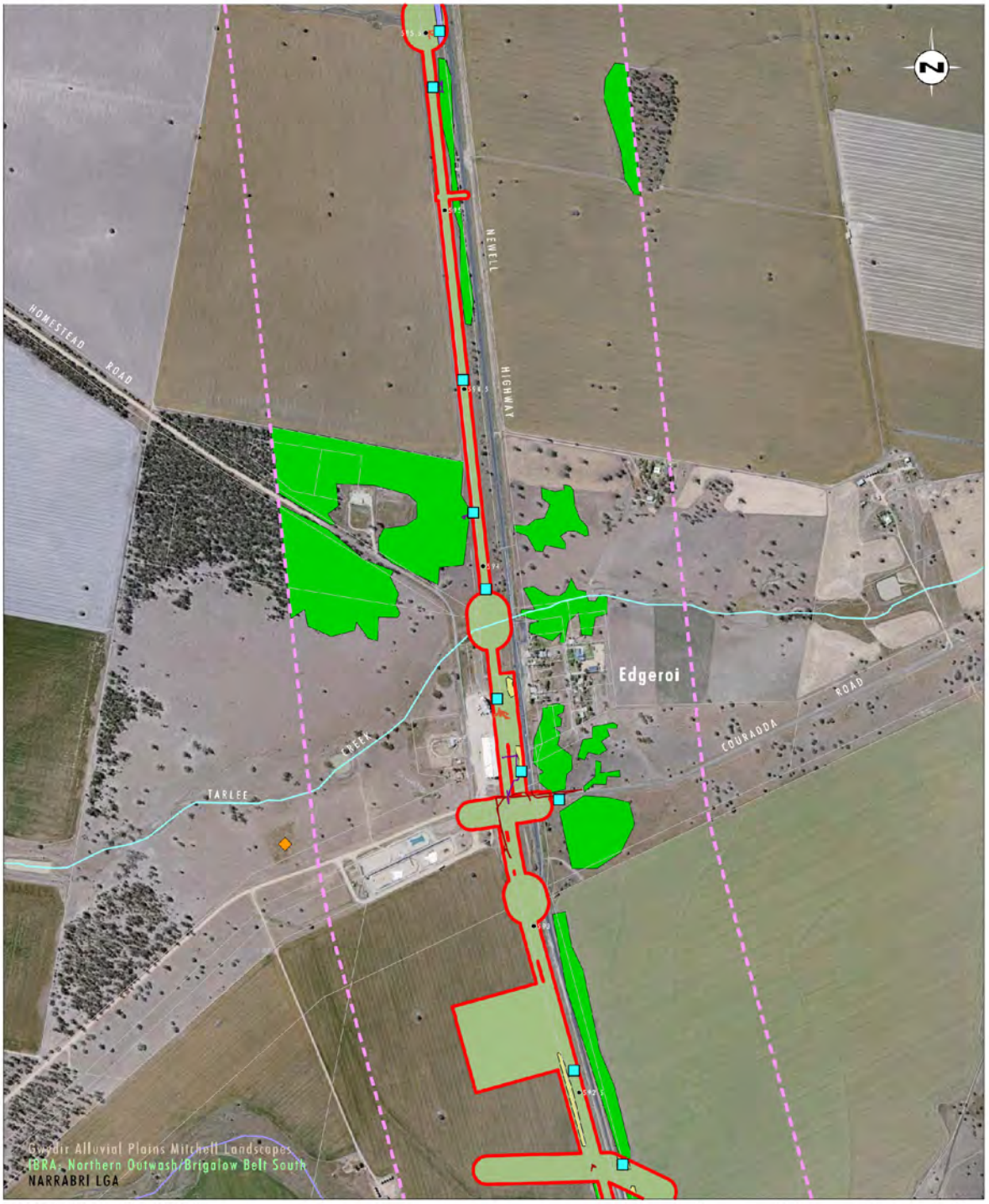


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A7

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_022.dgn
20160718 16.04

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A8

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_023.dgn
20160718 16.05

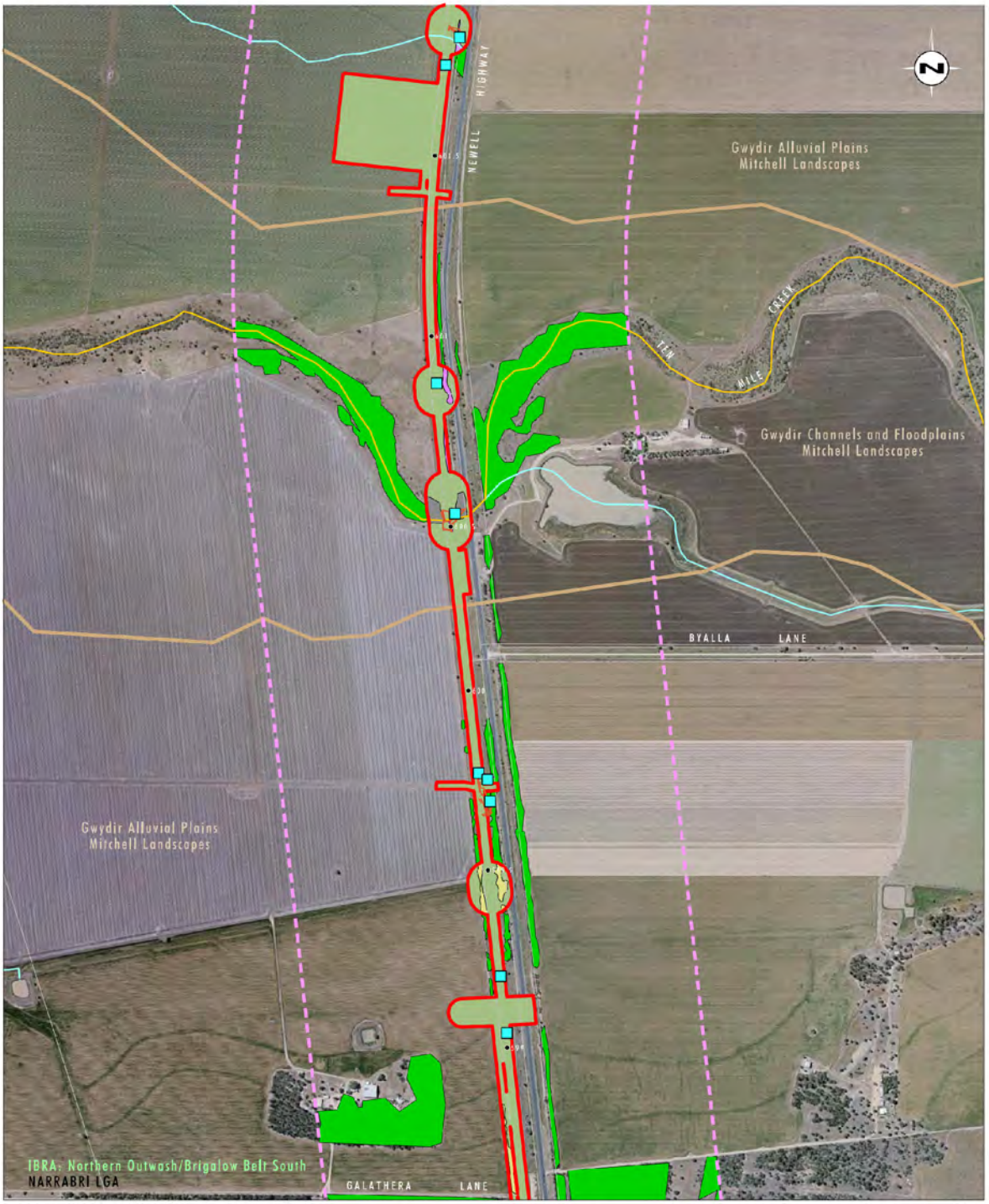


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A9

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_024.dgn
20160718 16.05

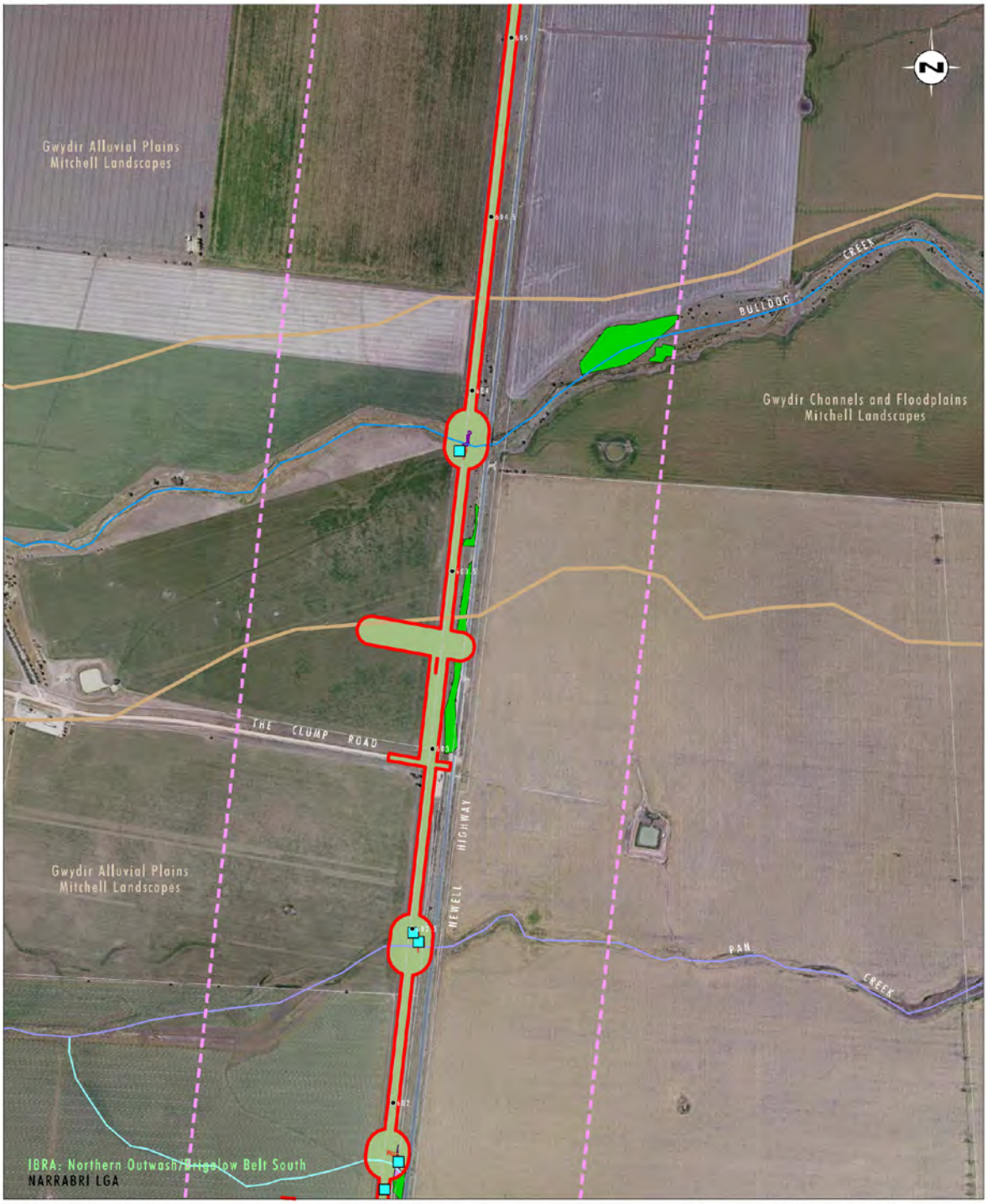


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A10

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_025.dgn
20160718 16.06

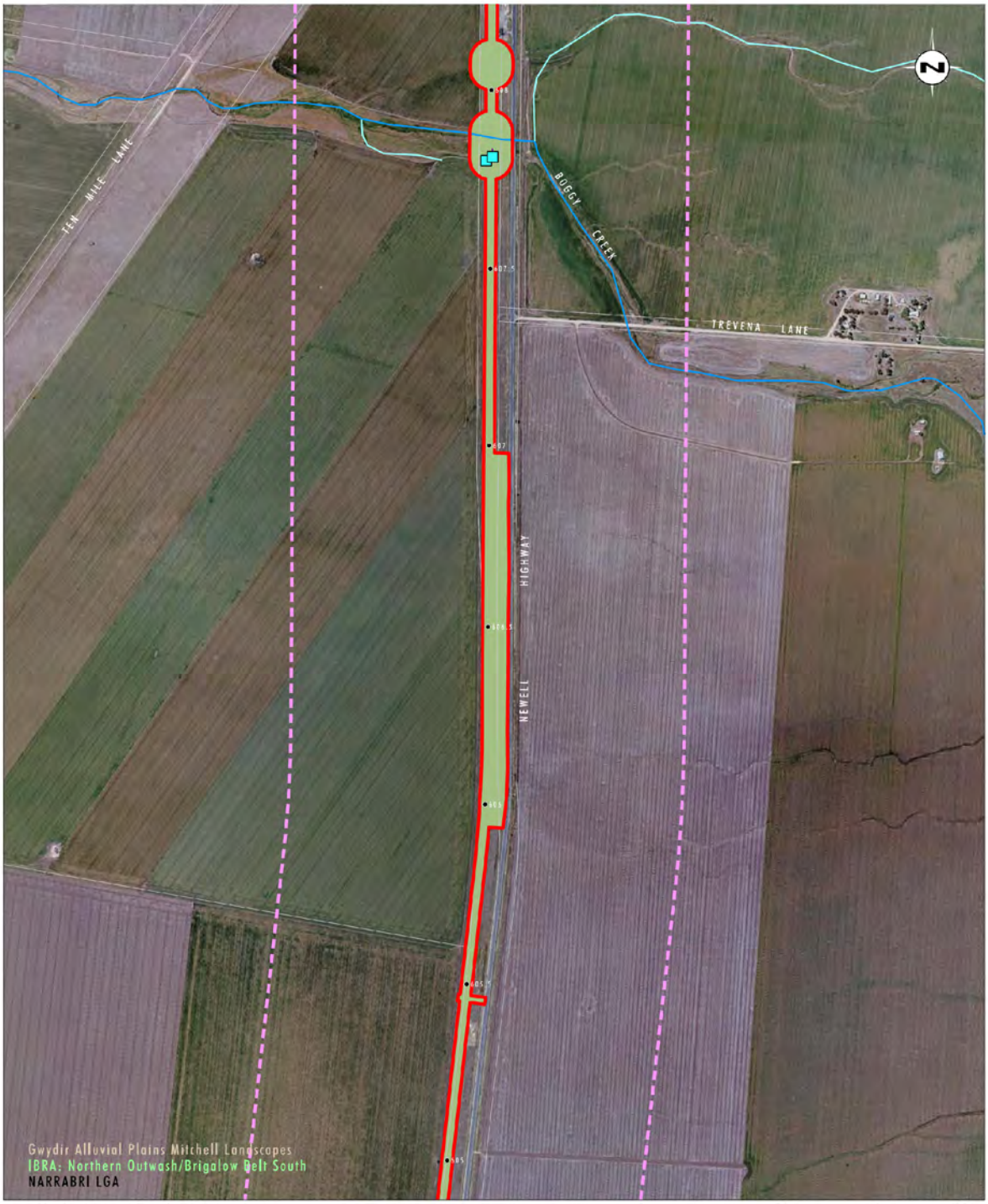


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A11

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_026.dgn
20160718 16.06

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A12

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_027.dgn
20160718 16.07

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A13

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_028.dgn
20160718 16.07

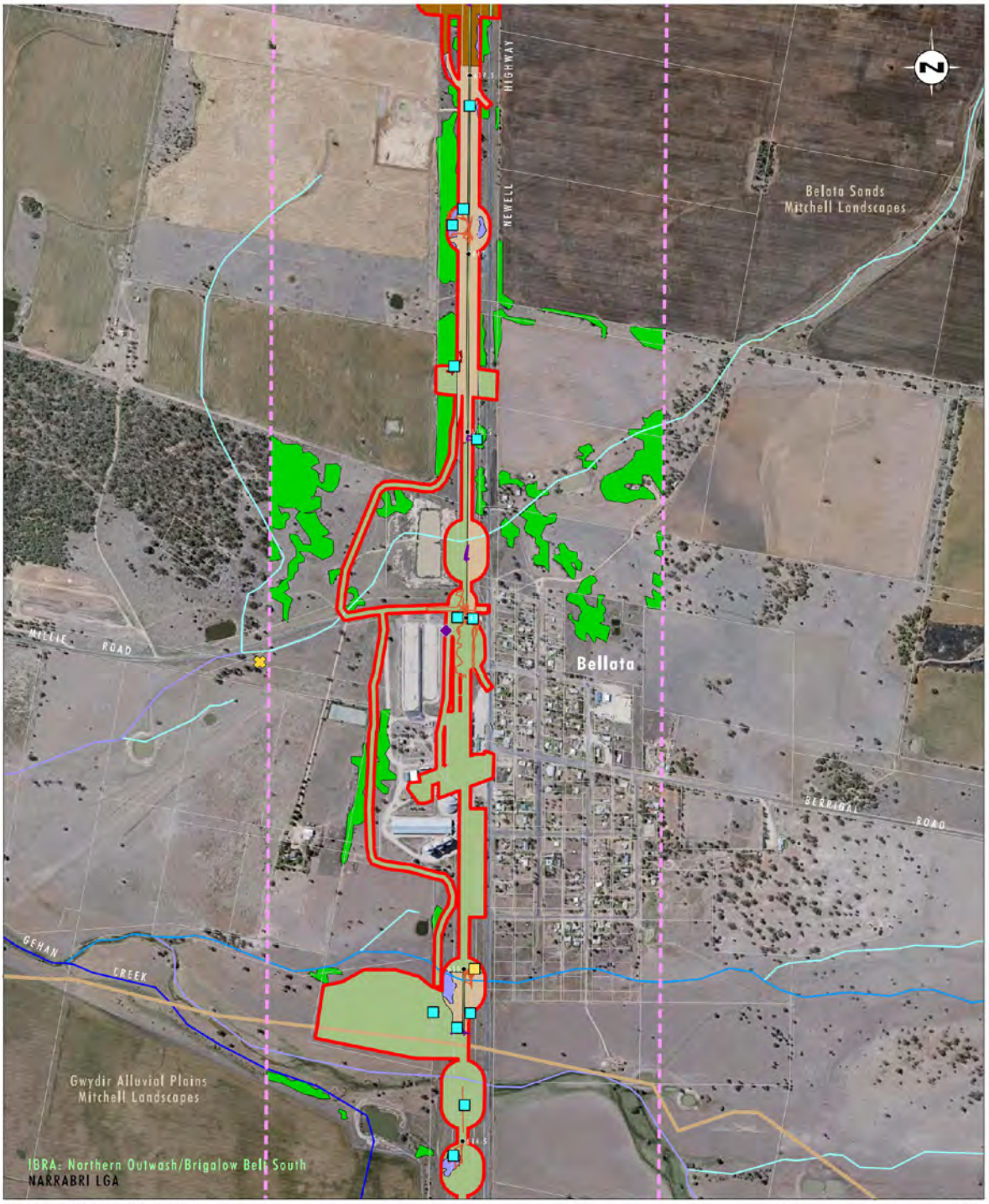


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A14

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_029.dgn
20160718 16.08

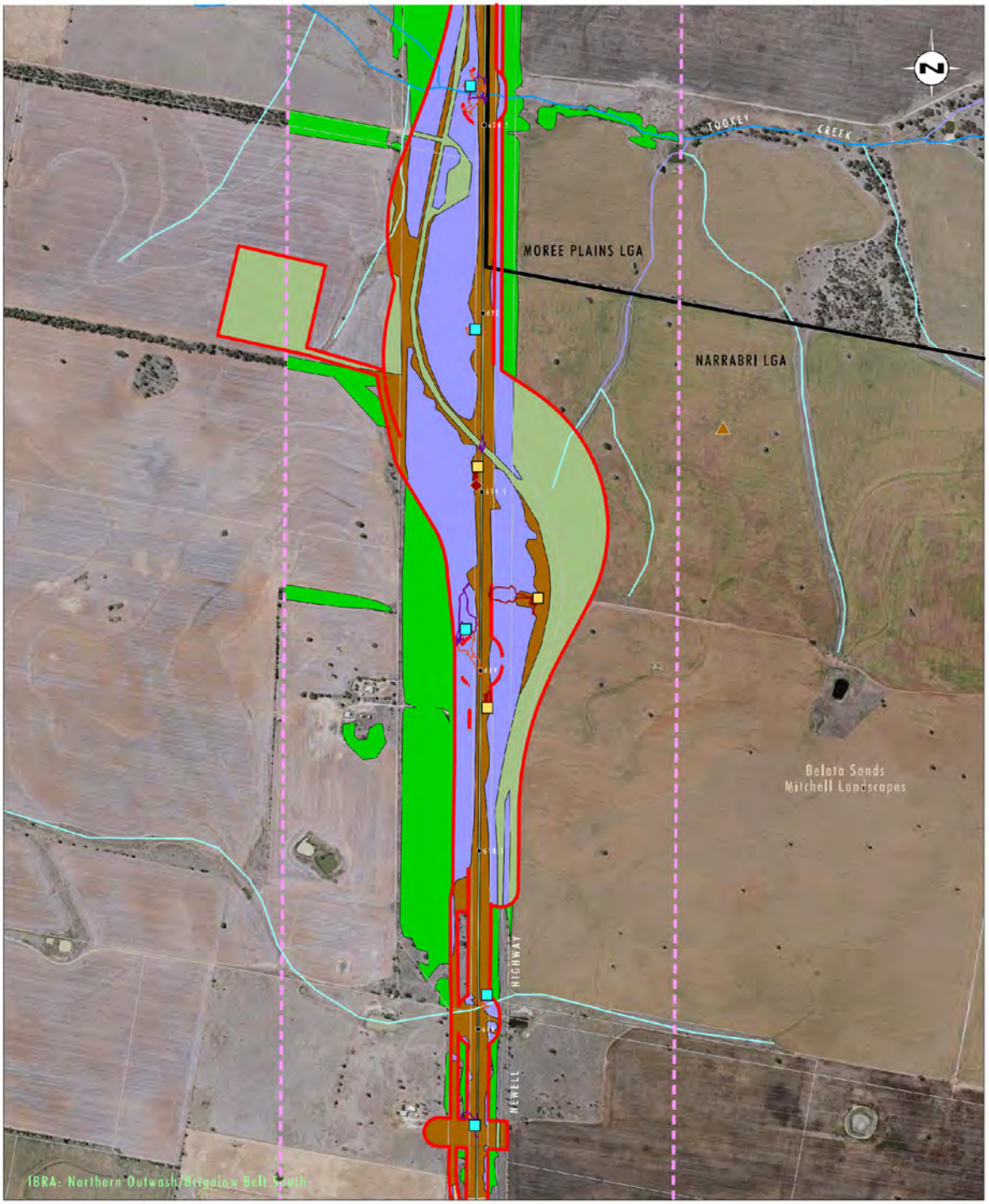


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Local Government Area
- Rail Line Chainage

FIGURE A15

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_030.dgn
20160718 16.08

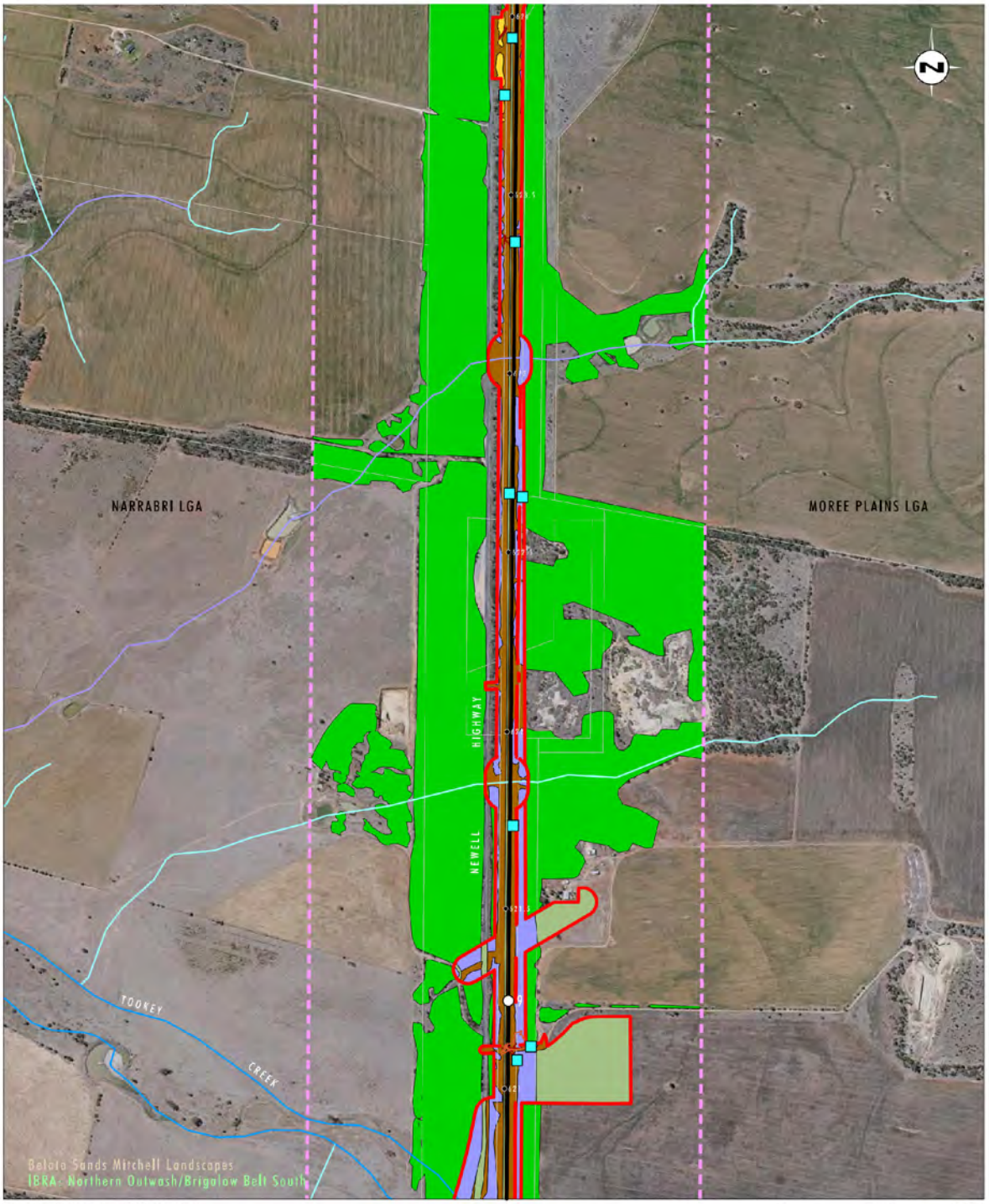


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Local Government Area
- Rail Line Chainage

FIGURE A16

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_031.dgn
20160718 16.08

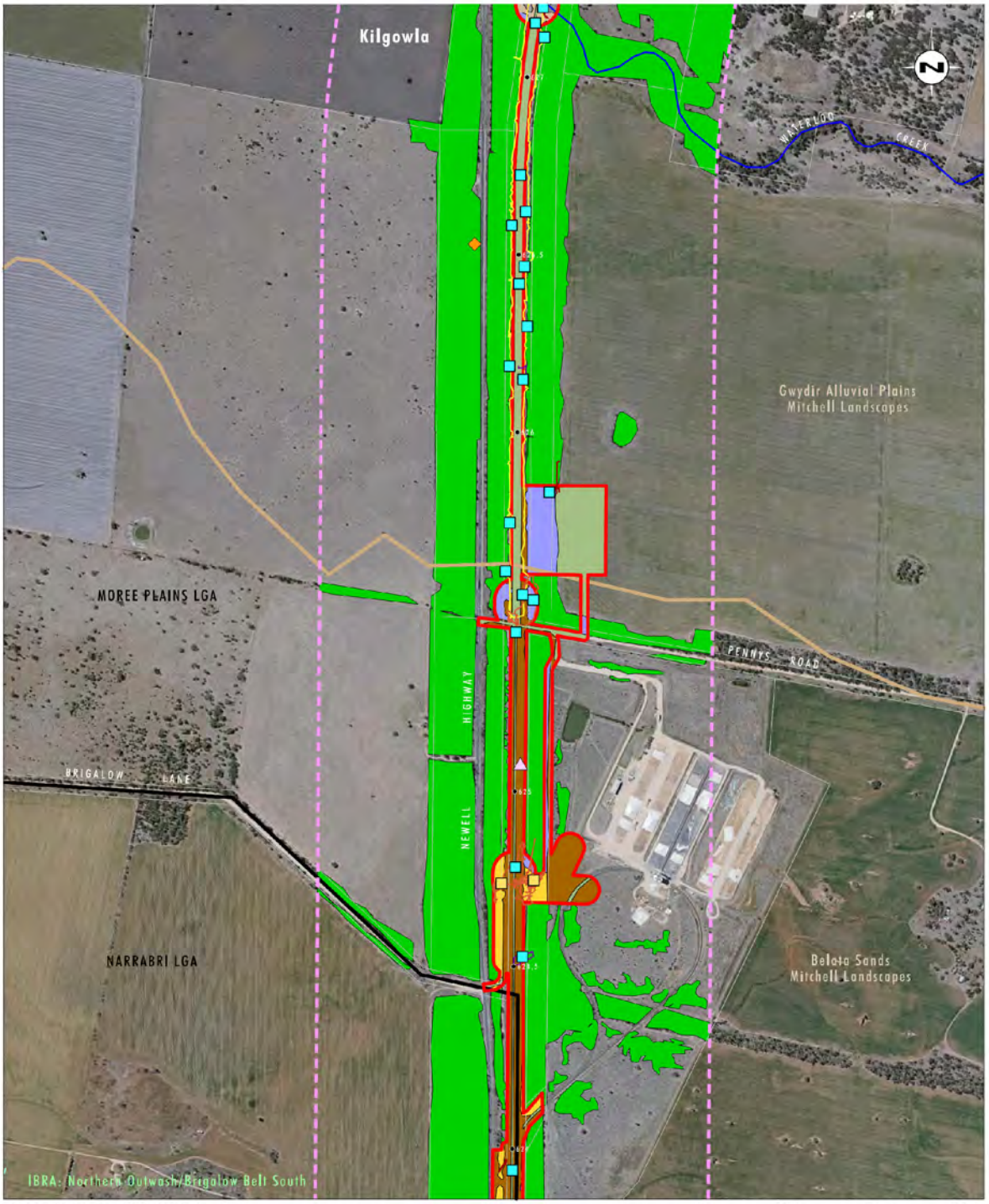


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Local Government Area
- Rail Line Chainage

FIGURE A17

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_032.dgn
20160718 16.10

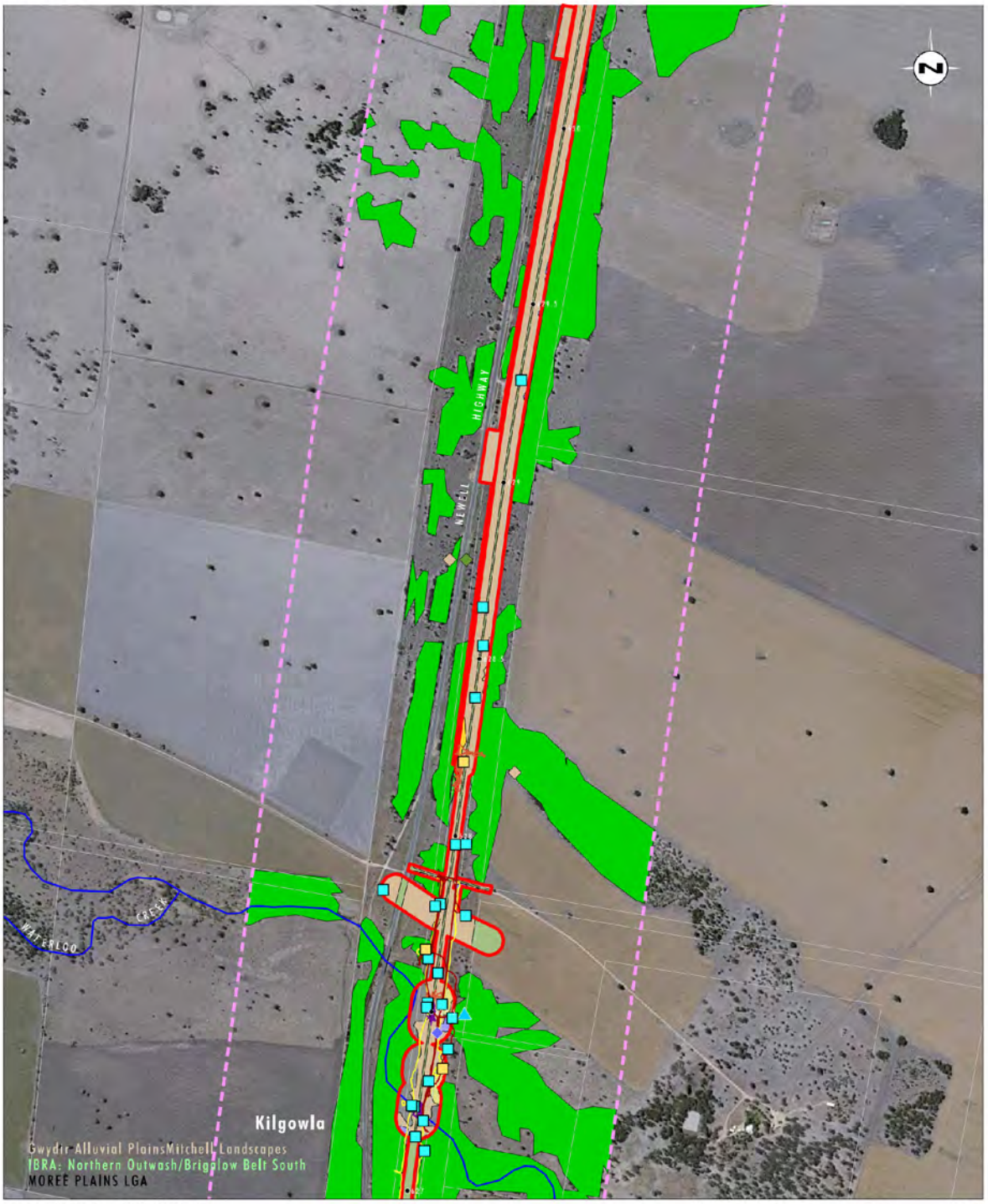


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A18

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_033.dgn
20160718 16.10

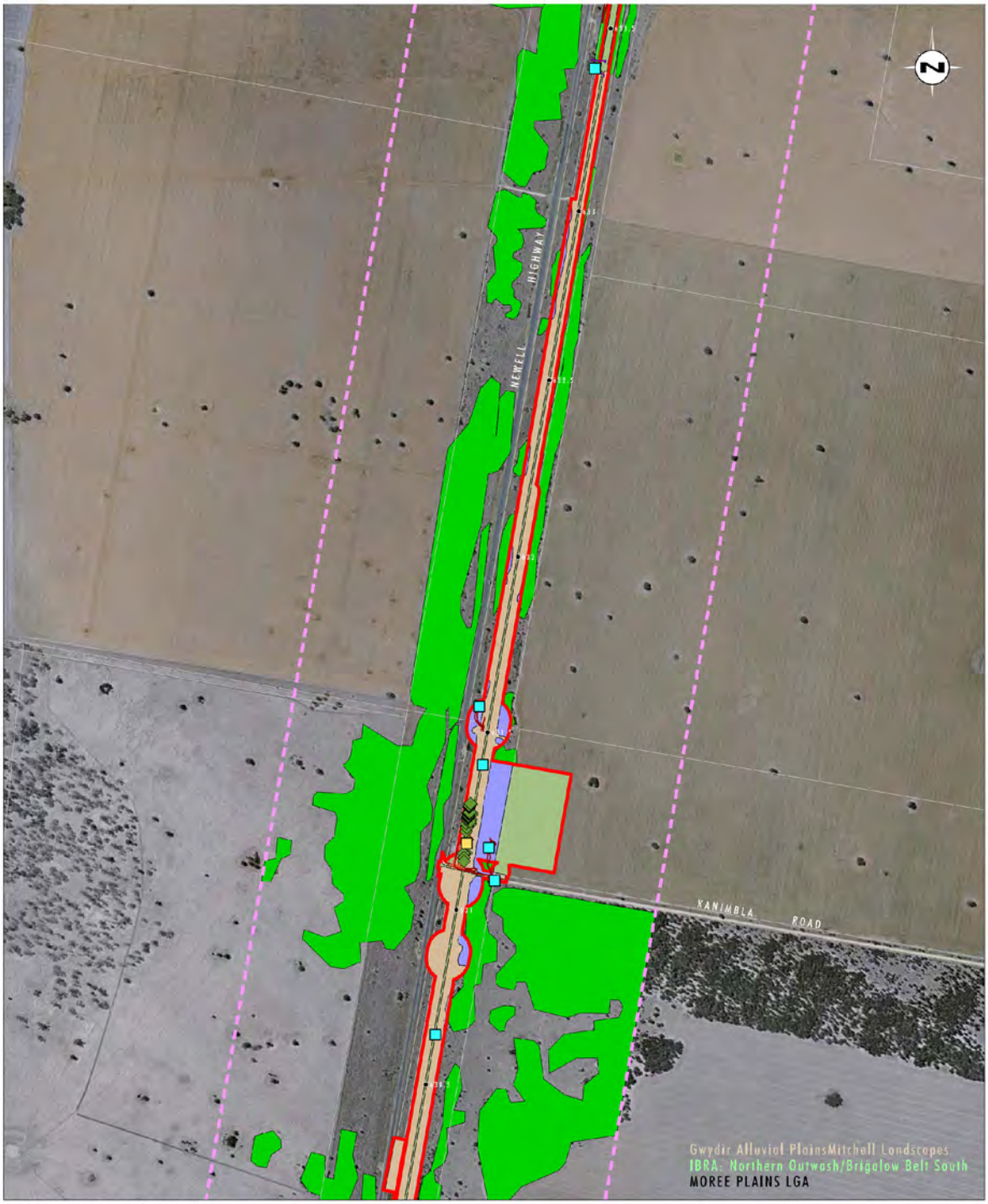


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A19

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_034.dgn
20160718 16.11

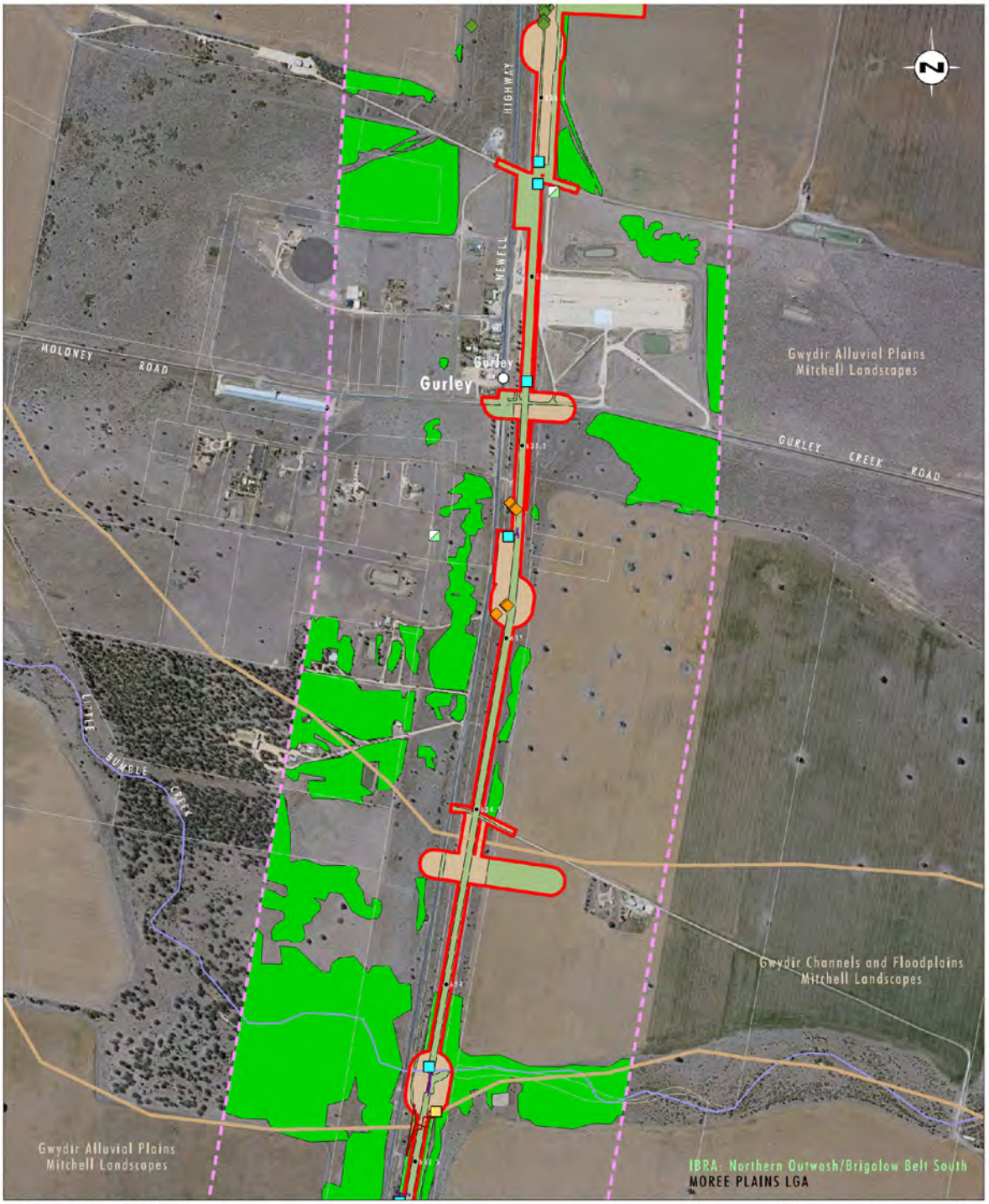


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A20

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_035.dgn
20160718 16.11

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A21

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_036.dgn
20160718 16.12

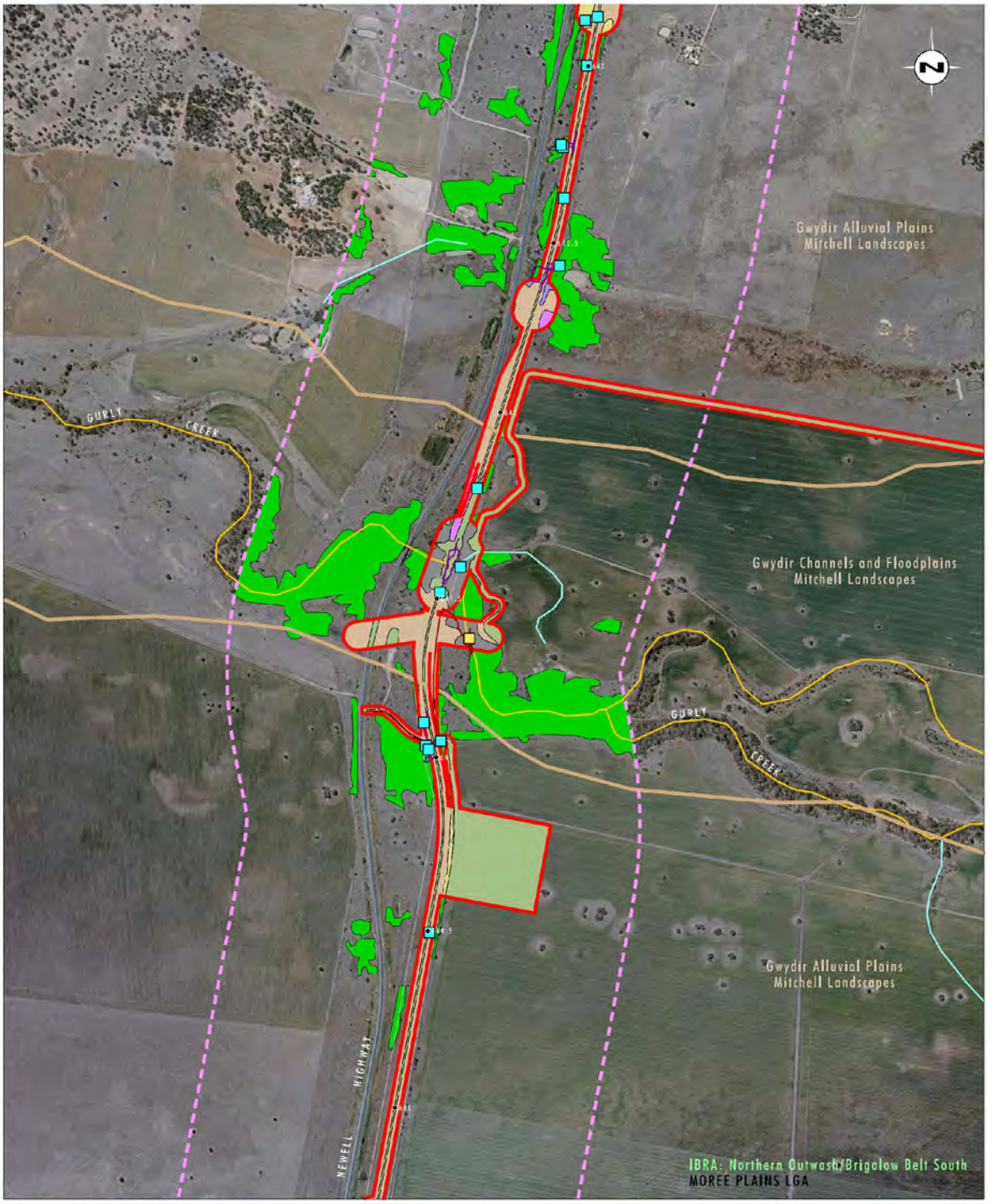


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A22

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_037.dgn
20160718 16.12

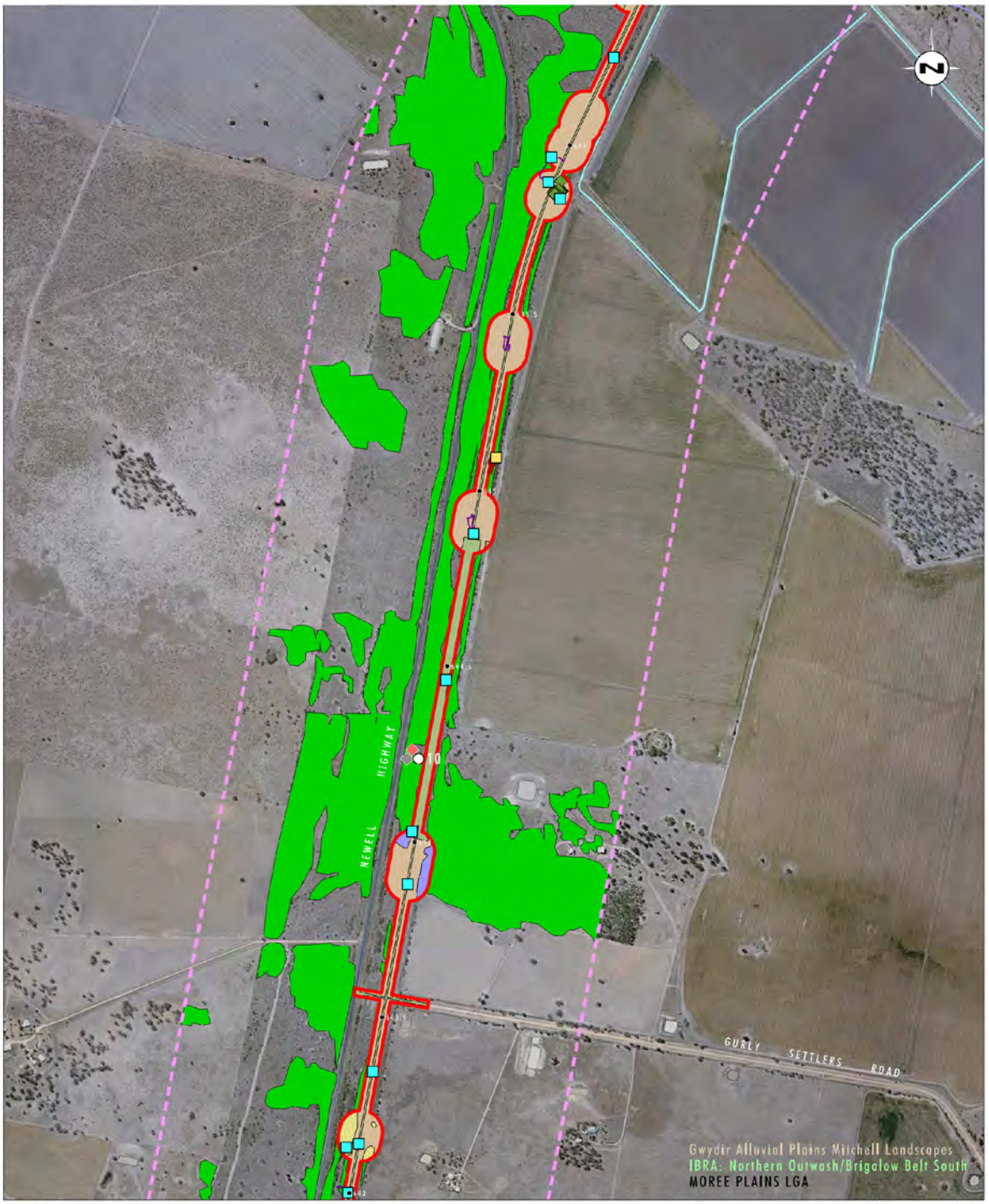


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A23

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_038.dgn
20160718 16.30

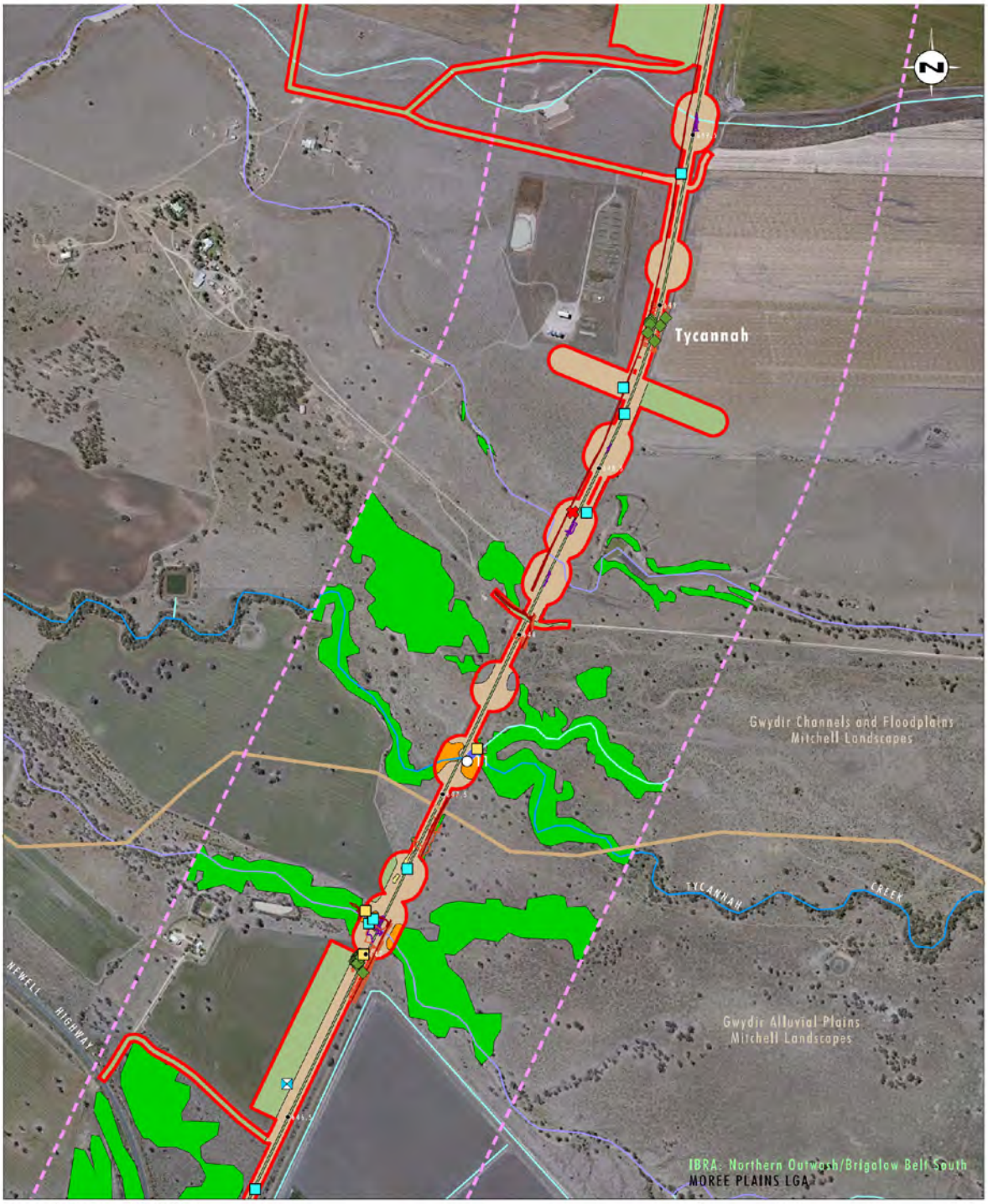


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A24

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_039.dgn
20160718 16.31

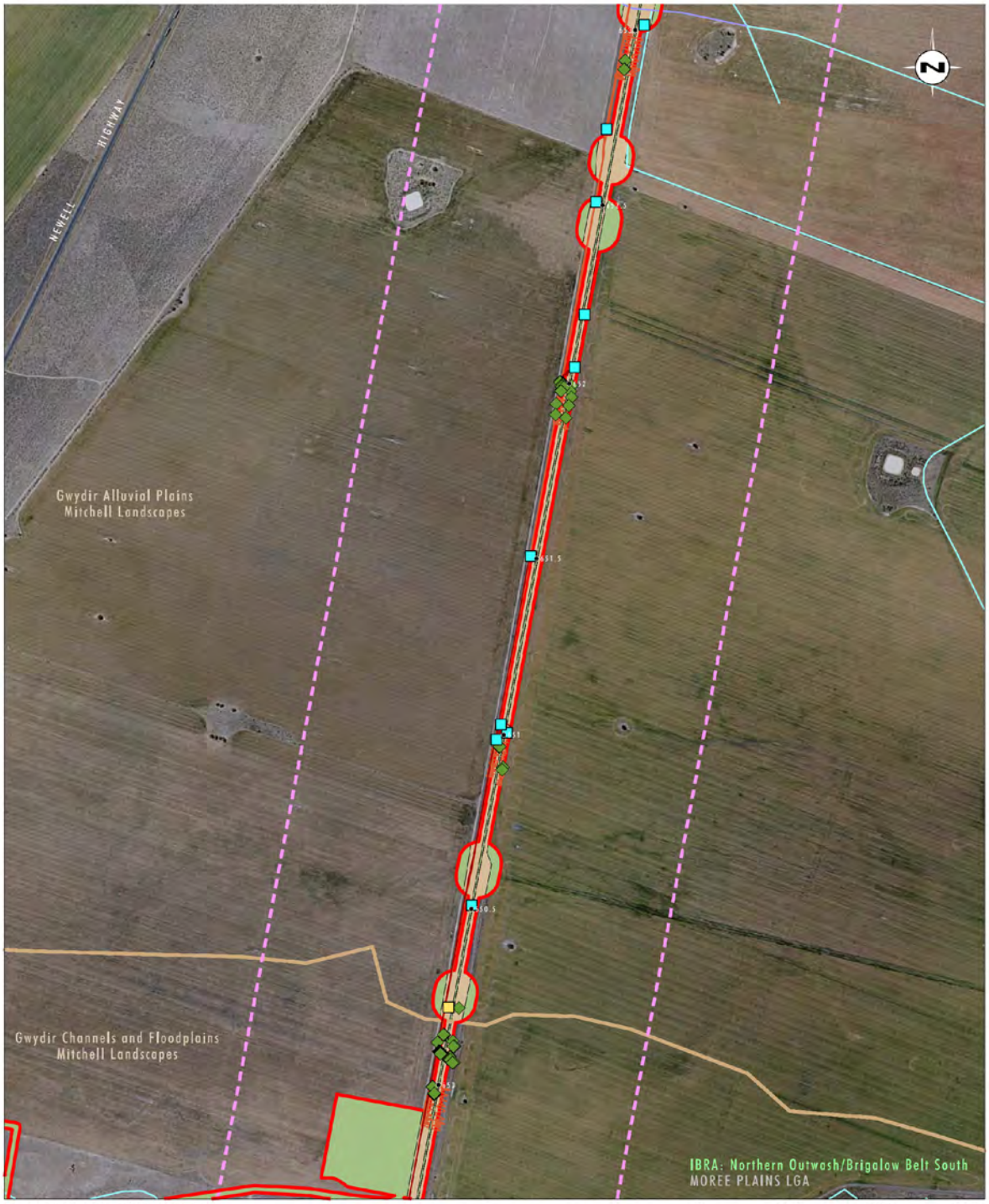


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A25

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_040.dgn
20160718 16.31

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A26

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_041.dgn
20160718 16.33

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A27

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_042.dgn
20160718 16.33

umwelt

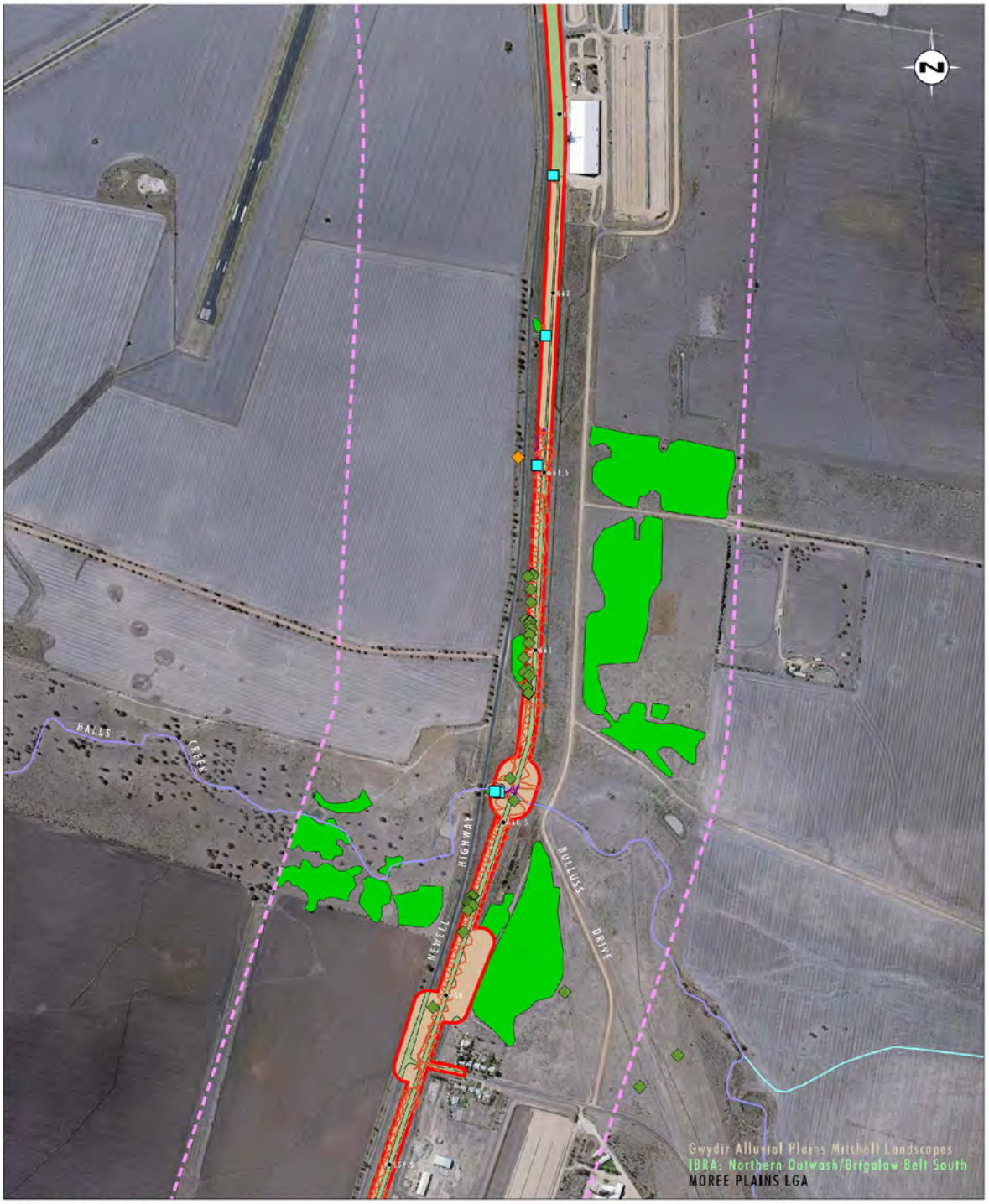


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A28

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_043.dgn
20160718 16.34

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A29

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_044.dgn
20160718 16.34

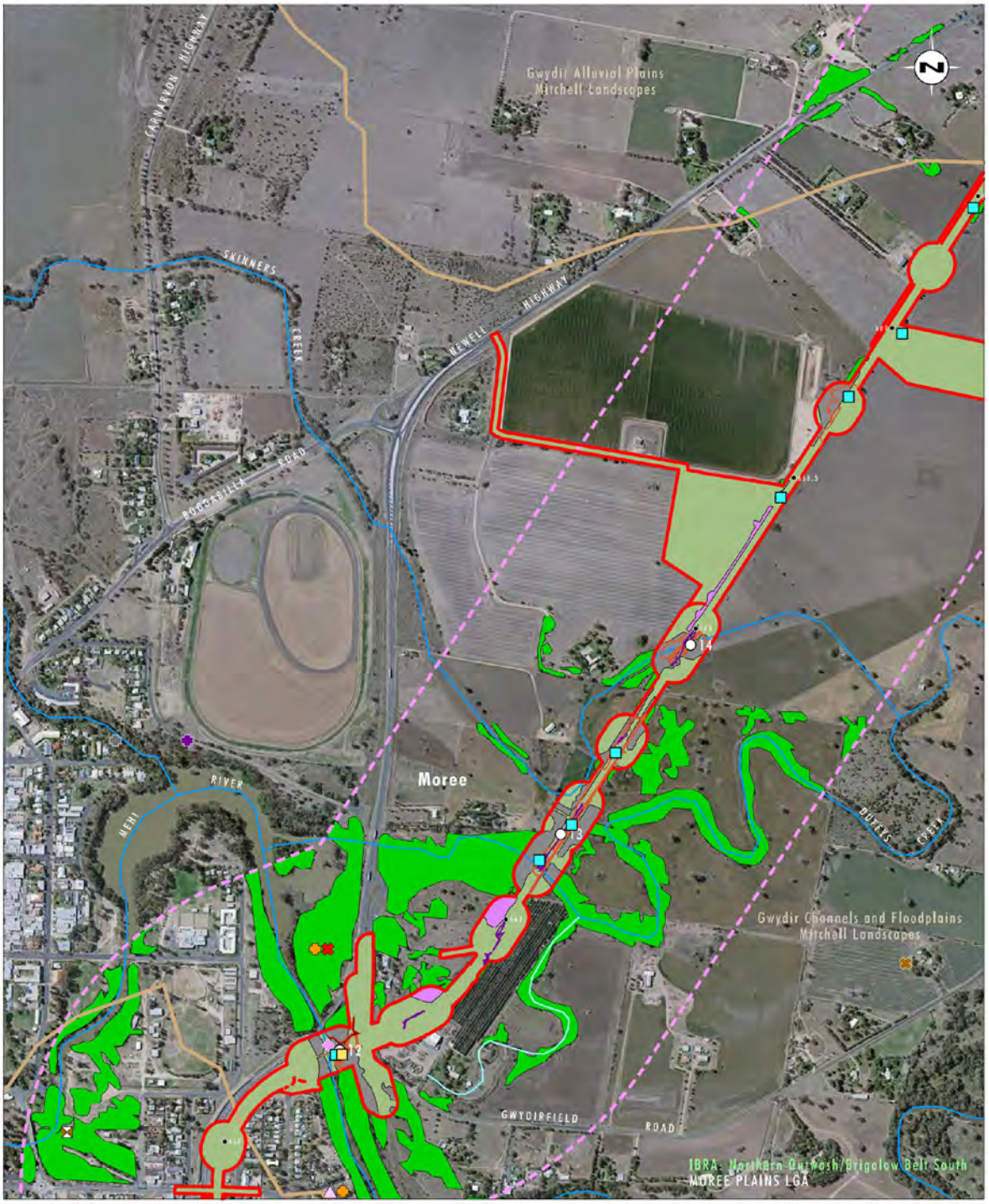


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A30

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_045.dgn
20160718 16.35

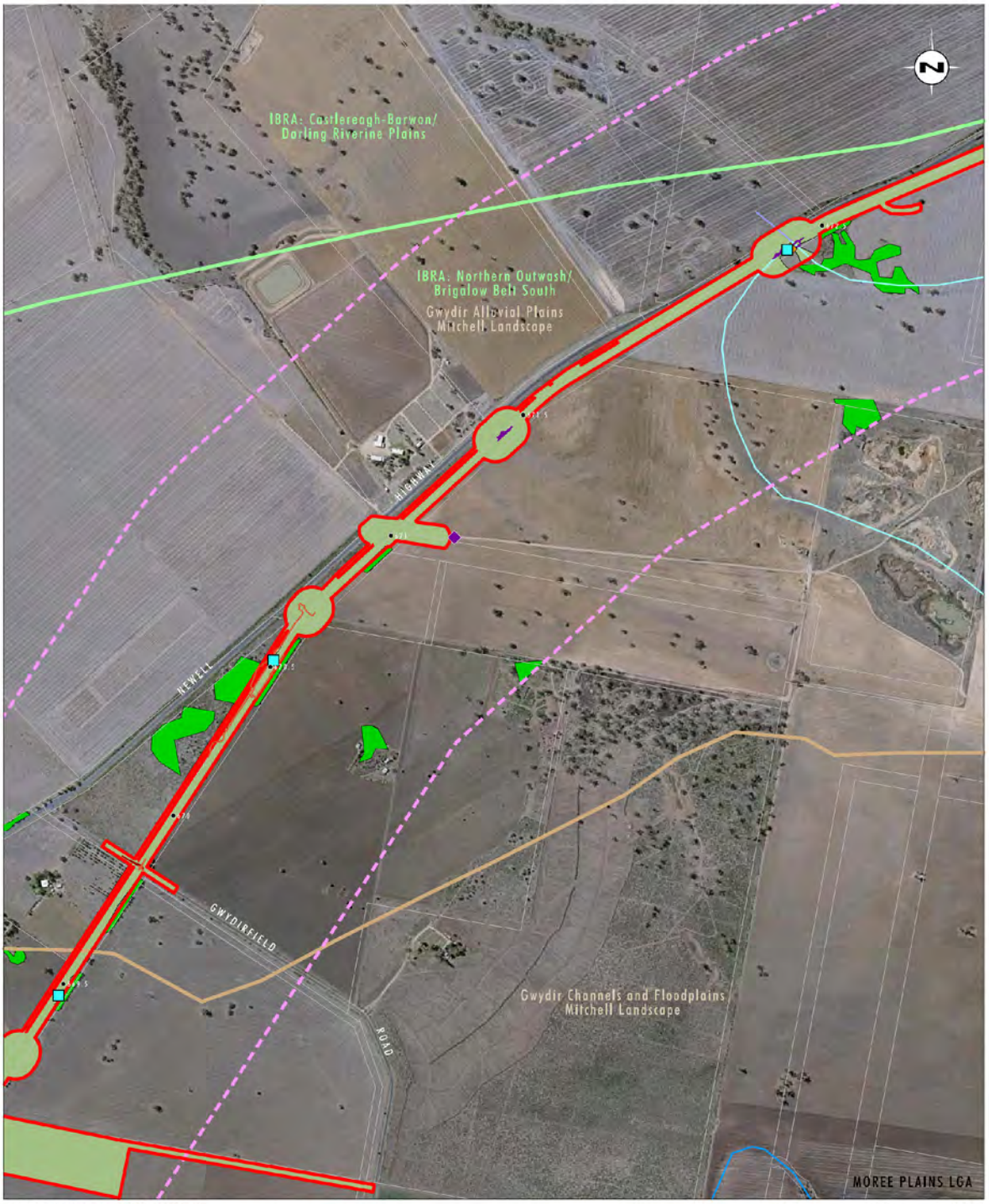


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A31

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_046.dgn
20160718 16.35

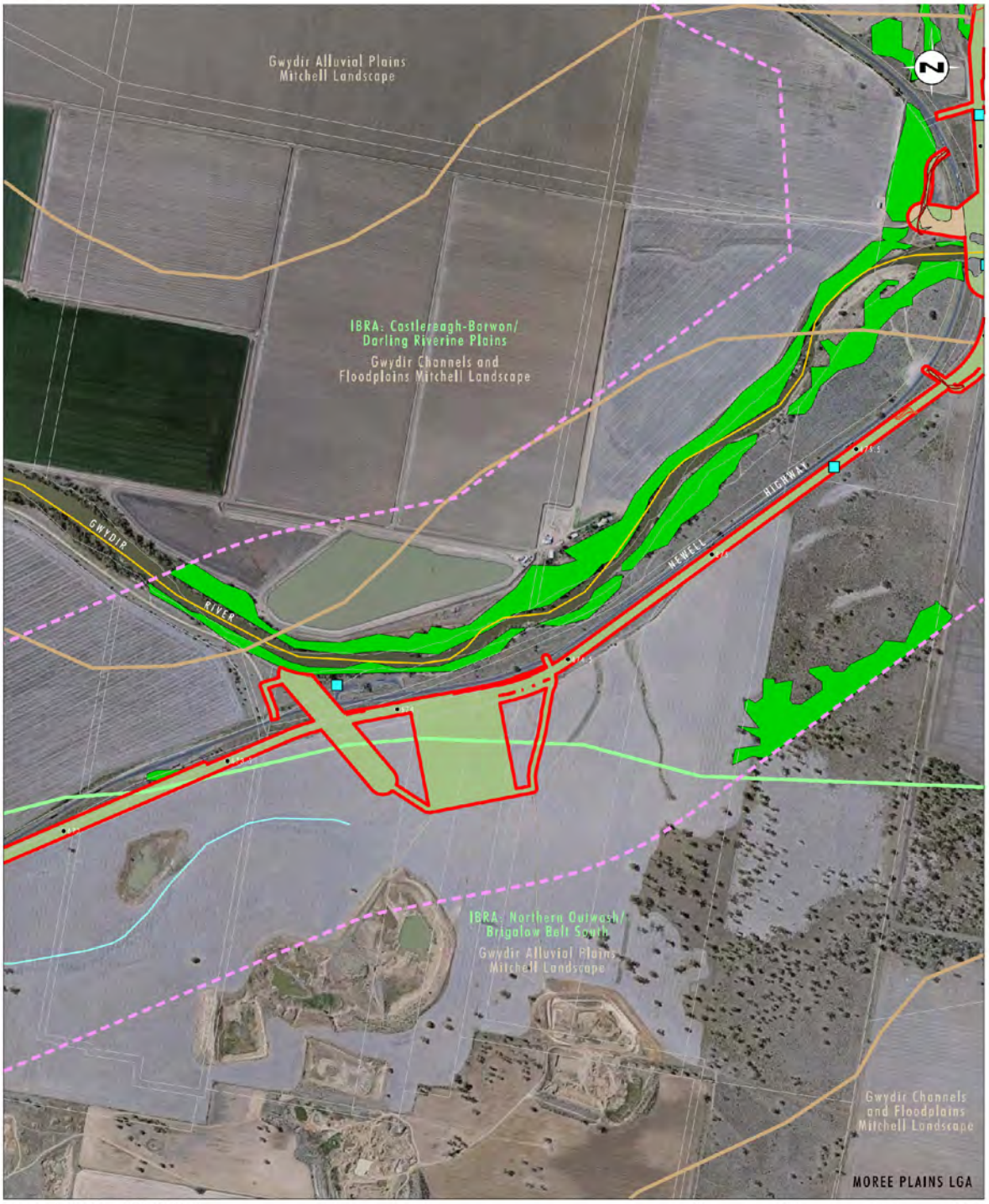


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A32

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_047.dgn
20160601 16:19

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A33

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_048.dgn
20160718 16.36

umwelt

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend
- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A34

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_049.dgn
20160718 16.36

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A35

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_050.dgn
20160718 16.36

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A36

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_051.dgn
20160601 16.37

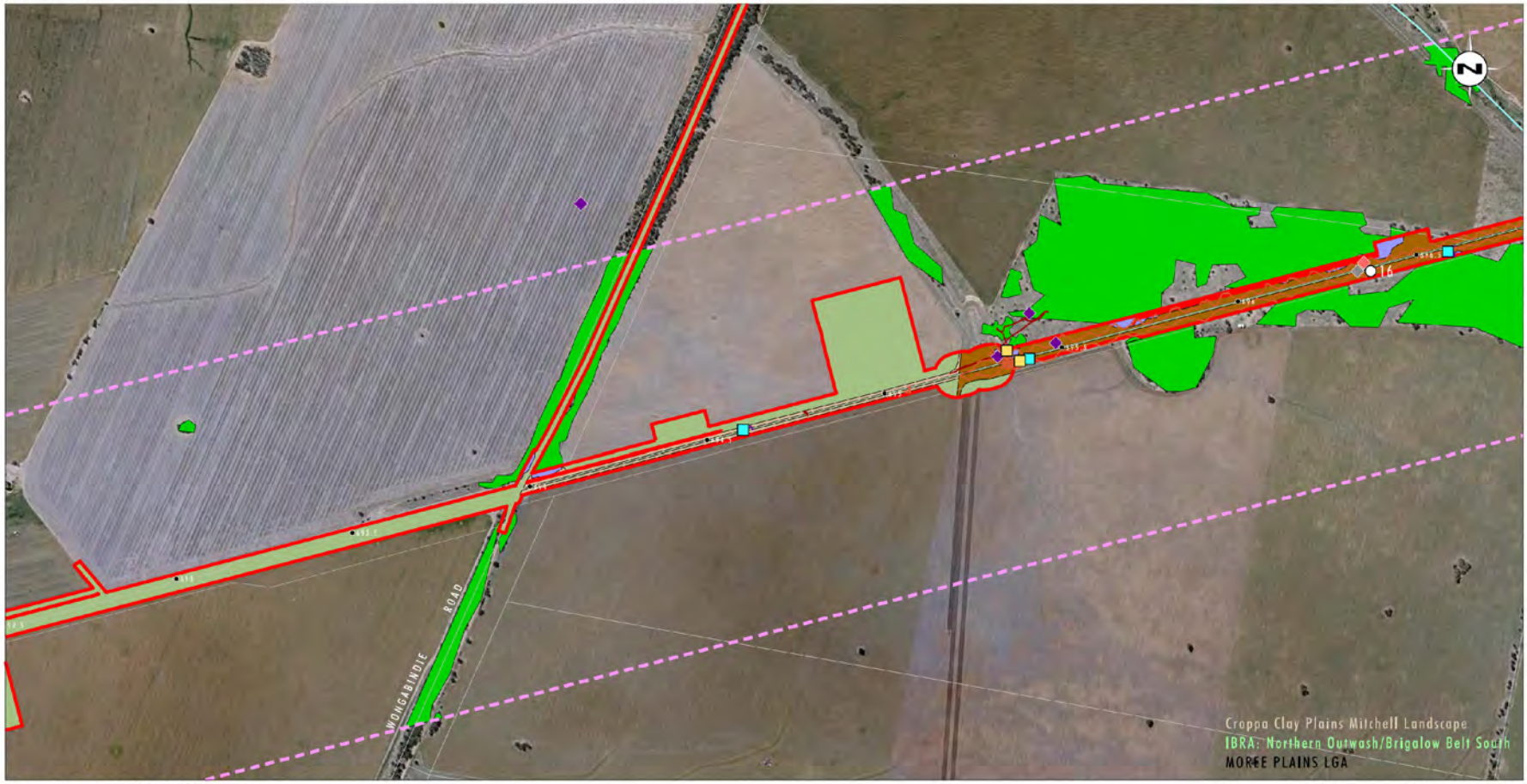


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A37

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_052.dgn
20160718 16.37

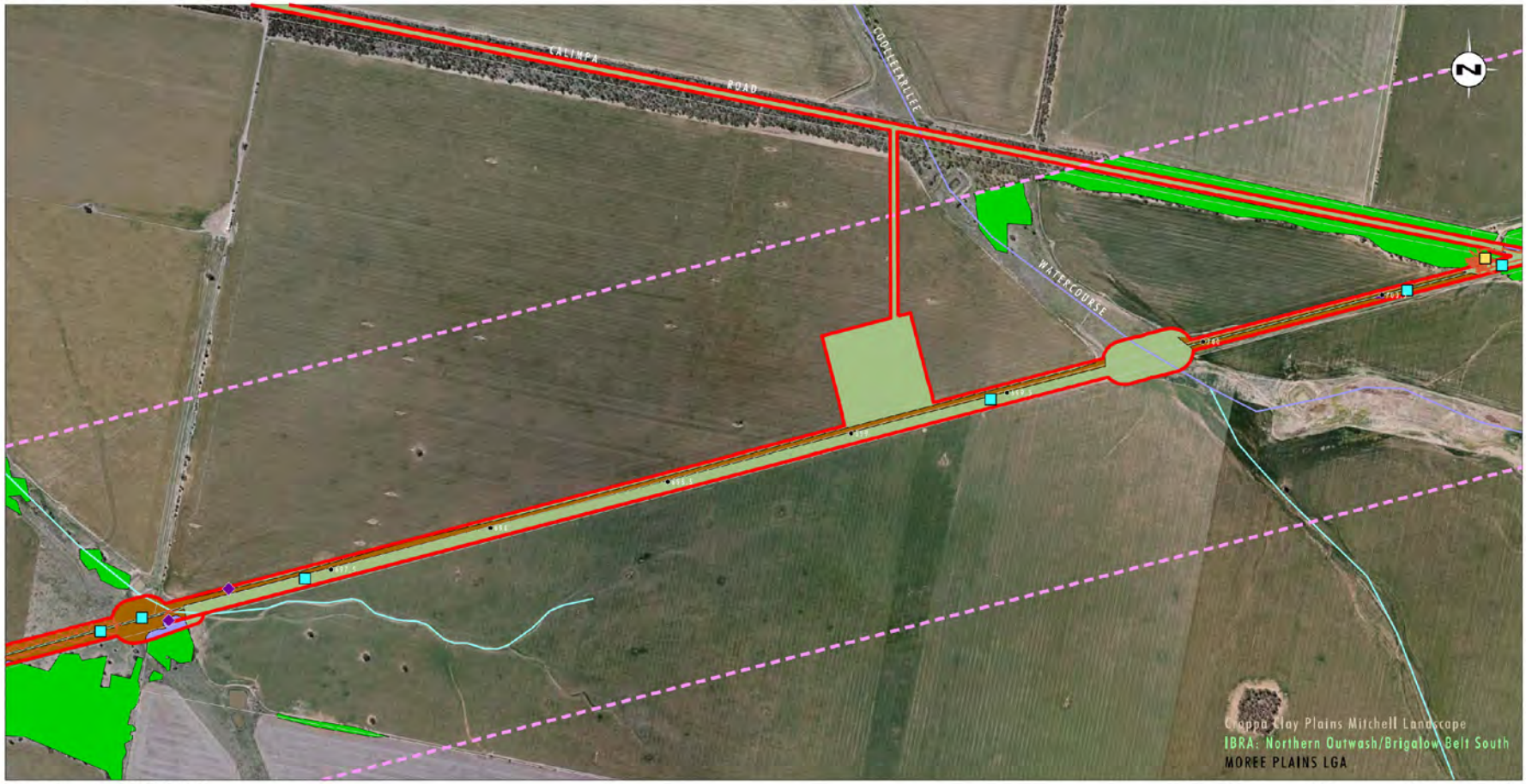


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A38

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_053.dgn
20160718 16.38

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Rail Line Chainage

FIGURE A39

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_054.dgn
20160718 16.38

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Local Government Area
- Rail Line Chainage

FIGURE A40

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_055.dgn
20160718 16.38

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:1155 00000

Legend

- Development Site
- 550m Buffer Area
- Local Government Area
- Rail Line Chainage

FIGURE A41

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_056.dgn
20160602 9.17

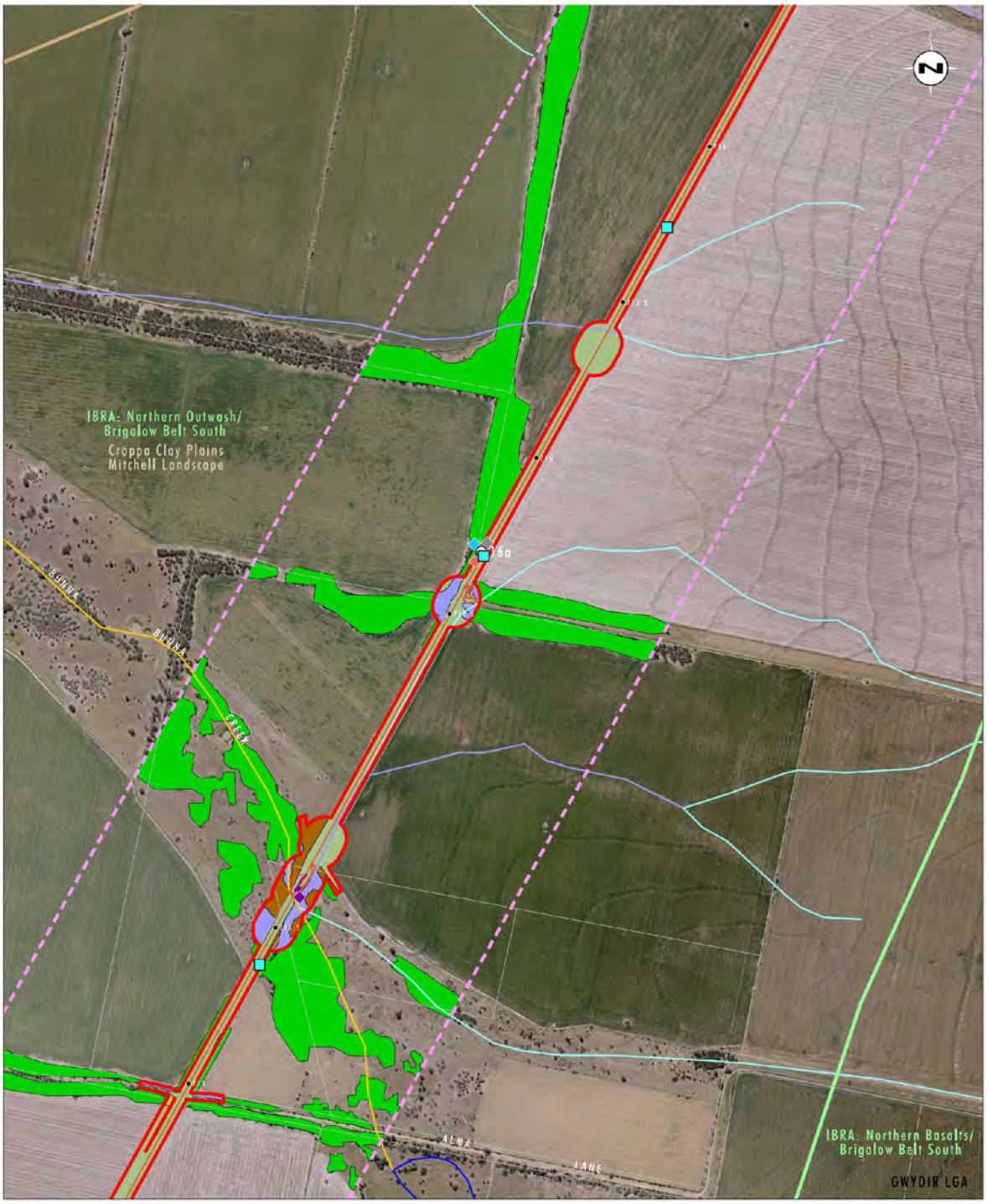


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A42

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_057.dgn
20160718 16.39

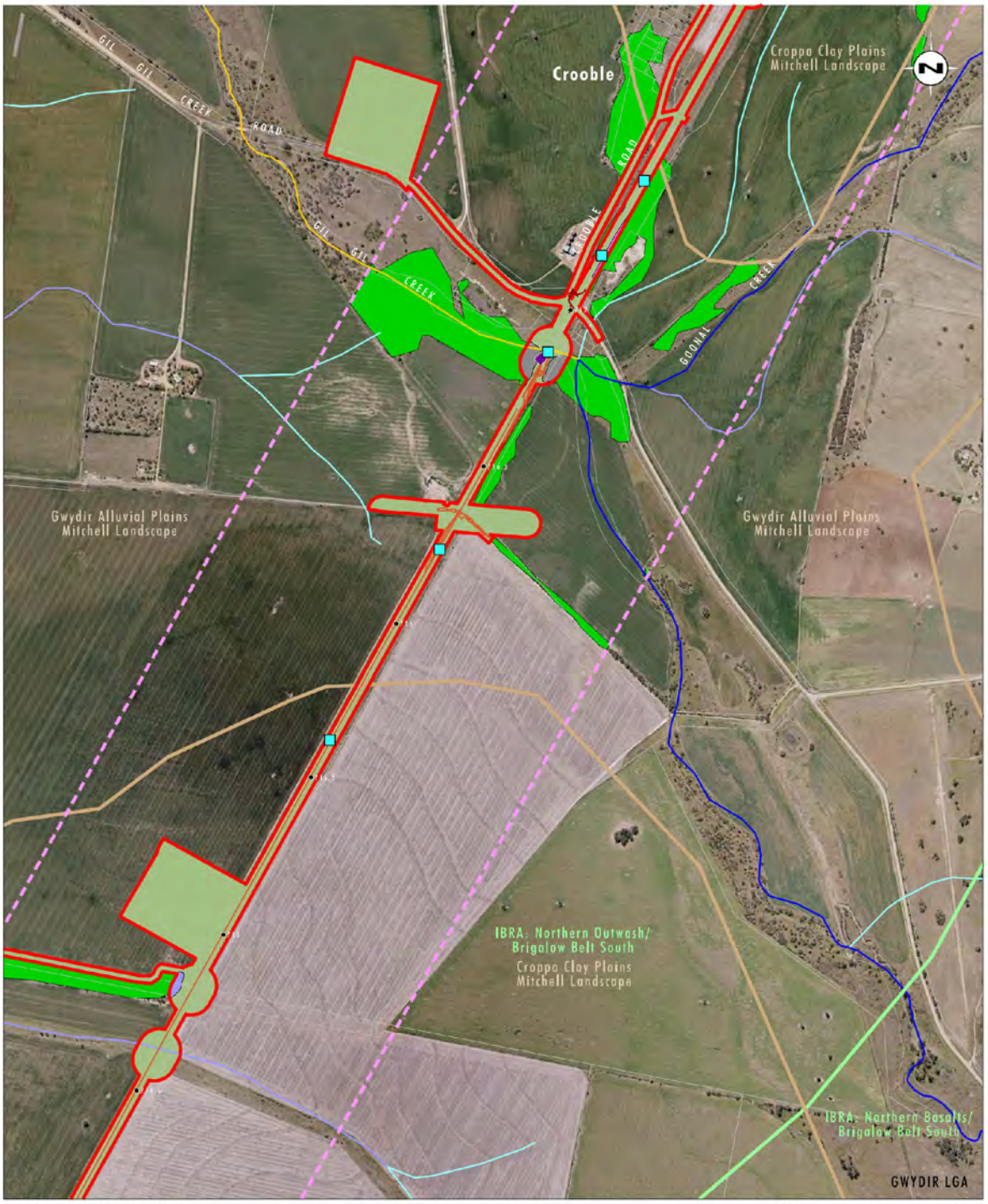


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A43

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_058.dgn
20160718 16.39

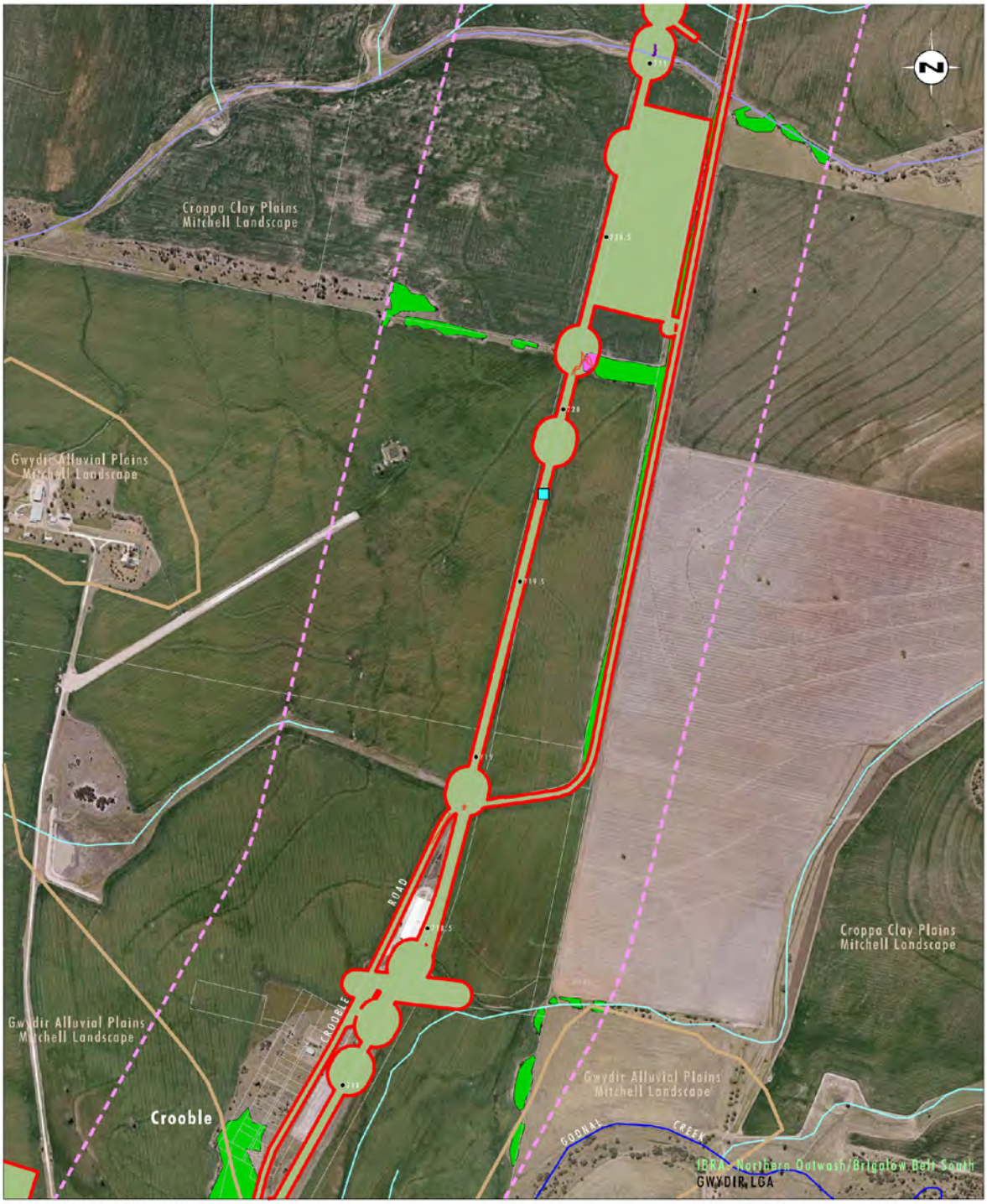


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A44

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_059.dgn
20160609 16.36

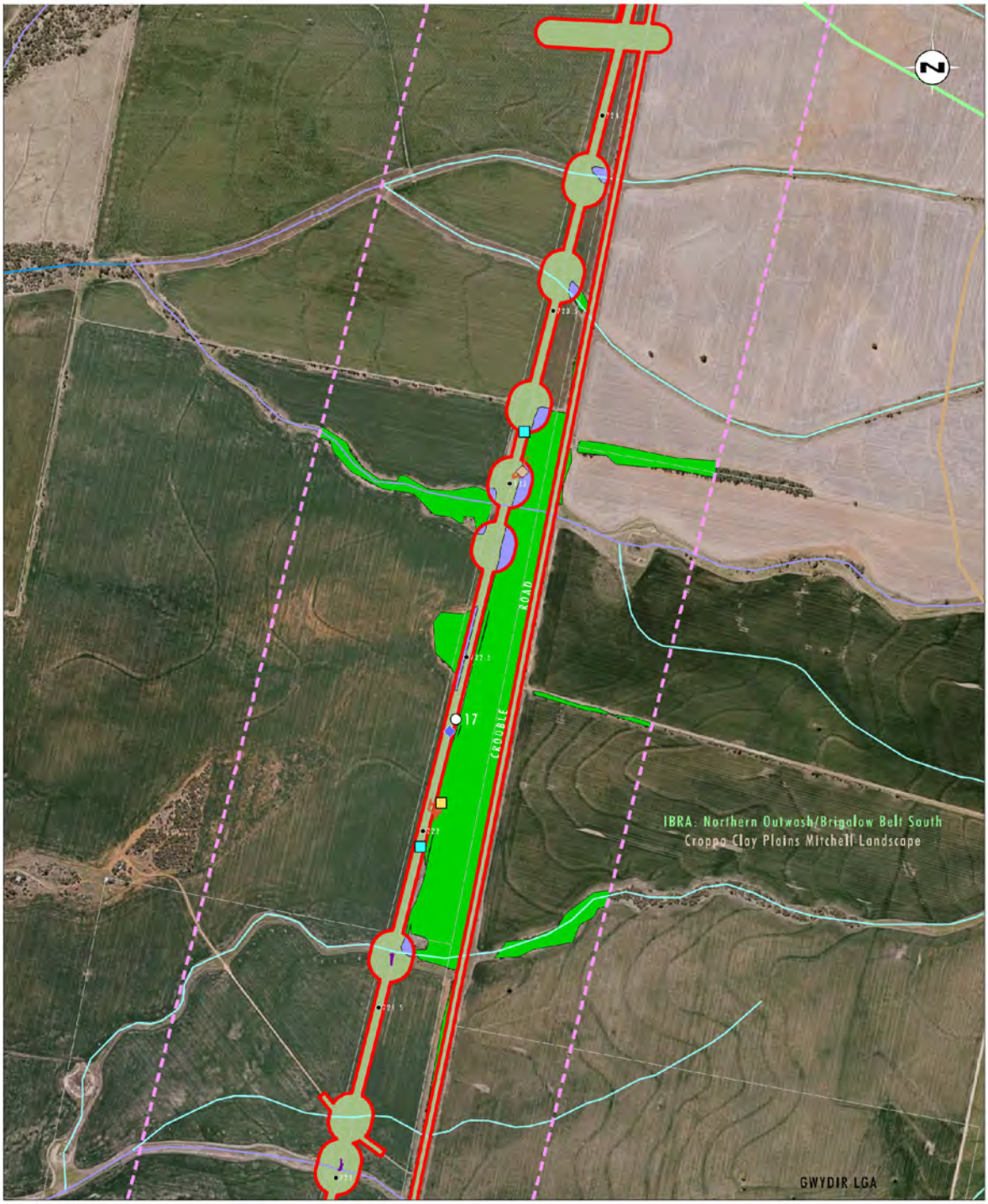


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A45

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_060.dgn
20160718 16.40

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A46

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_061.dgn
20160602 9.51

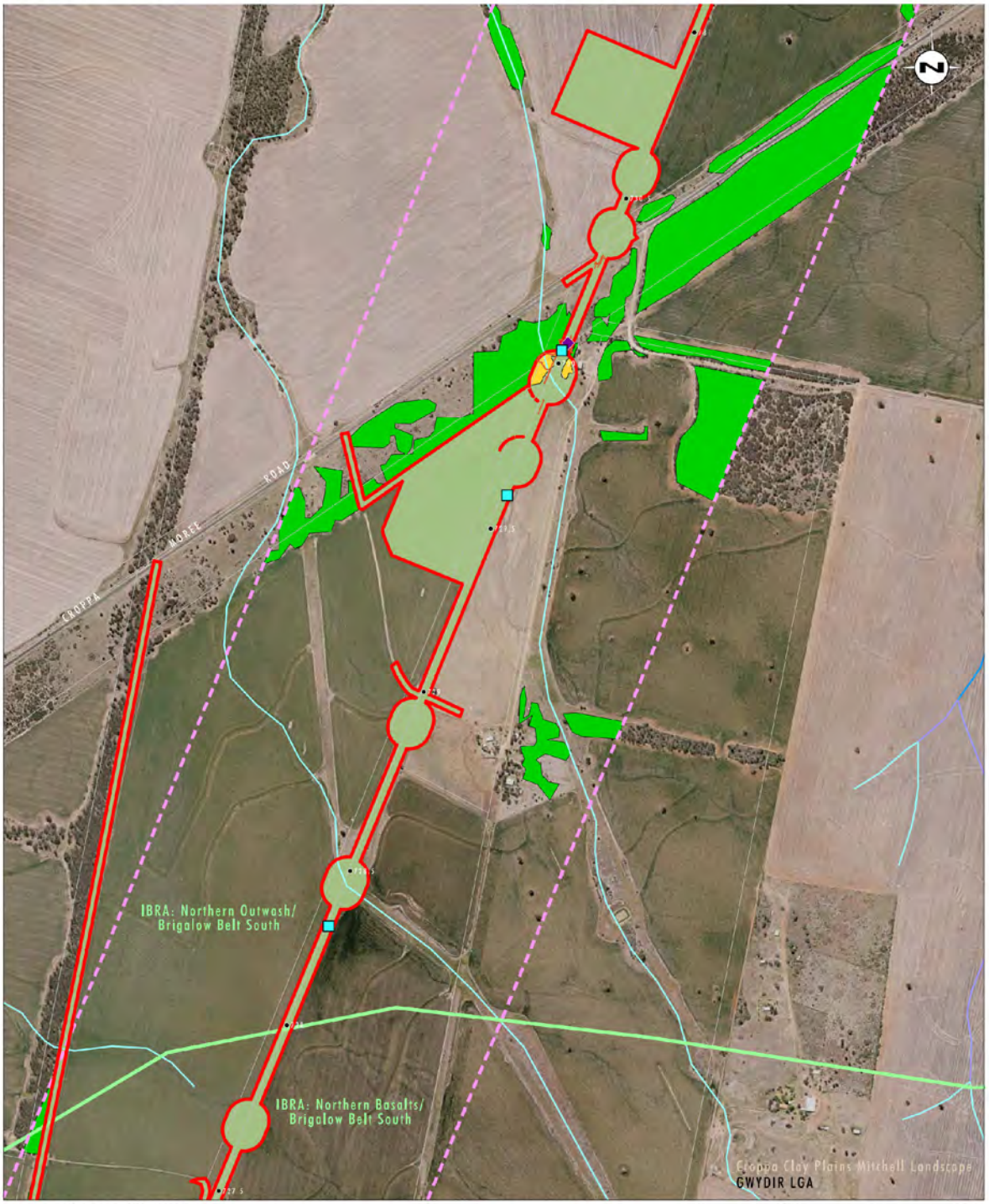


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A47

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_062.dgn
20160718 16.40

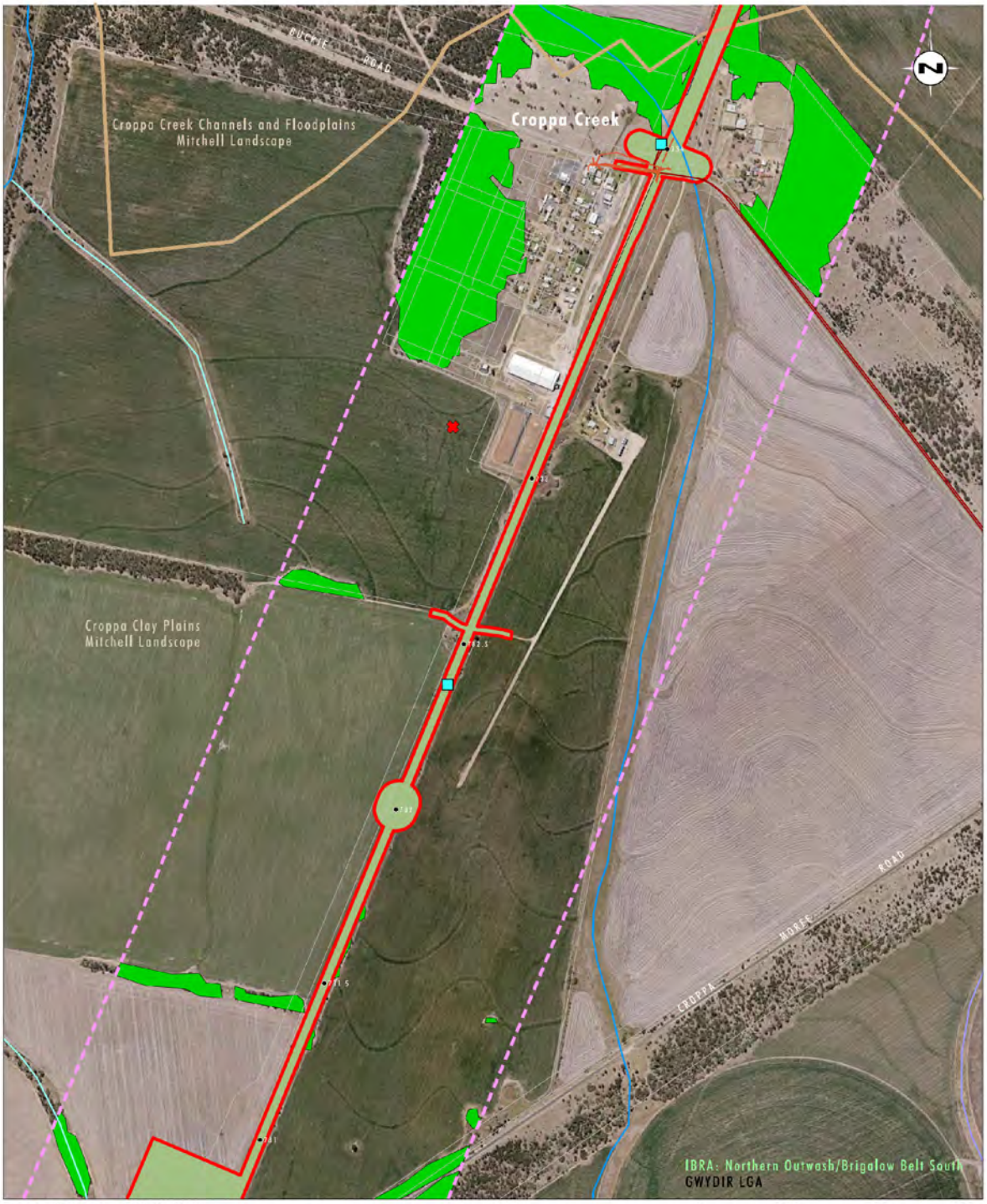


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A48

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_063.dgn
20160602 9.56

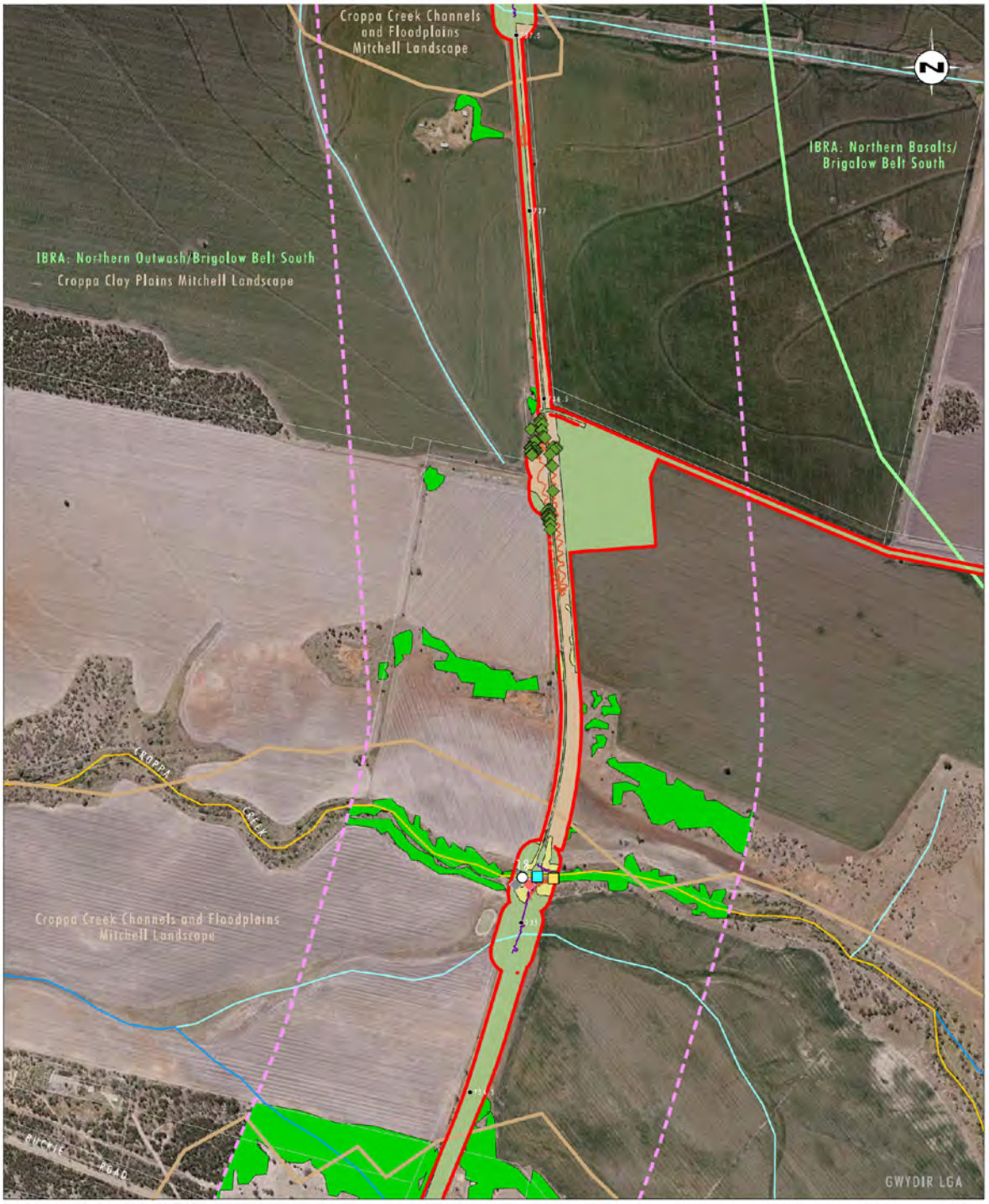


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A49

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_064.dgn
20160718 16.41

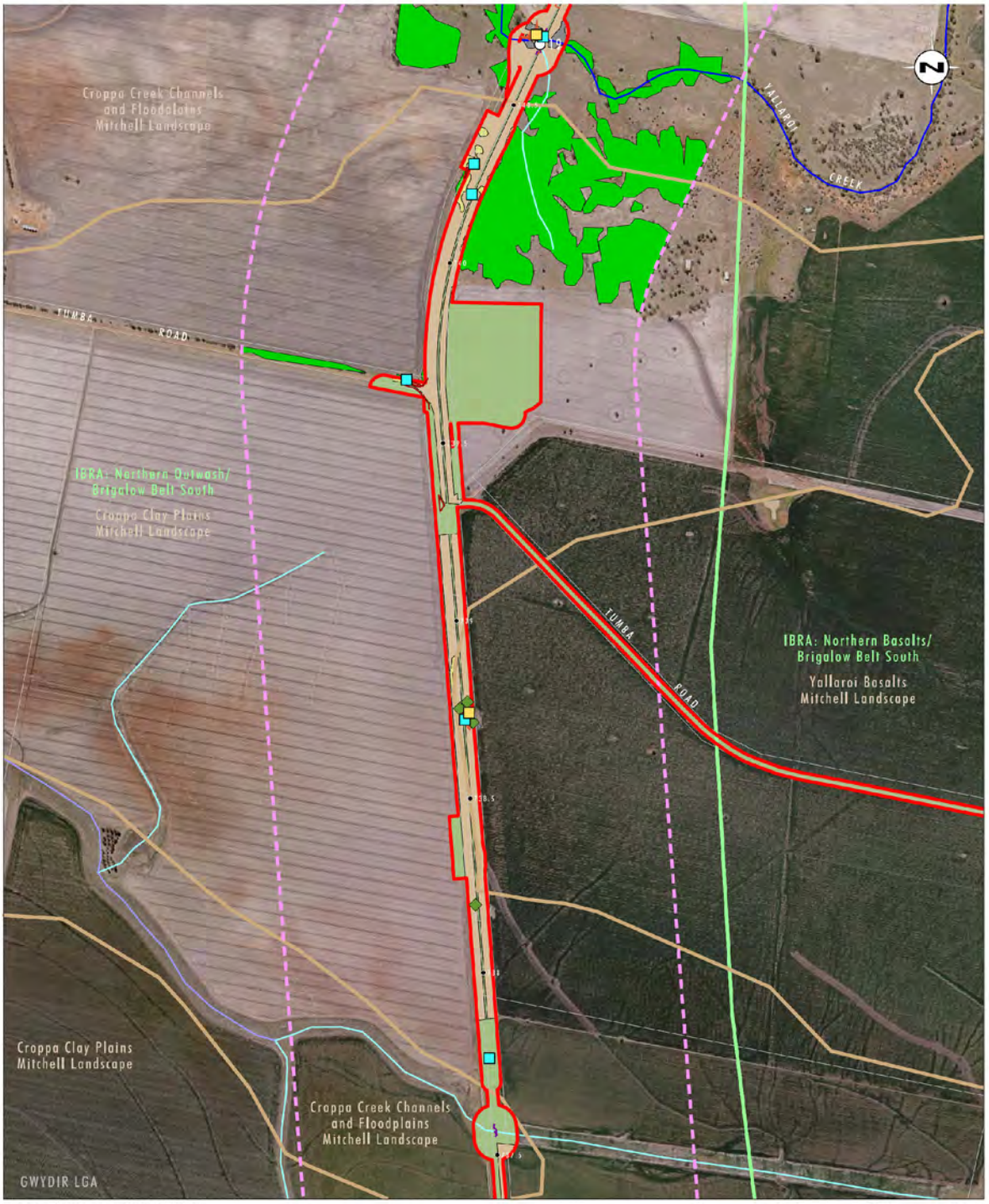


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A50

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_065.dgn
20160718 16.41

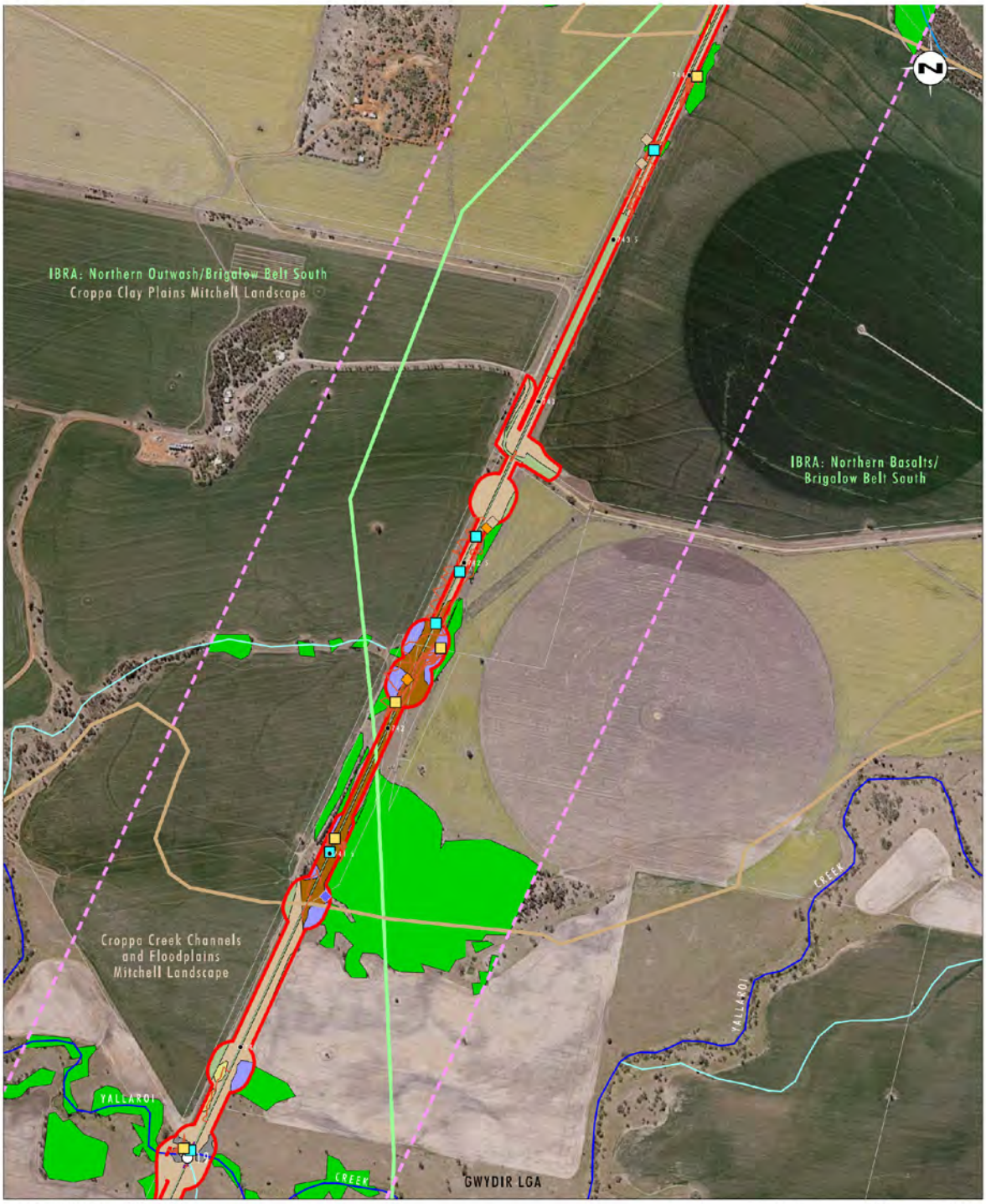


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A51

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_066.dgn
20160718 16.42

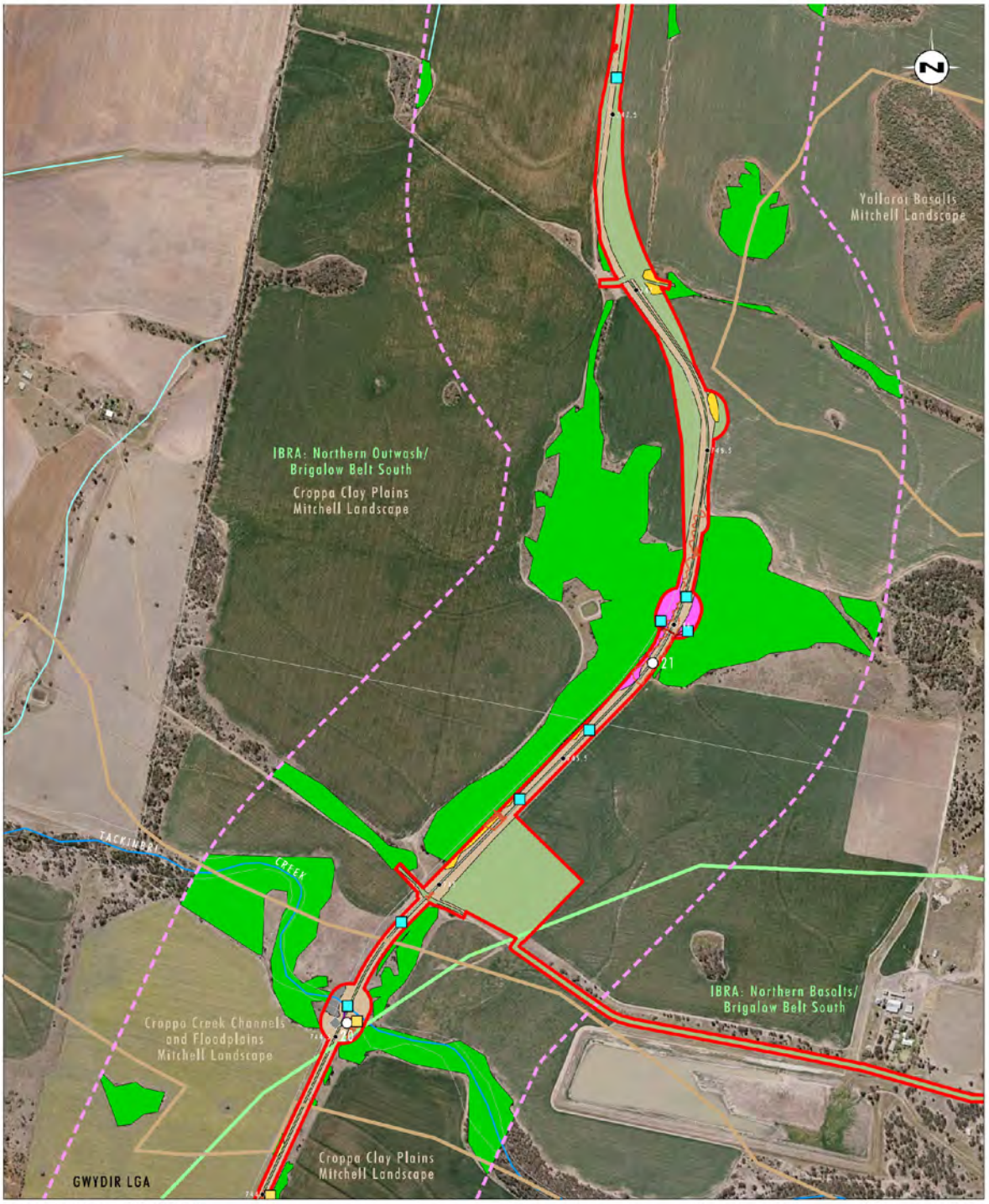


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A52

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_067.dgn
20160718 16.42

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A53

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_068.dgn
20160602 10.08

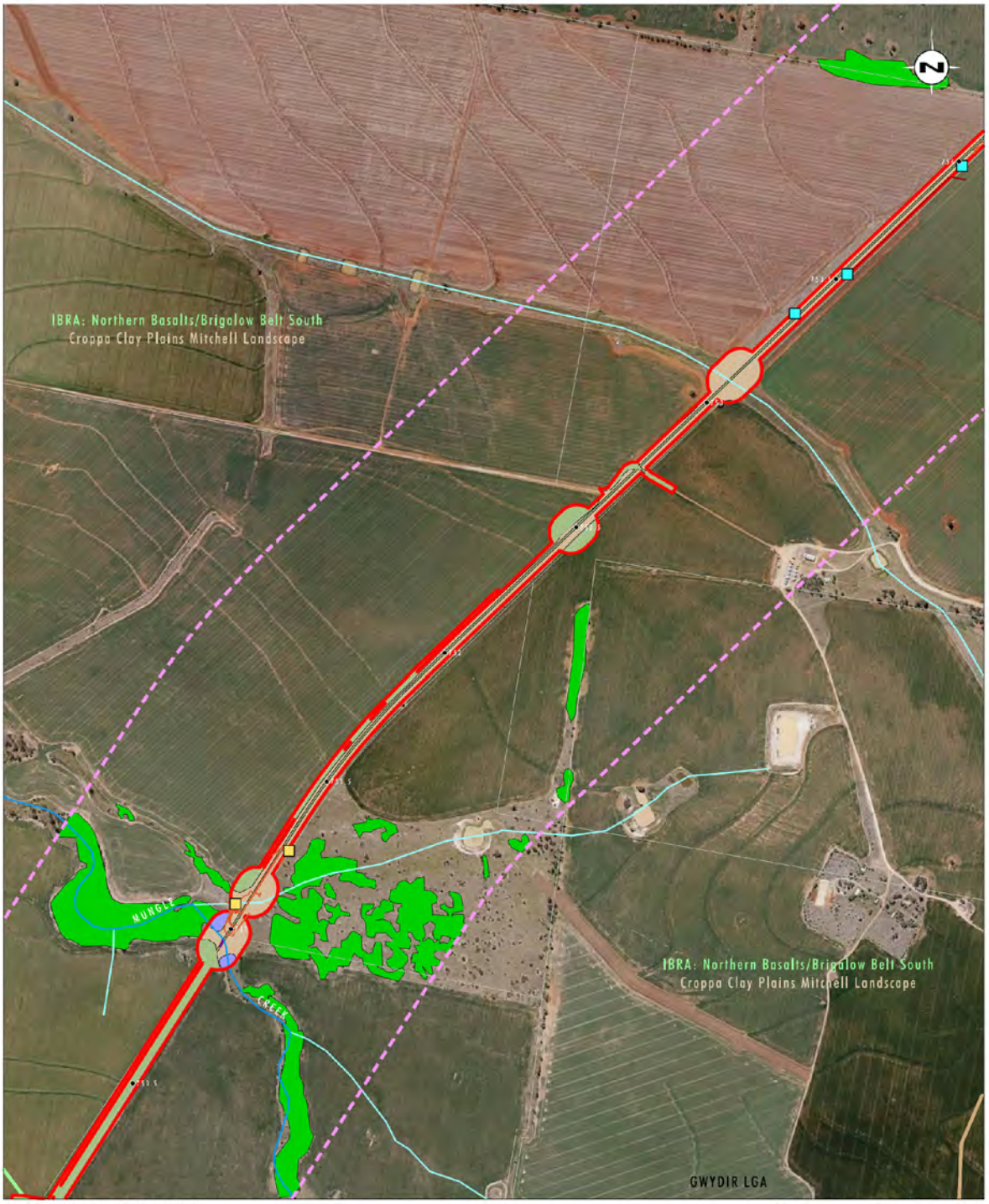


Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- IBRA Regions and Subregion Area
- Rail Line Chainage

FIGURE A54

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_069.dgn
20160602 10:12

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A55

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_070.dgn
20160602 10:15

Image Source: ARTC (2016)
Data Source: ARTC (2016), BioNet Atlas of NSW Wildlife (OEH 2016), Umwelt (2016)
Note: For full legend, refer to legend page

0 250 500 750m
1:15 000

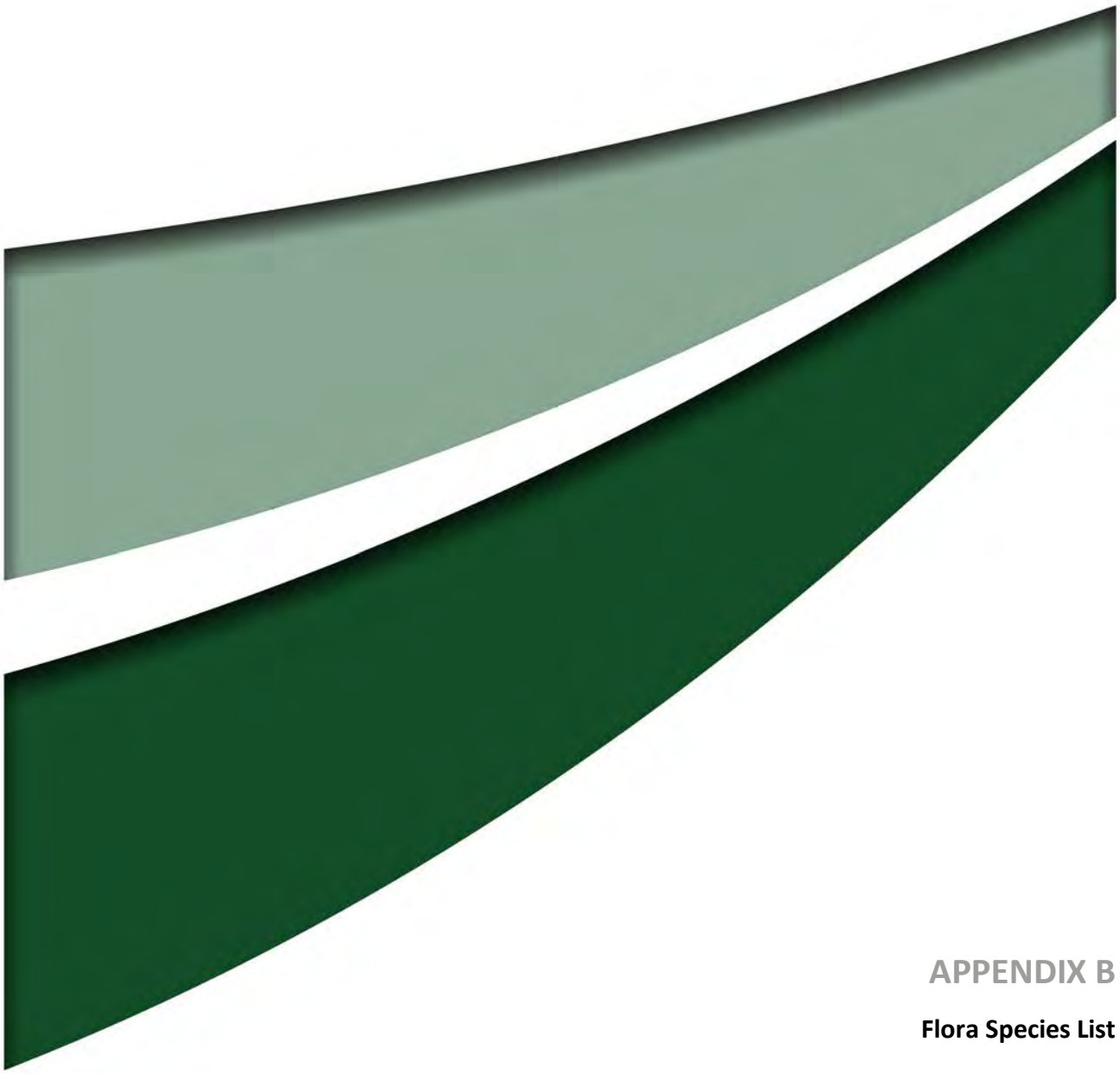
Legend

- Development Site
- 550m Buffer Area
- Mitchell Landscape Area
- Rail Line Chainage

FIGURE A56

Survey Effort, Vegetation Map, Threatened Species Locations and Landscape Assessment

File Name (A4): R05/3607_071.dgn
20160718 16.43



APPENDIX B

Flora Species List

Appendix B - Flora Species List

The following list was developed from surveys of the Development Site. It includes all species of vascular plants observed during these surveys. It is acknowledged that the list is not comprehensive, as not all species are readily detected at any one time of the year. Many species flower only during restricted periods of the year, and some flower only once in several years. In the absence of flowering material, many of these species cannot be identified, or even detected.

Names of classes and families follow a modified Cronquist (1981) System.

Any species that could not be identified to the lowest taxonomic level are denoted in the following manner:

sp.	specimens that are identified to genus level only.

The following abbreviations or symbols are used in the list:

✓	species recorded opportunistically during surveys
asterisk (*)	denotes species not native to the area
double asterisk (**)	denotes a Weed of National Significance (WoNS)
subsp.	subspecies and
var.	variety
Bold	font denotes a threatened plant species.

All vascular plants recorded or collected were identified using keys and nomenclature in Harden (1992, 1993, 2000 and 2002) and Wheeler *et al.* (2002). Where known, changes to nomenclature and classification have been incorporated into the results, as derived from PlantNET (Botanic Gardens Trust 2016), the on-line plant name database maintained by the National Herbarium of New South Wales.

Common names used follow Harden (1992, 1993, 2000 and 2002) where available, and draw on other sources such as local names where these references do not provide a common name.

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Coniferopsida (Conifers)																																																								
Cupressaceae	*Callitris glaucophylla*	white cypress pine					✓	✓	✓																																				✓									
Filicopsida (Ferns)																																																								
Adiantaceae	*Cheilanthes distans*	bristly cloak fern					✓			✓									✓	✓																									✓									
Adiantaceae	*Cheilanthes sieberi*	rock fern					✓	✓																																														
Marsileaceae	*Marsilea drummondii*	common nardoo															✓	✓				✓	✓																										✓							
Marsileaceae	*Marsilea* sp.	a nardoo																			✓																																			
Magnoliopsida (Flowering Plants) - Liliidae (Monocots)																																																								
Amaryllidaceae	*Calostemma purpureum*	garland lily												✓												✓																														
Anthericaceae	*Dichopogon fimbriatus*	nodding chocolate lily																													✓																									
Anthericaceae	*Tricoryne elatior*	yellow autumn-lily																													✓													✓												
Commelinaceae	*Commelina cyanea*	native wandering Jew															✓								✓		✓	✓	✓						✓	✓		✓				✓	✓													
Cyperaceae	*Carex inversa*	knob sedge			✓			✓		✓					✓	✓		✓							✓	✓		✓																								✓		✓		
Cyperaceae	*Carex* sp.																																																✓						
Cyperaceae	*Cyperus bifax*	downs nutgrass												✓		✓		✓			✓	✓	✓	✓		✓																✓														
Cyperaceae	*Cyperus difformis*	dirty Dora																✓				✓																																		
Cyperaceae	*Cyperus gracilis*	slender flat-sedge																	✓	✓										✓						✓					✓															
Cyperaceae	*Cyperus* sp.			✓											✓			✓			✓										✓			✓	✓					✓								✓	✓		✓					✓
Cyperaceae	*Eleocharis* sp.	spike-rush; spike-sedge																✓				✓	✓																																	
Cyperaceae	*Fimbristylis dichotoma*	common fringe-sedge					✓																																																	
Hypoxidaceae	*Hypoxis hygrometrica*	golden weather-grass																								✓												✓																		
Hypoxidaceae	*Hypoxis* sp.																						✓																																	
Juncaceae	*Juncus* sp.	a rush																✓																						✓										✓						
Phormiaceae	*Dianella longifolia* var. *longifolia*	a blue flax lily					✓																																																	
Phormiaceae	*Dianella* sp.																																		✓																					
Poaceae	*Aristida jerichoensis* var. *subspinulifera*	Jericho wiregrass							✓																																															

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Poaceae	*Aristida leichhardtiana*																																		✓																					
Poaceae	*Aristida leptopoda*	white speargrass			✓							✓				✓				✓		✓		✓							✓	✓		✓		✓		✓	✓		✓	✓	✓			✓			✓		✓		✓	✓
Poaceae	*Aristida personata*																											✓																											
Poaceae	*Aristida ramosa*	purple wiregrass					✓		✓																																															
Poaceae	*Aristida* sp.	a wiregrass					✓	✓		✓							✓				✓				✓																✓															
Poaceae	*Aristida vagans*	threeawn speargrass																											✓	✓	✓									✓											✓				
Poaceae	*Astrebla lappacea*	curly Mitchell grass																																														✓								
Poaceae	*Austrostipa aristiglumis*	plains grass				✓						✓		✓		✓	✓											✓				✓		✓			✓				✓		✓		✓			✓	✓				✓		✓		
Poaceae	*Austrostipa elegantissima*	feather speargrass																										✓													✓															
Poaceae	*Austrostipa scabra*	speargrass							✓																																													✓		
Poaceae	*Austrostipa scabra* subsp. *falcata*	rough speargrass					✓																									✓		✓		✓			✓								✓							
Poaceae	*Austrostipa* sp.	a speargrass			✓			✓																					✓																										
Poaceae	*Austrostipa verticillata*	slender bamboo grass					✓			✓									✓						✓			✓			✓										✓															
Poaceae	**Avena barbata*	bearded oats																											✓														✓					✓								
Poaceae	**Avena fatua*	wild oats															✓																																							
Poaceae	**Avena* sp.	oats	✓																																																				
Poaceae	*Bothriochloa biloba*	lobed bluegrass					✓																		✓																															
Poaceae	*Bothriochloa bladhii* subsp. *bladhii*	forest bluegrass																																								✓													
Poaceae	*Bothriochloa decipiens* var. *decipiens*	red grass																																		✓				✓						✓								
Poaceae	*Bothriochloa macra*	red grass								✓											✓																											✓							
Poaceae	*Bothriochloa* sp.	redgrass; bluegrass						✓	✓													✓																												✓	✓				
Poaceae	**Bromus* sp.	a brome																								✓	✓																											
Poaceae	**Cenchrus pennisetiformis*	Buffel grass									✓	✓									✓																																✓		
Poaceae	*Chloris divaricata* var. *divaricata*	slender chloris																																							✓													
Poaceae	**Chloris gayana*	Rhodes grass			✓			✓	✓	✓						✓						✓									✓		✓		✓												✓						
Poaceae	**Chloris* sp.																																																✓			✓					

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Poaceae	*Chloris truncata*	windmill grass				✓		✓		✓				✓																	✓		✓			✓		✓	✓	✓				✓							✓	✓		✓	
Poaceae	*Cymbopogon refractus*	barbed wire grass																													✓	✓																							
Poaceae	*Cynodon dactylon*	common couch			✓	✓		✓	✓	✓	✓	✓		✓								✓		✓					✓		✓			✓		✓	✓		✓	✓			✓		✓		✓			✓	✓				
Poaceae	*Dactyloctenium radulans*	button grass								✓	✓			✓		✓					✓	✓		✓										✓	✓	✓	✓	✓	✓	✓			✓												
Poaceae	*Dichanthium sericeum* subsp. *sericeum*	Queensland bluegrass			✓	✓								✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓	
Poaceae	*Digitaria divaricatissima*	umbrella grass			✓				✓		✓	✓					✓				✓	✓						✓			✓	✓										✓	✓			✓									
Poaceae	***Digitaria porrecta***	**finger panic grass**																			✓			✓				✓																												
Poaceae	*Echinochloa colona*	awnless barnyard grass			✓																	✓																																		
Poaceae	**Ehrharta erecta*	panic veldtgrass						✓		✓															✓			✓	✓							✓	✓			✓		✓	✓											
Poaceae	*Elymus scaber*	common wheatgrass																																															✓					
Poaceae	*Elymus* sp.						✓				✓																										✓																	
Poaceae	*Enneapogon gracilis*	slender nineawn																																																			✓	
Poaceae	*Enneapogon nigricans*	niggerheads																																	✓	✓								✓	✓											
Poaceae	*Enteropogon acicularis*	curly windmill grass			✓							✓		✓	✓	✓			✓	✓			✓	✓								✓				✓			✓								✓			✓	✓			
Poaceae	*Enteropogon ramosus*	curly windmill grass																																										✓											
Poaceae	*Eragrostis brownii*	brown's lovegrass																																																		✓				
Poaceae	**Eragrostis cilianensis*	stinkgrass																																						✓														
Poaceae	*Eragrostis leptostachya*	paddock lovegrass			✓	✓			✓	✓																										✓				✓										✓			✓
Poaceae	*Eragrostis* sp.	a lovegrass					✓	✓		✓				✓	✓				✓		✓								✓			✓			✓	✓		✓		✓						✓				✓			
Poaceae	**Eragrostis trichophora*															✓					✓	✓																																	
Poaceae	*Eriochloa crebra*	cup grass; tall cupgrass																																															✓					
Poaceae	*Eriochloa procera*	spring grass																					✓																																
Poaceae	*Eriochloa pseudoacrotricha*	early spring grass			✓					✓											✓	✓		✓		✓								✓												✓			✓				✓			
Poaceae	*Eulalia aurea*	silky browntop																					✓																																
Poaceae	**Hyparrhenia hirta*	Coolatai grass															✓																																						

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Poaceae	*Lachnagrostis* sp.																	✓																																						
Poaceae	*Leptochloa asthenes*																																																✓					✓		✓
Poaceae	*Leptochloa digitata*	umbrella canegrass		✓																																																				
Poaceae	*Leptochloa divaricatissima*																				✓																																			
Poaceae	**Lolium* sp.	a ryegrass																			✓			✓																																
Poaceae	**Melinis repens*	red natal grass					✓		✓																																						✓									
Poaceae	*Microlaena stipoides* var. *stipoides*	weeping grass																													✓				✓												✓									
Poaceae	**Panicum antidotale*	giant panic grass																													✓																			✓						
Poaceae	*Panicum buncei*	native panic			✓	✓									✓							✓														✓								✓									✓		✓	
Poaceae	*Panicum decompositum*	native millet												✓									✓	✓		✓							✓															✓								
Poaceae	*Panicum queenslandicum*	Yadbila grass																														✓		✓												✓										
Poaceae	*Panicum* sp.	panicum			✓					✓						✓																						✓			✓		✓													
Poaceae	*Paspalidium caespitosum*	Brigalow grass																																					✓																	
Poaceae	*Paspalidium distans*													✓		✓																		✓																						
Poaceae	*Paspalidium globoideum*	shotgrass																																														✓								
Poaceae	*Paspalidium gracile*	slender panic							✓		✓	✓	✓			✓	✓		✓	✓	✓	✓			✓		✓	✓		✓						✓					✓												✓			
Poaceae	*Paspalidium jubiflorum*	Warrego grass													✓									✓																																
Poaceae	*Paspalidium* sp.			✓																																			✓																	
Poaceae	**Paspalum dilatatum*	paspalum			✓				✓									✓											✓		✓			✓				✓		✓		✓										✓				
Poaceae	**Paspalum* sp.																																							✓					✓											
Poaceae	*Poa* sp.							✓		✓																																														
Poaceae	*Rytidosperma bipartita*	wallaby grass																																✓				✓														✓	✓			
Poaceae	*Rytidosperma fulvum*	wallaby grass			✓											✓																																								
Poaceae	*Rytidosperma* sp.	wallaby grass																														✓											✓													
Poaceae	**Setaria parviflora*																																									✓														
Poaceae	**Sorghum bicolor*	sorghum												✓	✓	✓	✓					✓																												✓	✓			✓		

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Poaceae	*Sorghum halepense	Johnson grass				✓	✓	✓		✓	✓	✓	✓								✓		✓			✓			✓			✓			✓		✓				✓				✓	✓	✓									
Poaceae	*Sporobolus africanus	Parramatta grass																						✓																																	
Poaceae	*Sporobolus caroli*	fairy grass												✓						✓											✓		✓		✓		✓		✓	✓	✓			✓								✓		✓
Poaceae	*Sporobolus creber*	slender rat's tail grass					✓									✓															✓		✓						✓							✓			✓				
Poaceae	*Sporobolus* sp.	rat's tail couch																																			✓																	
Poaceae	*Thellungia advena*	Coolibah grass																																													✓							
Poaceae	*Themeda avenacea*	native oatgrass																													✓	✓																					✓		
Poaceae	*Themeda* sp.																																✓																				
Poaceae	*Themeda triandra*	kangaroo grass																				✓																										✓				✓	✓			
Poaceae	*Tragus australianus*	small burrgrass																		✓																			✓	✓														✓		
Poaceae	*Urochloa panicoides	Urochloa grass			✓			✓	✓	✓	✓	✓										✓			✓		✓				✓	✓			✓	✓			✓	✓				✓	✓									
Poaceae	*Urochloa* sp.																																																		✓				
Poaceae	*Walwhalleya proluta*														✓		✓																																								
Magnoliopsida (Flowering Plants) - Magnoliidae (Dicots)																																																							
Acanthaceae	*Brunoniella australis*	blue trumpet			✓														✓	✓					✓				✓		✓		✓		✓							✓												
Acanthaceae	*Rostellularia adscendens*	pink tongues																																	✓							✓												
Aizoaceae	*Galenia pubescens*	galenia																																											✓								
Aizoaceae	*Tetragonia tetragonioides*	New Zealand spinach	✓	✓										✓	✓	✓			✓	✓					✓			✓					✓				✓					✓												
Amaranthaceae	*Alternanthera angustifolia*															✓							✓			✓																												
Amaranthaceae	*Alternanthera denticulata*	lesser joyweed							✓													✓																			✓												✓			
Amaranthaceae	*Amaranthus hybridus*	slim amaranth																																									✓											
Amaranthaceae	*Amaranthus* sp.	amaranth																	✓																																					
Amaranthaceae	*Gomphrena celosioides*	gomphrena weed			✓	✓		✓	✓	✓												✓																			✓	✓	✓						✓						
Amaranthaceae	*Ptilotus* sp.																									✓																												
Apiaceae	*Ammi majus*	bishop's weed																✓													✓																								
Apiaceae	*Cyclospermum leptophyllum*	slender celery			✓					✓								✓				✓	✓						✓								✓							✓	✓			✓							

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Apiaceae	*Daucus glochidiatus*	native carrot	✓	✓																											✓				✓							✓			✓	✓					✓	✓						
Apiaceae	**Foeniculum vulgare*	fennel																																																		✓						
Apocynaceae	*Cynanchum* sp.																																✓																										
Apocynaceae	**Gomphocarpus fruticosus*	narrow-leaved cotton bush								✓																									✓										✓	✓						✓						
Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo																												✓																													
Asteraceae	**Aster subulatus*	wild aster																✓																																			✓	✓						
Asteraceae	**Bidens pilosa*	Cobblers pegs					✓	✓		✓	✓	✓	✓	✓	✓									✓	✓		✓	✓			✓		✓	✓	✓							✓	✓	✓	✓	✓											
Asteraceae	**Bidens subalternans*	greater beggars ticks																																																						✓			
Asteraceae	*Brachyscome ciliaris* var. *subintegrifolia*	variable daisy			✓																																																							
Asteraceae	*Brachyscome dentata*													✓												✓																																				
Asteraceae	*Brachyscome* sp.																		✓						✓										✓						✓				✓				✓			✓						
Asteraceae	*Calotis cuneata*	mountain burr-daisy																	✓	✓	✓	✓		✓							✓		✓		✓		✓	✓				✓			✓	✓												
Asteraceae	*Calotis hispidula*	bogan flea					✓																																																						
Asteraceae	*Calotis lappulacea*	yellow burr-daisy				✓	✓	✓	✓	✓				✓																			✓					✓	✓	✓		✓	✓						✓	✓								
Asteraceae	**Carthamus lanatus*	saffron thistle																																							✓															✓			
Asteraceae	**Centaurea* sp.	thistle																																																							✓		
Asteraceae	**Chondrilla juncea*	skeleton weed																																																								✓	
Asteraceae	*Chrysocephalum apiculatum*	common everlasting						✓							✓								✓	✓						✓																													
Asteraceae	*Chrysocephalum* sp.																														✓																									✓	
Asteraceae	**Cirsium vulgare*	spear thistle																											✓		✓				✓																								
Asteraceae	**Conyza bonariensis*	flaxleaf fleabane			✓		✓	✓						✓	✓	✓	✓	✓					✓	✓			✓	✓		✓			✓	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓		✓		✓	✓	✓				✓
Asteraceae	*Euchiton involucratus*	star cudweed			✓									✓	✓	✓					✓																																									
Asteraceae	*Euchiton sphaericus*	star cudweed																																																											
Asteraceae	*Euchiton* sp.	a cudweed																																																										
Asteraceae	**Helianthus*	common			✓													✓																																											

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
	annuus	sunflower																																																						
Asteraceae	**Hypochaeris glabra*	smooth catsear																																																			✓	
Asteraceae	*Leiocarpa brevicompta*	flat billy-buttons																		✓										✓	✓	✓				✓					✓	✓												
Asteraceae	*Leiocarpa panaetioides*	wooly buttons			✓																					✓																			✓			✓								
Asteraceae	*Leptorhynchos* sp.																																												✓											
Asteraceae	*Leptorhynchos squamatus*	scaly buttons						✓																								✓		✓																						
Asteraceae	*Minuria integerrima*	smooth minuria																				✓	✓	✓																																
Asteraceae	*Pycnosorus globosus*	drumsticks																				✓																✓						✓												
Asteraceae	*Solenogyne* sp.																															✓		✓																						
Asteraceae	**Sonchus oleraceus*	common sowthistle				✓	✓			✓			✓														✓									✓																				
Asteraceae	**Tagetes minuta*	stinking Roger																																																						✓
Asteraceae	*Vernonia cinerea*				✓																																																			
Asteraceae	*Vittadinia cervicularis*					✓		✓	✓	✓																																														
Asteraceae	*Vittadinia cuneata*	a fuzzweed																														✓		✓													✓									
Asteraceae	*Vittadinia pterochaeta*	rough fuzzweed				✓									✓	✓				✓	✓	✓		✓												✓	✓							✓	✓											
Asteraceae	*Vittadinia* sp.	fuzzweed							✓							✓			✓																									✓									✓		✓	
Asteraceae	*Vittadinia sulcata*															✓																						✓																		
Asteraceae	**Xanthium occidentale*	Noogoora burr																✓																																						
Asteraceae	**Xanthium spinosum*	Bathurst burr																													✓									✓		✓			✓	✓										
Asteraceae	**Xanthium* sp.																																																		✓		✓	✓		✓
Asteraceae	*Xerochrysum* sp.						✓			✓																																														
Boraginaceae	**Heliotropium amplexicaule*	blue heliotrope						✓	✓												✓				✓							✓		✓										✓		✓										
Brassicaceae	**Brassica* sp.	brassica																																																✓						
Brassicaceae	**Lepidium africanum*	common peppercress				✓		✓				✓		✓		✓													✓									✓			✓								✓							
Brassicaceae	**Lepidium* sp.	a peppercress					✓			✓					✓				✓				✓														✓	✓																		
Brassicaceae	**Rapistrum rugosum*	turnip weed	✓	✓																								✓			✓	✓		✓	✓	✓		✓				✓	✓		✓	✓		✓								

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Cactaceae	**Opuntia aurantiaca*	tiger pear					✓		✓											✓							✓		✓	✓		✓		✓			✓		✓																			
Cactaceae	**Opuntia* sp.			✓																																																				
Cactaceae	**Opuntia stricta*	common prickly pear; smooth pest pear						✓	✓	✓				✓					✓							✓		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓				✓		✓							✓	✓		
Campanulaceae	*Wahlenbergia communis*	tufted bluebell			✓				✓																								✓				✓			✓										✓				
Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell						✓																															✓																
Campanulaceae	*Wahlenbergia* sp.	bluebell				✓									✓	✓	✓				✓		✓					✓										✓					✓				✓								
Capparaceae	*Apophyllum anomalum*	warrior bush																		✓																																					
Capparaceae	*Capparis lasiantha*	nepine	✓	✓																																																					
Capparaceae	*Capparis mitchellii*	native orange														✓				✓										✓									✓			✓															
Casuarinaceae	*Casuarina cristata*	belah				✓		✓											✓	✓										✓			✓		✓	✓			✓		✓			✓										
Chenopodiaceae	*Atriplex muelleri*	Muellers saltbush																		✓				✓													✓																		
Chenopodiaceae	*Atriplex semibaccata*	creeping saltbush										✓		✓																																												
Chenopodiaceae	*Atriplex spinibractea*	spiny-fruit saltbush																															✓																						
Chenopodiaceae	*Atriplex* sp.	a saltbush																						✓									✓															✓							✓
Chenopodiaceae	*Chenopodium desertorum*	desert goosefoot																																		✓																				
Chenopodiaceae	*Einadia hastata*	berry saltbush				✓				✓				✓	✓	✓			✓						✓			✓	✓			✓			✓	✓	✓	✓		✓					✓			✓	✓					
Chenopodiaceae	*Einadia nutans*	climbing saltbush				✓	✓			✓	✓			✓	✓														✓	✓	✓	✓		✓		✓	✓		✓		✓	✓			✓		✓						✓		
Chenopodiaceae	*Einadia polygonoides*	knotweed goosefoot																	✓				✓	✓									✓																						
Chenopodiaceae	*Einadia* sp.																																										✓					✓						
Chenopodiaceae	*Einadia trigonos*	fishweed				✓													✓	✓								✓			✓				✓												✓						
Chenopodiaceae	*Enchylaena tomentosa*	ruby saltbush		✓		✓	✓			✓				✓	✓	✓			✓	✓			✓		✓	✓	✓					✓	✓	✓		✓					✓		✓		✓			✓						
Chenopodiaceae	*Maireana enchylaenoides*	wingless fissure-weed																																							✓													
Chenopodiaceae	*Maireana microphylla*	small-leaf bluebush		✓																												✓		✓					✓		✓												
Chenopodiaceae	*Maireana* sp.	cotton bush; bluebush; fissure-weed																																	✓	✓															✓	✓		
Chenopodiaceae	*Rhagodia*	thorny saltbush	✓	✓											✓	✓			✓	✓				✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓		✓		✓	✓		✓	✓					

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
	spinescens																																																							
Chenopodiaceae	*Rhagodia* sp.																																	✓																						
Chenopodiaceae	*Salsola australis*	buckbush;soft rolypoly; saltwort																															✓																✓							
Chenopodiaceae	*Sclerolaena articulata*																														✓																									
Chenopodiaceae	*Sclerolaena birchii*	galvinized burr																																		✓	✓		✓																	
Chenopodiaceae	*Sclerolaena convexula*	tall copperburr																																						✓																
Chenopodiaceae	*Sclerolaena diacantha*	grey copperburr																																		✓					✓															
Chenopodiaceae	*Sclerolaena muricata*	black rolypoly	✓	✓																														✓			✓			✓									✓							
Chenopodiaceae	*Sclerolaena muricata* var. *muricata*	black rolypoly												✓	✓				✓		✓			✓	✓						✓		✓			✓			✓						✓	✓										
Chenopodiaceae	*Sclerolaena muricata* var. *semiglabra*	black rolypoly				✓			✓																							✓	✓																							
Chenopodiaceae	*Sclerolaena* sp.	copperburr; poverty-bush																						✓																																
Chenopodiaceae	*Sclerolaena tetracuspis*	Brigalow burr																												✓																										
Convolvulaceae	*Convolvulus erubescens*	pink bindweed								✓	✓	✓									✓					✓		✓	✓		✓		✓											✓							✓					
Convolvulaceae	*Convolvulus* sp.	a bindweed																								✓																														
Convolvulaceae	*Dichondra repens*	kidney weed							✓	✓					✓				✓																	✓			✓	✓																
Convolvulaceae	*Evolvulus alsinoides*	bindweed					✓		✓																																						✓									
Convolvulaceae	*Polymeria pusilla*																						✓	✓					✓									✓		✓			✓								✓					
Cucurbitaceae	*Cucumis melo* subsp. *agrestis*	Ulcardo melon															✓																																							
Cucurbitaceae	**Cucumis* sp.																											✓												✓						✓										
Euphorbiaceae	*Chamaesyce drummondii*	caustic weed				✓								✓		✓							✓	✓					✓			✓		✓						✓			✓	✓	✓											✓
Euphorbiaceae	**Euphorbia* sp.																																					✓																		
Euphorbiaceae	**Ricinus communis*	castor oil plant																			✓						✓																													
Fabaceae (Caesalpinioideae)	*Senna clavigera*							✓																																																
Fabaceae (Caesalpinioideae)	**Senna occidentalis*	coffee senna																																														✓								
Fabaceae	**Crotalaria* sp.																													✓	✓																									

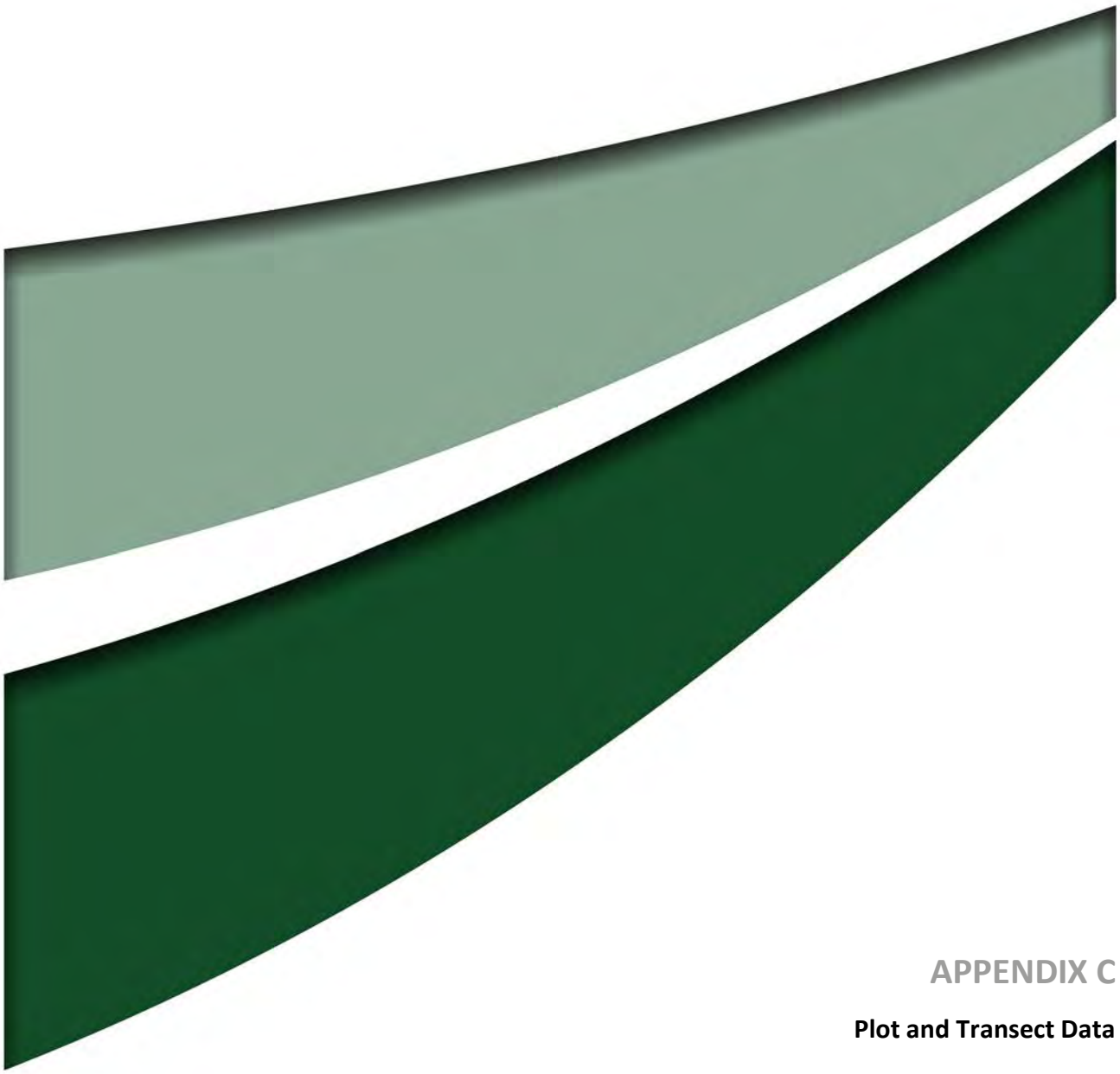
Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
(Faboideae)																																																									
Fabaceae (Faboideae)	*Cullen tenax*	emu-foot			✓				✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	✓			✓		✓			✓				✓	✓	✓	✓		✓				✓		✓												
Fabaceae (Faboideae)	***Desmodium campylocaulon***	**creeping tick-trefoil**																						✓		✓												✓						✓				✓											
Fabaceae (Faboideae)	*Desmodium gunnii*	slender tick-trefoil																			✓																																						
Fabaceae (Faboideae)	*Desmodium* sp.	tick-trefoil							✓																																																		
Fabaceae (Faboideae)	*Desmodium varians*	slender tick-trefoil																		✓										✓																														
Fabaceae (Faboideae)	*Glycine canescens*	silky glycine			✓																✓																																						
Fabaceae (Faboideae)	*Glycine clandestina*	twining glycine					✓																							✓																														
Fabaceae (Faboideae)	*Glycine latifolia*																																✓																										
Fabaceae (Faboideae)	*Glycine* sp.																						✓			✓																		✓	✓																
Fabaceae (Faboideae)	*Glycine stenophita*								✓																																																					
Fabaceae (Faboideae)	*Glycine tabacina*	variable glycine					✓															✓			✓					✓				✓	✓			✓	✓						✓														
Fabaceae (Faboideae)	**Medicago sativa*	Lucerne																		✓																																								
Fabaceae (Faboideae)	*Rhynchosia minima*				✓					✓	✓	✓	✓		✓		✓	✓			✓	✓	✓			✓		✓	✓		✓	✓						✓					✓	✓	✓			✓			✓					✓		✓	
Fabaceae (Faboideae)	*Sesbania cannabina* var. *cannabina*	Sesbania pea																✓																																										
Fabaceae (Faboideae)	*Swainsona* sp.																	✓								✓																				✓	✓															
Fabaceae (Faboideae)	**Vicia* sp.	vetch																												✓																												
Fabaceae (Faboideae)	*Vigna lanceolata*	Maloga pea															✓																																										
Fabaceae (Faboideae)	*Vigna* sp.																	✓																																									
Fabaceae (Mimosoideae)	*Acacia deanei*	green wattle							✓																																																				
Fabaceae (Mimosoideae)	*Acacia harpophylla*	Brigalow																		✓	✓																																							
Fabaceae	*Acacia pendula*	Boree	✓	✓										✓	✓	✓																																												

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
(Mimosoideae)																																																									
Fabaceae (Mimosoideae)	*Acacia salicina*	cooba									✓	✓	✓														✓	✓																		✓											
Fabaceae (Mimosoideae)	*Acacia* sp.	wattle					✓																																																		
Fabaceae (Mimosoideae)	*Acacia stenophylla*	river cooba																							✓																											✓	✓			✓		✓
Fabaceae (Mimosoideae)	*Neptunia dimorphantha*	sensitive plant																					✓																																			
Fabaceae (Mimosoideae)	*Neptunia gracilis f. gracilis*	sensitive plant			✓									✓	✓		✓	✓			✓	✓	✓	✓		✓		✓	✓			✓		✓				✓	✓			✓	✓				✓		✓						
Fabaceae (Mimosoideae)	*Vachellia farnesiana*	mimosa bush	✓										✓				✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓				✓			✓		✓		✓					✓	✓	✓	✓				✓
Gentianaceae	**Centaurium tenuiflorum*	branched centaury; slender centaury																✓																																							
Geraniaceae	*Geranium* sp.																																													✓										
Goodeniaceae	*Goodenia fascicularis*	mallee goodenia																✓				✓	✓	✓																																
Goodeniaceae	*Goodenia* sp.								✓						✓						✓										✓									✓	✓				✓										
Lamiaceae	*Mentha satureioides*	native pennyroyal																													✓				✓	✓							✓	✓									
Lobeliaceae	*Pratia concolor*	poison Pratia			✓													✓			✓																✓																	
Loranthaceae	*Amyema cambagei*	needle-leaf mistletoe																																	✓																			
Loranthaceae	*Amyema quandang*	grey mistletoe	✓	✓										✓	✓	✓																																								
Malvaceae	*Abutilon oxycarpum*	straggly lantern-bush																	✓																																		✓			✓	
Malvaceae	*Hibiscus brachysiphonius*	low hibiscus																														✓																					
Malvaceae	*Hibiscus* sp.																																																						
Malvaceae	**Malvastrum americanum*	spiked malvastrum												✓	✓						✓	✓				✓					✓	✓		✓		✓		✓	✓			✓	✓	✓	✓	✓		✓	✓				✓	
Malvaceae	**Pavonia hastata*																										✓																												
Malvaceae	*Sida corrugata*	corrugated sida					✓		✓	✓				✓										✓	✓																						✓									
Malvaceae	*Sida filiformis*															✓			✓	✓	✓	✓		✓	✓	✓				✓							✓		✓					✓	✓	✓								
Malvaceae	*Sida hackettiana*								✓																																															
Malvaceae	**Sida rhombifolia*	Paddy's Lucerne						✓		✓	✓																	✓																						✓					
Malvaceae	**Sida spinosa*				✓	✓						✓		✓	✓	✓					✓	✓	✓					✓										✓		✓		✓					✓	✓	✓			✓		✓
Malvaceae	*Sida* sp.																✓																																					✓			✓

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
Moraceae	**Morus alba*	white mulberry																									✓																														
Myoporaceae	*Eremophila debilis*	amulla								✓				✓	✓										✓	✓		✓			✓			✓			✓			✓		✓	✓			✓					✓					
Myoporaceae	*Eremophila mitchellii*	budda																	✓	✓										✓					✓	✓																				
Myoporaceae	*Eremophila* sp.																																	✓																				
Myoporaceae	*Myoporum montanum*	western boobialla		✓		✓	✓	✓	✓	✓				✓	✓	✓				✓					✓					✓					✓	✓					✓					✓					✓	✓		✓	
Myoporaceae	*Myoporum* sp.	boobialla												✓																																											
Myrtaceae	*Callistemon viminalis*	weeping bottlebrush																																								✓															
Myrtaceae	*Corymbia tessellaris*	carbeen																										✓																											
Myrtaceae	*Eucalyptus camaldulensis*	river red gum																									✓	✓			✓				✓							✓													✓		✓
Myrtaceae	*Eucalyptus coolabah*	Coolibah																																																					✓
Myrtaceae	*Eucalyptus melanophloia*	silver-leaved ironbark							✓																					✓																										
Myrtaceae	*Eucalyptus populnea* subsp. *bimbil*	bimble box						✓		✓									✓									✓			✓								✓																	
Nyctaginaceae	*Boerhavia dominii*	tarvine				✓		✓		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓		✓	✓	✓	✓	✓	✓							
Oleaceae	*Jasminum lineare*	desert jasmine																	✓	✓																																					
Oleaceae	*Jasminum suavissimum*																																																				✓	
Oleaceae	*Notelaea microcarpa* var. *microcarpa*	native olive					✓	✓		✓				✓	✓													✓	✓						✓				✓		✓	✓	✓		✓		✓							
Oxalidaceae	*Oxalis chnoodes*																																																	✓					
Oxalidaceae	**Oxalis corniculata*	creeping oxalis																																	✓																			
Oxalidaceae	*Oxalis perennans*					✓				✓				✓	✓		✓	✓	✓			✓	✓	✓		✓			✓			✓				✓		✓										✓							
Oxalidaceae	*Oxalis* sp.			✓	✓				✓												✓																																			
Papaveraceae	**Argemone ochroleuca* subsp. *ochroleuca*	Mexican poppy																																																						
Phyllanthaceae	*Phyllanthus virgatus*	wiry spurge							✓									✓		✓	✓	✓		✓							✓								✓																
Plantaginaceae	*Plantago* sp.	plantain																						✓																															
Polygonaceae	*Duma florulenta*	lignum																												✓																									
Polygonaceae	**Fallopia*	black bindweed									✓	✓																																													

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
	convolvulus																																																								
Polygonaceae	*Muehlenbeckia* sp.																															✓																										
Polygonaceae	**Polygonum aviculare*	wireweed																							✓																																			
Polygonaceae	**Polygonum bellardii*	tree hogweed																								✓																																		
Polygonaceae	*Rumex brownii*	swamp dock																									✓		✓						✓																								
Polygonaceae	**Rumex crispus*	curled dock																✓				✓									✓				✓																								
Portulacaceae	*Portulaca filifolia*	slender pigweed					✓																																																				
Portulacaceae	*Portulaca oleracea*	pigweed				✓			✓	✓	✓			✓		✓					✓	✓	✓	✓		✓								✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓									
Ranunculaceae	*Clematis microphylla*	small-leaved clematis																																							✓																	
Ranunculaceae	*Ranunculus* sp.																																									✓															
Rubiaceae	**Galium* sp.															✓					✓			✓		✓			✓		✓							✓		✓			✓													
Rutaceae	*Geijera parviflora*	wilga					✓		✓	✓			✓	✓	✓	✓			✓	✓									✓			✓		✓		✓			✓		✓																
Santalaceae	*Santalum lanceolatum*	northern sandalwood		✓																																																						
Sapindaceae	*Alectryon oleifolius*	western rosewood		✓		✓																			✓																																		
Sapindaceae	*Atalaya hemiglauca*	whitewood																																		✓									✓														
Sapindaceae	**Cardiospermum grandiflorum*	balloon vine																									✓																																
Sapindaceae	*Dodonaea viscosa*	sticky hop-bush																																								✓																
Solanaceae	**Cestrum parqui*	green cestrum																									✓																																
Solanaceae	**Cestrum* sp.																										✓																																
Solanaceae	***Lycium ferocissimum*	African boxthorn				✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓					✓		✓	✓		✓							✓		✓			✓	✓		✓		✓										
Solanaceae	*Nicotiana suaveolens*	native tobacco																																		✓									✓	✓														
Solanaceae	*Solanum esuriale*	quena	✓		✓				✓		✓			✓	✓		✓					✓	✓	✓		✓							✓		✓		✓	✓	✓	✓	✓	✓		✓	✓				✓		✓						
Solanaceae	**Solanum nigrum*	black-berry nightshade				✓	✓	✓		✓		✓	✓	✓											✓				✓					✓					✓			✓	✓			✓					✓						
Solanaceae	*Solanum parvifolium* subsp. *parvifolium*	nightshade																	✓	✓																							✓																
Solanaceae	**Solanum* sp.																✓				✓				✓																									✓			✓						
Thymelaeaceae	*Pimelea microcephala* subsp.															✓		✓													✓																												

Family	Scientific Name	Common Name	P01	P02	P03	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P22A	P23	P23B	P24	P25	P26	P27	P30	P31	P33	P34	P35	P41	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56	P57	P58	P59	P60	P61	P62
	microcephala																																																									
Thymelaeaceae	*Pimelea neo-anglica*	poison pimelea																																												✓															
Urticaceae	*Urtica incisa*	stinging nettle											✓																																															
Verbenaceae	**Glandularia aristigera*	Mayne's pest	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓				✓	✓	✓	✓	✓								✓			✓	✓			✓			✓		✓																	
Verbenaceae	**Phyla canescens*	lippia																												✓																												
Verbenaceae	**Verbena officinalis*	common verbena																		✓	✓		✓			✓							✓										✓							✓	✓			✓	✓
Verbenaceae	**Verbena* sp.							✓																																																		
Zygophyllaceae	*Tribulus micrococcus*	spineless caltrop								✓	✓											✓						✓																												✓		
Zygophyllaceae	*Tribulus* sp.	cat-head; caltrop																		✓						✓																						✓		✓								
Zygophyllaceae	**Tribulus terrestris*	cat-head							✓	✓		✓	✓	✓	✓	✓	✓				✓							✓								✓	✓	✓			✓							✓								
Zygophyllaceae	*Zygophyllum glaucum*	pale twinleaf																		✓																																								



APPENDIX C

Plot and Transect Data

Appendix C - Plot and Transect Data

The following plot and transect data was collected from surveys of the Development Site. It includes the ten site attributes that are recorded in each Biometric plot and transect as per Table 2 of the FBA (OEH 2014). This data is assessed against benchmark data for PCTs and then entered into the BioBanking Calculator to assess the site value of each PCT in the Development Site.

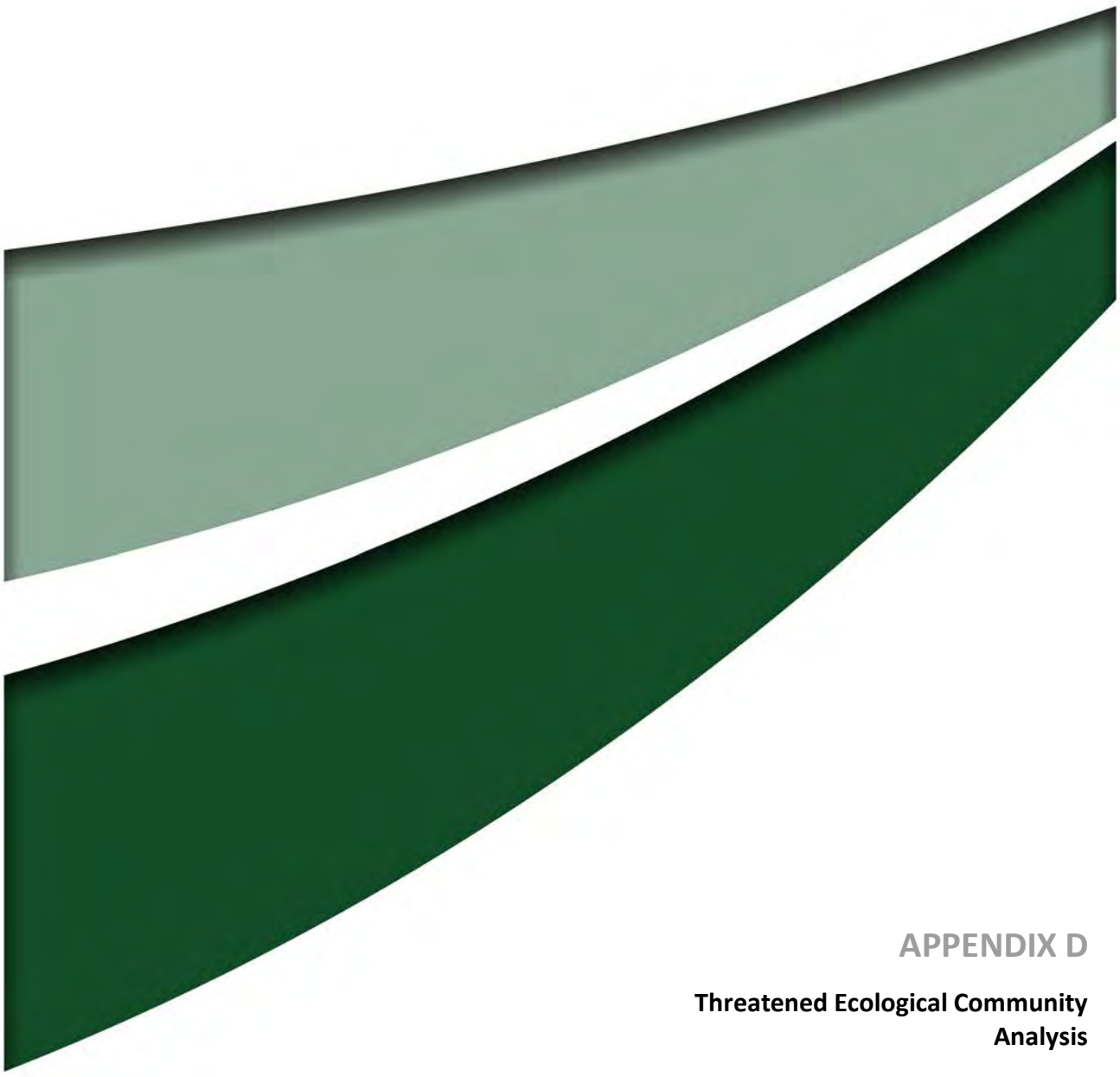
The following abbreviations or symbols are used in the list:

NPS	native plant species
NOC	native overstorey cover
NMC	native midstorey cover
NGCG	native ground cover (grasses)
NGCS	native ground cover (shrubs)
NGCO	native ground cover (other)
EPC	exotic plant cover
NTH	number of trees with hollows
OR	overstorey regeneration, and
FL	total length of fallen logs.

Plot Name	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL	Easting	Northing	Zone
Zone 1: BR233, NA219_Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion_Moderate/Good													
P01	9	2	0	46	4	36	2	0	1	4	769563	6699187	55
P02	16	33	6	42	6	16	6	0	1	5.5	769611	6698853	55
P13	35	14.5	10.5	52	6	24	38	0	1	12	770033	6663341	55
P14	29	18	24.5	34	16	38	36	0	1	23	769984	6663543	55
P15	34	21.5	11	8	14	20	40	0	1	145	769282	6668767	55
P49	33	10.5	4.5	58	12	50	18	0	1	0	237970	6779874	56
Zone 2: BR120, NA117_Brigalow – Belah Open Forest/Woodland on Alluvial often Gilgaied Clay from Piliga Scrub to Goondiwindi, Brigalow Belt South Bioregion_Moderate/Good													
P18	29	15.5	11	30	4	30	4	4	1	38	769531	6696262	55
P19	31	5.7	0.5	28	2	8	0	0	1	45	769440	6696253	55
P47	36	9	14	42	12	26	10	0	1	37	222729	6748051	56
Zone 3: BR130, NA129_Coolabah – River Coobah – Lignum Woodland Wetland of the Frequently Flooded Floodplains mainly in the Darling Riverine Plains Bioregion_Moderate/Good													
P23	21	17.5	12.5	24	14	0	10	1	0.3	55	773246	6718722	55
P62	10	44	5	56	2	0	0	3	0.3	5	772933	6718268	55
Zone 4: BR191, NA187_Queensland Bluegrass +/- Mitchell Grass Grassland on Cracking Clay Floodplains and Alluvial Plains mainly the Northern-Eastern Darling Riverine Plains Bioregion_Moderate/Good													
P03	26	0	0	38	0	30	40	0	0	0	769769	6648204	55
P16	18	0	0	66	0	16	0	0	0	0	769399	6681128	55
P20	31	0	0	30	0	22	10	0	0	0	769670	6699713	55
P21	31	0	0	56	0	26	2	0	0	0	770151	6702656	55
P22	27	0	0	90	0	0	0	0	0	0	771184	6710390	55
P22A	33	0	0	58	0	0	0	0	0	0	775314	6727631	55

P23B	26	0	0	38	0	22	10	0	0	0	773973	6721169	55
P44	28	0	0	68	28	42	28	0	0	0	209079	6743775	56
P50	26	0	0	70	0	28	22	0	0	0	239344	6784850	56
P51	27	0	5	76	6	16	26	0	0	0	240926	6791319	56
P52	16	0	0	84	12	58	8	0	0	0	241069	6791476	56
P54	27	0	0	38	16	4	42	0	0	0	772927	6718146	55
P55	14	0	0	16	12	22	6	0	0	0	783718	6744232	55
P56	12	0	4.5	78	0	4	0	0	0	0	772295	6716367	55
P57	9	0	2.5	34	0	12	0	0	0	0	770613	6705077	55
Zone 5: BR186, NA182_Poplar Box – Belah Woodland on Clay-loam Soils on Alluvial Plains of North-Central NSW_Moderate/Good													
P05	22	20.5	11	46	4	30	34	4	0.67	0	769945	6648617	55
P07	21	8	15.5	36	4	32	76	1	0.67	27	770360	6651503	55
P06	25	17	12	20	8	28	8	0	0.67	43	769891	6649176	55
P09	32	8.5	17	62	14	24	22	1	0.67	20	770189	6651990	55
P26	18	5.5	6.5	28	22	32	62	3	0.67	37	213181	6745038	56
P33	17	36.5	0	2	2	28	10	8	0.67	0	238708	6783213	56
P45	32	1.7	0	76	0	66	18	1	0.67	18	217534	6746411	56
Zone 6: BR186, NA182_Poplar Box – Belah Woodland on Clay-loam Soils on Alluvial Plains of North-Central NSW_Derived Native Grasslands													
P31	34	0	0	44	0	26	26	0	1	0	238439	6782667	56
P34	34	0	0	96	12	40	0	0	1	0	238590	6783057	56
P41	38	0	10	70	22	38	4	0	1	0	240257	6788816	56
P46	27	0	0	80	6	58	44	0	1	0	217570	6746385	56
P58	18	0	0	70	2	0	0	0	1	0	769453	6690406	55
P59	17	0	5	60	0	2	0	0	1	0	769595	6690712	55
P61	16	0	0	48	0	6	2	0	1	0	769427	6691080	55

Zone 7: BR127, NA126_Carbeen – White Cypress Pine – River Red Gum – Bloodwood Tall Woodland on Sandy Loam Alluvial and Aeolian Soils in the Northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion_Moderate/Good													
P25	27	12.5	9.5	12	48	58	50	0	1	0	785434	6744310	55
Zone 8: BR196, NA 193_River Red Gum Riparian Tall Woodland/Open Forest Wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion_Moderate/Good													
P24	9	24.5	0	4	0	0	66	2	1	43	776546	6736804	55
P30	29	10.5	3.5	14	2	40	76	1	1	16	238061	6781778	56
P35	26	13	7.5	10	14	10	48	0	1	3	239562	6785350	56
P48	14	7.5	14.5	40	24	38	76	1	1	8	238336	6776290	56
P60	5	2	33.5	86	0	0	0	1	1	7	771551	6712705	55
Zone 9: BR284, NA271_Coobah – Western Rosewood Low Open Tall Shrubland or Woodland mainly on Outwash areas in the Brigalow Belt South Bioregion_Moderate/Good													
P10	13	13	3.5	20	0	22	96	0	0	0	771483	6658199	55
P11	13	6.2	0	0	0	14	94	0	0	13	771453	6658187	55
P12	7	17.5	9.5	0	12	20	78	2	0	95	771270	6658867	55
Zone 10: BR346, NA348_Silver-leaved Ironbark – White Cypress Pine – Box Dry Shrub Grass Woodland of the Piliga Scrub – Warialda Region, Brigalow Belt South Bioregion_Moderate/Good													
P08	30	0.4	6	16	6	16	36	0	1	0	770297	6651507	55
P27	19	19	9.5	0	30	6	60	0	1	17	234409	6763871	56
P53	19	8	7	0	4	2	88	0	1	0	770173	6652264	55
Cleared/Non-native Vegetation													
P17	18	0	0	0	0	0	68	0	0	0	769438	6686506	55
P43	19	0	0	56	10	20	70	0	0	0	783544	6743092	55



APPENDIX D

Threatened Ecological Community Analysis

Appendix D -Threatened Ecological Community Analysis

The following TECs were specifically identified in the SEARs as requiring further consideration in the BAR:

- *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC* under the TSC Act and *Brigalow (Acacia harpophylla dominant and co-dominant) EEC* under EPBC Act
- *Cadellia pentastylis (Ooline) community in the Nandewar and Brigalow Belt South Bioregions EEC* under the TSC Act
- *Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act
- *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act
- *Marsh Club-rush sedgeland in the Darling Riverine Plains Bioregion CEEC* under the TSC Act
- *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions EEC* under the TSC Act and *Weeping Myall Woodland EEC* under EPBC Act
- *Native Vegetation on Cracking Clay Soils of the Liverpool Plains EEC* under the TSC Act and *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD CEEC* under the EPBC Act
- *White Box Yellow Box Blakely's Red Gum Woodland EEC* under the TSC Act and *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC* under the EPBC Act.

Of the above TECs, the following were recorded within the Development Site during the surveys undertaken for this assessment:

- *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC* under the TSC Act and *Brigalow (Acacia harpophylla dominant and co-dominant) EEC* under EPBC Act
- *Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act
- *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions EEC* under the TSC act and *Weeping Myall Woodland EEC* under EPBC Act
- *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD CEEC* under the EPBC Act (note that the TSC Act equivalent *Native Vegetation on Cracking Clay Soils of the Liverpool Plains EEC* was not recorded within the Development Site based on known distribution detailed in the scientific determination as discussed in further detail below).

Based on detailed and comprehensive floristic field surveys and analysis against NSW Scientific Committee Final Determinations and the Commonwealth Threatened Species Scientific Committee Listing and Conservation Advice for listed TECs, the remaining TECs outlined in the SEARs were not found to occur within the Development Site and will not be impacted directly or indirectly by the proposal.

Analysis of consistency with the scientific determinations for each TEC recorded in the Disturbance Site was undertaken for each of the communities listed above, with consideration of the advice provided by the NSW Scientific Committee and/or the Commonwealth Threatened Species Scientific Committee guidelines for interpreting listings for species, populations and ecological communities under the TSC Act and EPBC Act respectively.

Eight vegetation communities mapped within the Development Site conform to State and Commonwealth listed TECs, comprising:

- Weeping Myall Woodlands:
    - *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes Bioregions EEC* under the TSC Act.
    - *Weeping Myall Woodlands EEC* under the EPBC Act
- Brigalow Woodlands:
    - *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC* under the TSC Act
    - *Brigalow (Acacia harpophylla dominant and co-dominant) EEC* under the EPBC Act
- Coolibah Woodlands:
    - *Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions EEC* under the TSC Act
    - *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC* under the EPBC Act
- Natural Grasslands:
    - *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD CEEC* under the EPBC Act
- Carbeen Open Woodlands:
    - *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act.

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions EEC under the TSC Act

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions is listed as an endangered ecological community under the TSC Act. This ecological community is scattered across the eastern parts of the alluvial plains of the Murray-Darling river system. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The community is dominated by *Acacia pendula* as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs.

A comprehensive analysis of this vegetation community with reference to the Final Determination for this community (NSW Scientific Committee 2005) is undertaken below.

Constituent Species

The species recorded within *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions* EEC in the Development Site comprise species, and/or taxa below species rank, as required by the Act.

This included the canopy or upper species of weeping myall (*Acacia pendula*) which as the dominant and frequently the sole species within PCT 27 (BR233, NA219) Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South (Moderate to Good condition) within the Development Site (PCT 27).

Assemblage of Species

The NSW Scientific Committee (2005) lists 84 species as characterising the assemblage of species for *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions* EEC. As part of ecological investigations for the proposal, six systematic 20 metre x 20 metre quadrats were sampled in this community across the Development Site.

Within the Development Site, weeping myall (*Acacia pendula*) was recorded in all six quadrats sampled in PCT 27. A total of 36 (42.8 per cent) of the species listed in the Final Determination were present within this vegetation zone across the Development Site.

Particular Area

In relation to the particular area of the *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions* EEC, the NSW Scientific Committee (2005) states that the community occurs within the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions.

The area in which this vegetation zone occurs within the Development Site is situated within the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion (refer to **Appendix A**).

Supplementary Descriptors

In relation to supplementary descriptors, the NSW Scientific Committee (2005) includes the following key information pertaining to the *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions* EEC:

- ***occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall***

- ***structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland,***

- ***the tree layer grows up to a height of about 10 metres and invariably includes Acacia pendula as one of the dominant species or the only tree species present, and***

- ***the understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs.***

Of the above supplementary descriptors, PCT 27 present in the Development Site comprises an upper stratum dominated by weeping myall (*Acacia pendula*). Beneath the canopy, PCT 27 comprises a number of chenopod shrubs along with several grass and herb species. The vegetation zone is characterised by open woodland through to open shrubland, a likely result of disturbance associated with the existing rail corridor.

Climatically the Development Site has an average annual rainfall of between 645 and 646 millimetres (BOM 2016) which is slightly higher than the measurements listed in the Final Determination, however in recent years the rainfall has been lower than average. Additionally, the soils on which this community occurs is consistent with the Final Determination.

Summary

The Development Site supports a total of 6.95 hectares of Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions EEC under the TSC Act mapped as PCT27 (BR233, NA219) Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South (Moderate to Good condition).

Weeping Myall Woodlands EEC under the EPBC Act

Weeping Myall Woodlands is listed as an endangered ecological community under the EPBC Act. The community occurs on inland alluvial plains west of the Great Dividing Range in NSW and Queensland. The Listing Advice for the community identifies the community as occurring in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling Depression, Nandewar and Cobar Peneplain bioregions (TSSC 2008). The community is characterised by open woodlands and woodlands, generally 4-12 metres high that are dominated by weeping myall (*Acacia pendula*).

Condition Class

The published Listing Advice for *Weeping Myall Woodlands EEC* under the EPBC Act (TSSC 2008) and EPBC Policy Statement 3.17 (DEWHA 2009) provides a set of condition classes that patches of vegetation are required to meet in order to conform to the EEC. These are listed below and comparison is made to the Weeping Myall Woodlands (PCT 27) identified within the Development Site.

- ***Tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated Weeping Myall trees.***

The tree canopy of PCT 27 within the Development Site is dominated by weeping myall (*Acacia pendula*) trees.

- ***Overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha.***

PCT 27 identified in the Development Site has more than 5% tree canopy of weeping myall (*Acacia pendula*).

- ***The area is at least 0.5 hectares in size.***

A total of 6.95 hectares of PCT 27 (BR233, NA219) Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion (Moderate to Good condition) was identified within the Development Site. Due to the restricted nature of the rail corridor, a majority of patches strictly within corridor were smaller than the minimum 0.5 hectare patch size. A process was undertaken to identify which patches extended outside the bounds of the Development Site and therefore met the area patch requirements of the EPBC Act community. This process identified five patches of PCT 27 that were larger than 0.5 hectares, however only 2.61 hectares occurred within the Development Site.

- ***Patch has either: more than two layers of regeneration of Weeping Myall Present; or the tallest layer of living, dead or defoliated Weeping Myall trees is at least 4 metres tall and of the vegetation cover present, 50% is comprised of native species.***

The patches that meet the minimum patch size requirements specified in the Final Determination has more than two layers of regeneration of weeping myall (*Acacia pendula*) present or the tallest layer of living, dead or defoliated weeping myall trees is at least 4 metres tall.

Particular Area

In relation to the particular area of the Weeping Myall Woodlands EEC, the TSSC (2008) states that the community occurs within the Brigalow Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling Depression, Nandewar and Cobar Peneplain IBRA Bioregions.

The area in which PCT 27 occurs within the Development Site is situated within the Brigalow Belt South and Darling Riverine Plains Bioregion (refer to **Appendix A**).

Summary

The Development Site supports a total of 2.61 hectares of *Weeping Myall Woodlands EEC* within PCT27 (BR233, NA219) Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion (Moderate to Good condition). A comprehensive analysis of this PCT27 was undertaken to determine if, or what proportion of the vegetation zone conformed to the Listing Advice for Weeping Myall Woodlands EEC (TSSC 2008). This analysis identified that the Development Site supports a total of 2.61 hectares of *Weeping Myall Woodlands EEC* under the EPBC Act. The remaining 4.34 hectares of PCT27 within the Development Site did not conform to the EEC due to the community not meeting the minimum patch size requirements in some areas in the Development Site.

Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC under the TSC Act

Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions is listed as an EEC under the TSC Act. This community is known to occur in the Brigalow Belt South Bioregion and as isolated patches in the Darling Riverine Plains and Nandewar Bioregions of NSW in which Brigalow (*Acacia harpophylla*) is a dominant or co-dominant canopy species.

PCT 35 (BR120, NA117) Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion (PCT 35)was identified within the Development Site and was compared against the listing criteria to determine the extent of the EEC within the Development Site.

Constituent Species

The species recorded within PCT 35 in the Development Site comprise species, and/or taxa below species rank, as required by the Act.

PCT 35 included Brigalow (*Acacia harpophylla*) being the dominant or co-dominant canopy species often with scattered occurrences of poplar box (*Eucalyptus populnea* subsp. *bimbil*) and/or belah (*Casuarina cristata*).

Assemblage of Species

The NSW Scientific Committee (2002) lists 48 species as characterising the assemblage of species for *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC*. As part of ecological investigations for the proposal, three systematic 20 metre x 20 metre quadrats were sampled in PCT 35 across the Development Site.

Within the Development Site, Brigalow (*Acacia harpophylla*) was recorded in all quadrats sampled within PCT 35. A total of 19 (39.6 per cent) of the species listed in the Final Determination were present within this community across the Development Site.

Particular Area

In relation to the particular area of *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC*, the NSW Scientific Committee (2002) states that the community occurs within the Brigalow Belt South Bioregion with isolated occurrences in the Darling Riverine Plains and Nandewar Bioregions. The majority of the Development Site is situated within the Brigalow Belt South bioregion with a small area crossing into the Darling Riverine Plains bioregion.

Supplementary Descriptors

In relation to supplementary descriptors, the NSW Scientific Committee (2002) includes the following key information pertaining to *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC*:

- ***usually associated with heavy clay soils;***
- ***can be found in two distinct structural forms:***
    - ***a closed canopy form up to 25 metres high associated with deep gilgaied clay soils on gently undulating country where the understorey is scattered and ground cover sparse, or***

- ***a low woodland form dominated by Brigalow (Acacia harpophylla) with pockets of vegetation dominated by belah (Casuarina cristata) and poplar box (Eucalyptus populnea subsp. bimbil). The main canopy of this structural form tends to be moderately dense with small trees, shrubs and grasses occurring as scattered individuals.***

- ***surviving remnants of Brigalow are often small linear patches along roadsides and the edges of paddocks where threats include ongoing logging for fence posts; road widening and invasion by weeds.***

In relation to the above supplementary descriptors, PCT 35 occurring in the Development Site occurs on heavy clay soils as well as clay – loam soils. With regard to structure, PCT 35 is predominantly a low woodland dominated by brigalow (*Acacia harpophyll*a) with pockets of vegetation dominated by belah (*Casuarina cristata*) and poplar box (*Eucalyptus populnea subsp. bimbil*). Although the canopy is typically only between 5 and 35 per cent foliage cover, this is a likely result of historic clearing and disturbance. Within the understorey, small trees, shrubs and grasses tend to occur as scattered individuals.

PCT 35 present in the Development Site occurs as small linear patches, primarily on the edges of paddocks which have largely been cleared for cropping. Invasion by introduced perennials and annual exotic grasses were often locally common.

Summary

The Development Site supports a total of 4.75 hectares of *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC* under the TSC Act that is mapped as PCT35 (BR120, NA117) Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion (Moderate to Good condition).

Brigalow (*Acacia harpophylla* dominant and co-dominant) EEC under the EPBC Act

Brigalow (Acacia harpophylla dominant and co-dominant) is listed as an EEC under the EPBC Act. This community occurs within Queensland and New South Wales. It is characterised by the presence of brigalow (*Acacia harpophylla*) as one of the most abundant trees occurring as either, dominant or co-dominant within the tree layer.

The Development Site supports 4.75 hectares of PCT35 (BR120, NA117) Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion (Moderate to Good condition). A comprehensive analysis of this vegetation community was undertaken to determine if it conformed to Listing Advice provided by the Department of the Environment under the EPBC Act (TSSC 2013).

Particular Area

In relation to the particular area of the *Brigalow (Acacia harpophylla dominant and co-dominant)* EEC, the TSSC (2013) states that the community predominantly occurs west of the Great Dividing Range, extending north almost to Townsville in QLD, south to Narrabri in NSW, and west to Bourke on the Darling River and Blackall in central western QLD. Within NSW, remnants of the listed community mostly occur north of Bourke, west of Narrabri and north of Moree with minor occurrences near Walgett and Gunnedah, at Mt Misery and in the Pilliga East State Forest.

The area in which PCT 35 occurs within the Development Site is mostly north of Moree with smaller patches near Narrabri, north-western NSW (refer to **Appendix A**).

Additional Criteria – Key Diagnostic Characteristics

A detailed assessment of the vegetation communities described and mapped within the Development Site was undertaken to determine whether the vegetation present met the key diagnostic characteristics and condition thresholds identified within the *Brigalow (Acacia harpophylla dominant and co-dominant) EEC* Listing Advice (TSSC 2013).

- ***The presence of Acacia harpophylla as one of the most abundant tree species in the patch. A. harpophylla is either dominant in the tree layer or co-dominant with other species (notably Casuarina cristata, other species of Acacia, or species of Eucalyptus).***

All vegetation in PCT 35 within the Development Site assessed against the *Brigalow (Acacia harpophylla dominant and co-dominant)* EEC criteria contains brigalow (*Acacia harpophylla*) as either the dominant tree species in the patch or as co-dominant occurring with belah (*Casuarina cristata*) and bimble box (*Eucalyptus populnea* subsp. *bimbil*).

- ***In NSW – the patch meets one of the following NSW Vegetation and Classification and Assessment (VCA) community descriptions. The NSW VCA communities are: VCA IDs 29, 31 and 35; as described in Benson et al. (2006).***

All vegetation in PCT 35 within the Development Site assessed against the *Brigalow (Acacia harpophylla dominant and co-dominant*) EEC criteria is consistent with VCA ID 35 – Brigalow-Belah woodland on alluvial often gilgaied clay soil mainly in the Brigalow Belt South Bioregion based on a similar assemblage of species within the tree, shrub and ground layer, vegetation structure and geographic distribution.

Additional Criteria - Condition Thresholds

- ***The patch is 0.5 hectares or more in size;***

All patches of PCT 35 in the Development Site assessed against the *Brigalow (Acacia harpophylla dominant and co-dominant*) EEC criteria is 0.5 hectares or more in size.

- ***Exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 hectares (100 metres by 50 metres), that is representative of the patch.***

All patches of PCT 35 in the Development Site assessed against the *Brigalow (Acacia harpophylla dominant and co-dominant*) EEC criteria comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 hectares that is representative of the patch.

Summary

The Development Site is considered to support 4.75 hectares of *Brigalow (Acacia harpophylla dominant and co-dominant)* is listed as an EEC under the EPBC Act.

Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions under the TSC Act

Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions is listed as an endangered ecological community under the TSC Act. This community primarily occurs in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions and specifically in the local government areas of Brewarrina, Central Darling, Cobar, Coonamble, Moree Plains, Narrabri, Walgett, Bourke, Warren and Bogan, but may also occur elsewhere in these bioregions. Coolibah (*Eucalyptus coolabah*) is typically the dominant or subdominant tree species

however it may occur with or without river cooba (*Acacia stenophylla*), cooba (*Acacia salicina*), belah (*Casuarina cristata*), eurah (*Eremophila bignoniiflora*), black box (*Eucalyptus largiflorens*), river red gum (*Eucalyptus camaldulensis*) and poplar box (*Eucalyptus populnea* subsp. *bimbil*). The community occupies grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees, varying from tall riparian woodlands to open grassy woodlands with a sparse midstorey (NSW Scientific Committee 2012).

The Development Site supports a total of 1.19 hectares of PCT39 (BR130, NA129) Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion (Moderate to Good condition). A comprehensive analysis of this vegetation community was undertaken to determine if it conformed to the Final Determination for this *Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions EEC* under the TSC Act within (NSW Scientific Committee 2012).

Constituent Species

The species recorded within PCT 39 within the Development Site comprises species, and/or taxa below species rank, as required by the Act.

This included a canopy of Coolibah (*Eucalyptus coolabah*) as the dominant tree species with river red gum (*Eucalyptus camaldulensis*) and river cooba (*Acacia stenophylla*) occurring as subdominants.

Assemblage of Species

The NSW Scientific Committee (2012) lists 87 species as characterising the assemblage of species for *Coolibah - Black Box Woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC*. As part of ecological investigations for the proposal, two systematic 20 metre x 20 metre quadrats were sampled in PCT 39 in the Development Site.

Coolibah (*Eucalyptus coolabah*) was recorded as a dominant or subdominant canopy species and occurred with river red gum (*Eucalyptus camaldulensis*) and river cooba (*Acacia stenophylla*). A total of 17 species (19.5 per cent) of the species listed in the Final Determination were present within this community across the Development Site.

Particular Area

In relation to the particular area of the *Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions EEC*, the NSW Scientific Committee (2012) states that the community is found principally in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions. Specifically, the community is known to occur in the local government areas of Brewarrina, Central Darling, Cobar, Coonamble, Moree Plains, Narrabri, Walgett, Bourke, Warren and Bogan are known to, but may also occur elsewhere in these bioregions.

The Development Site is situated within the Brigalow Belt South and Darling Riverine Plains Bioregion which includes the Moree Plains and Narrabri LGAs (refer to **Appendix A**).

Supplementary Descriptors

In relation to supplementary descriptors, the NSW Scientific Committee (2012) includes the following key information pertaining to the *Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions EEC*:

- ***typically occurs on grey self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees.***

- ***typically formed as a woodland or open woodland with a grassy groundlayer but the size and density of trees will depend on its "successional" stage in relation to natural and anthropogenic disturbance regimes.***

Of the above supplementary descriptors, PCT 39 present in the Development Site comprises a woodland that occupies the clay soils of the floodplain in Gurley and on the levee of Tycannah Creek (refer to **Appendix A**).

Summary

The Development Site supports a total of 1.19 hectares of *Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions EEC* under the TSC Act within (NSW Scientific Committee 2012), mapped and described as PCT39 (BR130, NA129) Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion (Moderate to Good condition).

Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC under the EPBC Act

Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion is listed as an EEC under the EPBC Act. This community is limited to the Darling Riverine Plains and Brigalow Belt South bioregions in northern NSW and southern Queensland. It is broadly characterised by a canopy dominated by coolibah (*Eucalyptus coolabah* subsp. *coolabah*) and black box (*Eucalyptus largiflorens*) with a grassy understorey.

The Development Site is considered to support 1.19 hectares of *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion* EEC within PCT39 (BR130, NA129) Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion (Moderate to Good condition) (PCT 39). A comprehensive analysis of this vegetation community was undertaken to determine if it conformed to Listing Advice provided by the Department of the Environment under the EPBC Act (TSSC 2011).

Particular Area

In relation to the particular area of the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC*, the TSSC (2011) states that the community is limited to the Darling Riverine Plains and Brigalow Belt South bioregions.

The area in which PCT 39occurs within the Development Site spans both the Darling Riverine Plains and Brigalow Belt South bioregions (refer to **Appendix A**).

Additional Criteria– Key Diagnostic Characteristics

A detailed assessment of PCT 39 described and mapped within the Development Site was undertaken to determine whether the vegetation present met the key diagnostic characteristics and condition thresholds identified within the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion* EEC Listing Advice (TSSC 2011).

- ***It typically occurs on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees.***

PCT 39 occurs on clay soils of periodically waterlogged floodplains or on stream levees.

- ***A tree canopy layer is present that shows these features:***

- ***Coolibah (Eucalyptus coolabah subsp. coolabah) must be present in the tree canopy;***
- ***Coolibah typically is dominant (≥50% of tree crown cover);***
- ***Where Coolibah and black box (Eucalyptus largiflorens) co-occur, together they make up the dominant species in the tree canopy layer (≥50% of tree crown cover);***
- ***Hybrids of Coolibah or Black Box with each other and other Eucalyptus species (typically Bimble Box) are included as dominant tree species.***

PCT 39 has a tree canopy layer where Coolibah is dominant.

- ***The mid or shrub layer may or may not be present. When present it is typically sparse or clumped and is of variable composition.***

PCT 39 is identified as having a sparse shrub layer varying in species composition.

- ***The ground layer is of variable composition and cover ranging from sparse to dense. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall (Refer to Appendix A of Listing Advice).***

PCT 39 is identified as having a variable ground layer of between 30 to 60 per cent foliage cover and dominated by tufted grasses, chenopods and forbs.

Additional Criteria - Condition Thresholds

- ***The minimum patch size is 5 hectares. This may include areas of native vegetation that may be naturally open or contain regrowth.***

All patches of PCT 39 in the Development Site is 5 hectares or more in size due to being linked to vegetation outside the Development Site.

- ***The crown cover of trees in the canopy layer of the patch must be ≥8 per cent.***

The trees in the canopy layer of all patches of PCT 39 assessed against the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion* EEC criteria have a crown cover ≥8 per cent.

- ***Coolibah and/or Black Box in the tree canopy must be present in the patch that are either:***
  - ***matures trees with a main stem that has a diameter at breast height (dbh) of ≥30 cm; or***
  - ***hollow-bearing trees (live or dead); or***
  - ***coppiced trees with a main stem that has a dbh of ≥20 cm.***

All patches of PCT 39 assessed against the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion* EEC criteria contain mature trees with a dbh ≥30 cm as well as hollow-bearing trees.

- ***10 per cent or more of the ground cover comprises native graminoids, other herbs, chenopods and/or native low shrubs (i.e. woody plants typically less than 50 cm tall).***

All patches of PCT 39 assessed against the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC* criteria have a native ground cover greater than 10 per cent.

- ***In the ground layer, the percentage cover of non-native perennial plant species does not exceed the percentage cover of native plant species (annual or perennial).***

For all patches of PCT 39 assessed against the *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC* criteria the non-native perennial species cover in the ground layer do not exceed the percentage cover of native plant species in the ground layer.

Summary

The Development Site supports a total of 1.19 hectares of *Coolibah – Black Box Woodland of the Darling Riverine Plains and the Brigalow Belt South Bioregion EEC* under the EPBC Act, mapped and described as PCT39 (BR130, NA129) Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion (Moderate to Good condition).

Native Vegetation on Cracking Clay Soils of the Liverpool Plains EEC under the TSC Act

Native Vegetation on Cracking Clay Soils of the Liverpool Plains is listed as an EEC under the TSC Act. This community occurs on cracking clay soils within the Liverpool Plain Catchment. In relation to the particular area of this EEC, the final determination states that '*The community occurs on cracking clay soils (vertosols - including soils referred to as Black Earth) and is within the Liverpool Plains Catchment. The Mooki River, Coxs Creek and their tributaries drain this catchment into the Namoi River. This catchment occurs in the Brigalow Belt South and Nandewar Bioregions*' (NSW Scientific Committee 2011a). A review of the Mooki River, Coxs Creek and their tributaries revealed that this catchment occurs to the south of Narrabri and the closest occurrence to the Development Site is where Coxs Creek joins the Namoi River near Boggabri. Therefore the native vegetation that occurs on cracking clay soils within the Development Site, although floristically similar to that described as *Native Vegetation on Cracking Clay Soils of the Liverpool Plains* , **does not** occur in the particular area where the *Native Vegetation on Cracking Clay Soils of the Liverpool Plains* EEC occurs and **does not** meet the EEC final determination.

Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD CEEC under the EPBC Act

Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD is listed as a CEEC under the EPBC Act. This community occurs from the Darling Downs in Queensland to Dubbo in New South Wales however within this broad geographical area it confined to where climate, soils and landform are conducive to the development of tussock grasslands. The community is typically dominated by tussock grasses in the genera *Austrostipa, Bothriochloa, Chloris, Enteropogon, Rytidosperma* or *Themeda.*

A comprehensive analysis of PCT52 (BR191, NA187) Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion/Native Grassland (Moderate to Good condition) (PCT 52) was undertaken to determine if it conformed to Listing Advice provided by the Department of the Environment under the EPBC Act (TSSC 2009).

Particular Area

In relation to the particular area of the *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD*, the TSSC (2009) states that the community predominantly occurs from the Darling Downs of southern Queensland to Dubbo in New South Wales and incorporates the Liverpool and Moree Plains.

The Development Site is situated within the Darling Riverine Plains and Brigalow Belt South bioregions (refer to **Appendix A**).

Additional Criteria - Key Diagnostic Characteristics

A detailed assessment of the vegetation communities described and mapped within the Development Site was undertaken to determine whether the vegetation present met the key diagnostic characteristics and condition thresholds identified within the *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD* CEEC Listing Advice (TSSC 2011).

- ***Distribution mainly in the Darling Downs of southern Queensland and the Liverpool Plains and Moree Plains of northern NSW. Occurrence is mainly associated with fine textured, often cracking clay soils derived from either basalt or alluvium.***

PCT 52 occurs on black and red clay textured soils derived from basalt or on alluvial plains and cracking clay plains, with a slope of <5 degrees.

- ***Occurrence on landforms that is typically flat to very low slopes (less than 5 per cent/1 degree).***

PCT 52 occurs on alluvial plains or floodplains with a slope <5 per cent/1 degree.

- ***Tree canopy usually absent to sparse, comprising less than 10 per cent projective crown cover.***

The tree canopy of PCT 52 is usually absent to sparse comprising less than 10 per cent projective crown cover.

- ***The ground layer of typically dominated by perennial native grasses and contains 3 or more of the indicator native species (Refer to Listing Advice for indicator species list).***

The ground layer of all PCT 52 contained at least 3 of the indicator native species from the Listing Advice. Indicative species commonly encountered include Queensland bluegrass (*Dichanthium sericeum*), white speargrass (*Aristida leptopoda*), plains grass (*Austrostipa aristiglumis*), native millet (*Panicum decomposition*) and kangaroo grass (*Themeda triandra*).

Summary

The Development Site is considered to support 268.64 hectares of *Natural Grassland on Basalt and Fine-textured Alluvial Plains of Northern NSW and Southern QLD CEEC,* mapped as PCT52 (BR191, NA187) Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion/Native Grassland (Moderate to Good condition).

PCT 52 did not conform to the TSC Act equivalent threatened community *Native Vegetation on Cracking Clay Soils of the Liverpool Plains EEC* as the Development Site is located outside the known distribution of the TSC Act listed *Native Vegetation on Cracking Clay Soils of the Liverpool Plains EEC*.

Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC under the TSC Act

Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions is listed as an endangered ecological community under the TSC Act. The community occurs on siliceous sands, earthy sands and clayey sands on the riverine plains of the Mehi, Gwydir, MacIntyre and Barwon Rivers and has been recorded from the Local Government Areas of Moree Plains and Walgett within the Darling Riverine Plains and Brigalow Belt South Bioregions. Characteristic tree species of *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* include carbeen (*Corymbia*

tessellaris) and white cypress pine (*Callitris glaucophylla*). Associate tree species may include long-fruited bloodwood (*Corymbia dolichocarpa*), poplar box (*Eucalyptus populnea subsp. bimbil*), river red gum (*Eucalyptus camaldulensis*), belah (*Casuarina cristata*) and/or bulloak (*Allocasuarina leuhmannii*) (NSW Scientific Committee 2011b).

The Development Site supports a total of 0.04 hectares of PCT71 (BR127, NA126) Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and aeolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion (Moderate to Good condition) (PCT 71) which has been compared to the listing advice for *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act. A comprehensive analysis of PCT 71 was undertaken to determine if it conformed to the Final Determination for this community (NSW Scientific Committee 2011b).

Constituent Species

The species recorded within *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* in the Development Site comprise species, and/or taxa below species rank, as required by the Act.

PCT 71 included the canopy species of carbeen (*Corymbia tessellaris*) with river red gum (*Eucalyptus camaldulensis*) occurring as an associate tree species.

Assemblage of Species

The NSW Scientific Committee (2011b) lists 26 species as characterising the assemblage of species for *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* however emphasizes that the total species list of the community is actually larger and that species composition is influenced by the size of the site and by its recent disturbance history. As part of ecological investigations for the proposal, one systematic 20 metre x 20 metre quadrat was sampled in PCT 71 within the Development Site.

Within PCT 71, carbeen (*Corymbia tessellaris*) was recorded as dominant, with river red gum (*Eucalyptus camaldulensis*) occurring as an associate tree species within the quadrat sampled. A total of 4 species (15.4 per cent) of the species listed in the Final Determination were present within this community across the Development Site.

Particular Area

In relation to the particular area of the *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC*, the NSW Scientific Committee (2011b) states that the community occurs on the riverine plains of the Mehi, Gwydir, MacIntyre and Barwon Rivers and has been recorded from the Local Government Areas of Moree Plains and Walgett within the Darling Riverine Plains and Brigalow Belt South Bioregions.

The area in which PCT 71 was recorded within the Development Site is situated within the Brigalow Belt South Bioregion (refer to **Appendix A**).

Supplementary Descriptors

In relation to supplementary descriptors, the NSW Scientific Committee (2011b) includes the following key information pertaining to *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC*:

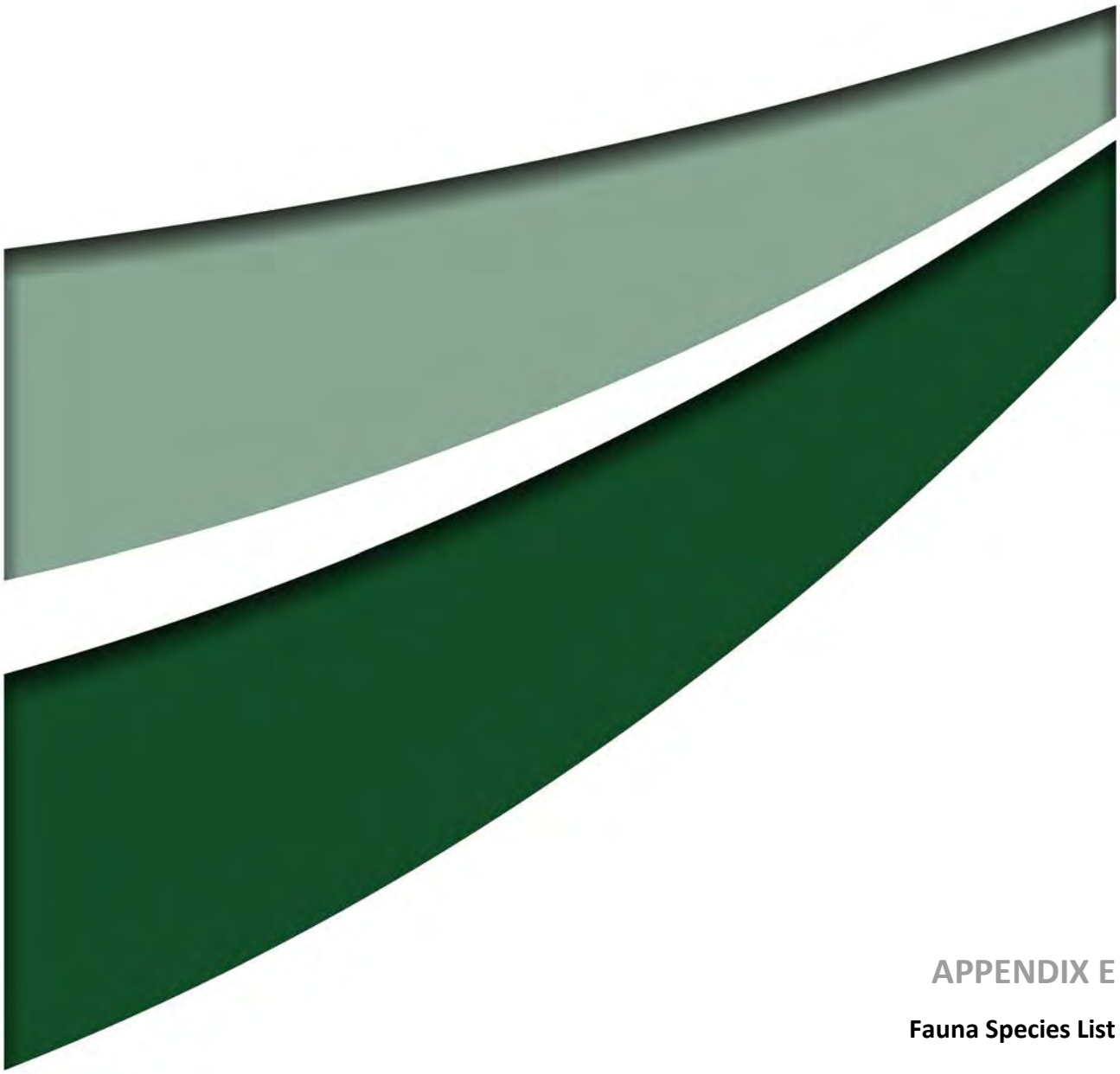
- ***occurs on siliceous sands, earthy sands and clayey sands and are restricted to well drained sandy soils and***

- ***remaining stands of this community are typically fragmented and often isolated.***

Of the above supplementary descriptors, PCT 71 present in the Development Site occurs on well-drained clayey sands in comparison to adjacent remnant vegetation. This community was recorded as a fragmented and isolated stand due to historic clearing and recent disturbances.

Summary

The Development Site supports a total of 0.04 hectares of PCT71 (BR127, NA126) Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and aeolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion (Moderate to Good condition) (PCT 71) which has been compared to the listing advice for *Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions EEC* under the TSC Act.



APPENDIX E

Fauna Species List

Appendix E - Fauna Species List

The following fauna list was developed from surveys of the Development Site.

The following abbreviations or symbols are used in the list:

asterisk (*)	Denotes species not indigenous to the Development Site;
subsp.	Subspecies;
V	Vulnerable under the TSC and/or EPBC Acts;
D	Definite Anabat echolocation recording;
Pr	Probable Anabat echolocation recording; and
Po	Possible Anabat echolocation recording.

Birds recorded were identified using descriptions in Pizzey and Knight (2012) and the scientific and common name nomenclature of Birdlife Australia (Birdlife International 2015). Reptiles recorded were identified using keys and descriptions in Cogger (2014) and Wilson and Swan (2008) and the scientific and common name nomenclature of Cogger (2014).

Amphibians recorded were identified using keys and descriptions in Cogger (2014), Robinson (1998), Anstis (2013) and Barker *et al*. (1995) and the scientific and common name nomenclature of Cogger (2014). Mammals recorded were identified using keys and descriptions in Van Dyck and Strahan (2008), and Menkhorst and Knight (2010) and the scientific and common name nomenclature of Van Dyck and Strahan (2008). Bat species recorded were identified using keys and descriptions in Churchill (1998) and ecological information was obtained from Churchill (2008).

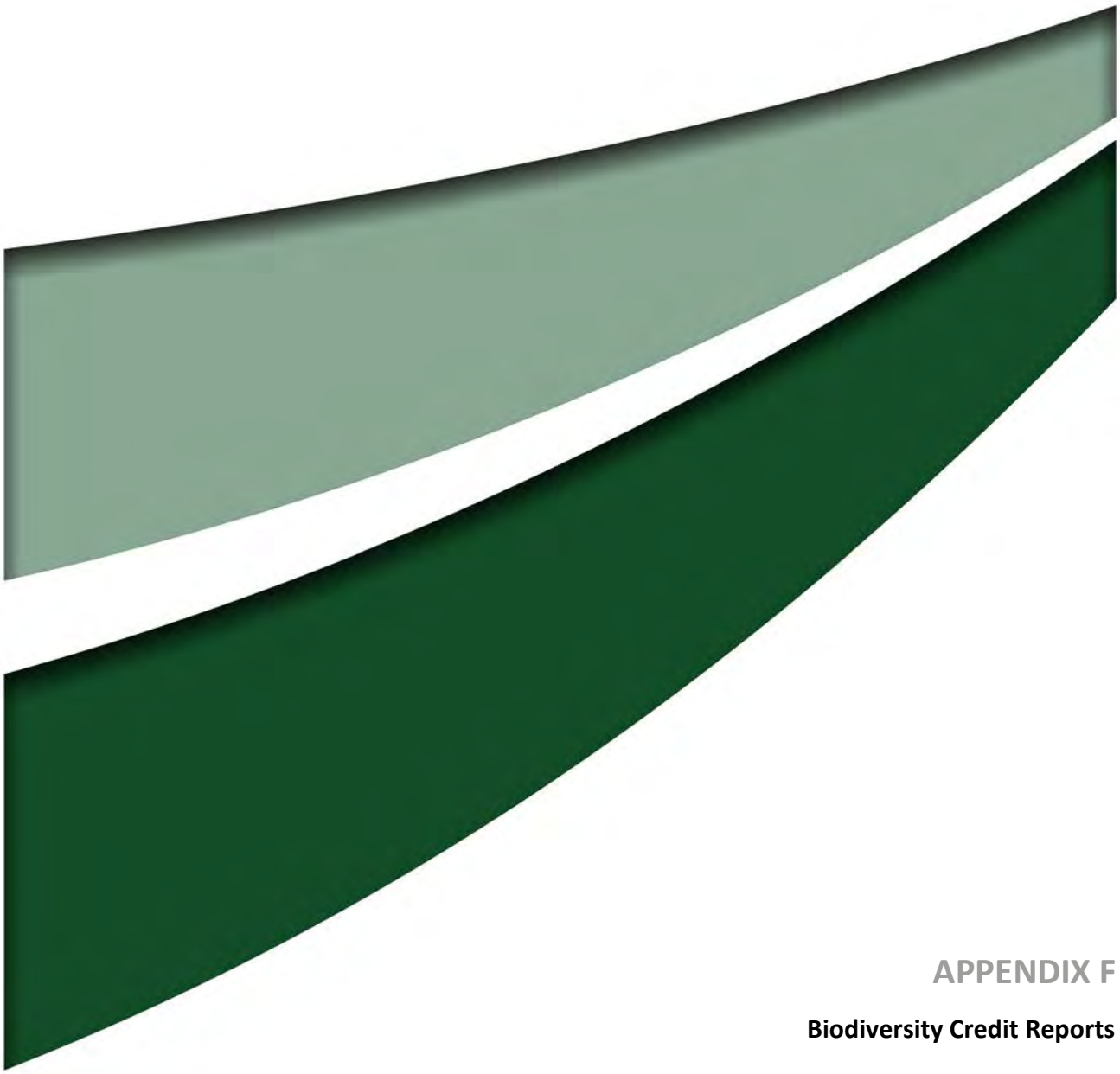
Scientific name	Common name	TSC Act	EPBC Act	Confidence
AMPHIBIA				
Myobatrachidae				
Limnodynastes fletcheri	marsh frog			
Limnodynastes tasmaniensis	spotted grass frog			
Hylidae				
Litoria latopalmata	Gunther's frog			
Litoria peronii	Peron's tree frog			
REPTILIA				
Pygopodidae				
Lialis burtonis	Burton's snake-lizard			
Scincidae				
Cryptoblepharus plagiocephalus	Peron’s snake-eyed skink			
Egernia striolata	tree skink			
Elapidae				
Pseudechis porphyriacus	red-bellied black snake			
AVES				

Scientific name	Common name	TSC Act	EPBC Act	Confidence
Podargidae				
Podargus strigoides	tawny frogmouth			
Columbidae				
Geopelia humeralis	bar-shouldered dove			
Ocyphaps lophotes	crested pigeon			
Alcedinidae				
Dacelo novaeguineae	laughing kookaburra			
Todiramphus sanctus	sacred kingfisher			
Cacatuidae				
Cacatua galerita	sulphur-crested cockatoo			
Eolophus roseicapillus	galah			
Nymphicus hollandicus	cockatiel			
Psittacidae				
Barnardius zonarius barnardi	Australian ringneck			
Northiella haematogaster	bluebonnet			
Platycercus adscitus	pale-headed rosella			
Psephotus haematonotus	red-rumped parrot			
Tytonidae				
Tyto alba	eastern barn owl			
Anatidae				
Dendrocygna eytoni	plumed whistling-duck			
Chenonetta jubata	wood duck			
Pelecanidae				
Pelecanus conspicillatus	Australian pelican			
Ardeidae				
Ardea pacifica	white-necked heron			
Nycticora caledonicus	nankeen night heron			
Threskiornithidae				
Platalea sp.	a spoonbill			
Accipitridae				
Milvus migrans	black kite			
Aquila audax	wedge-tailed eagle			
Elanus aillaris	black-shouldered kite			
Haliastur sphenurus	whistling kite			
Falco cenchroides	nankeen kestrel			
Rallidae				

Scientific name	Common name	TSC Act	EPBC Act	Confidence
Fulica atra	Eurasian coot			
Pardalotidae				
Pardalotus striatus	striated pardelote			
Meliphagidae				
Acanthagenys rufogularis	spiny-cheeked honeyeater			
Entomyzon cyanotis	blue-faced honeyeater			
Lichenostomus virescens	singing honeyeater			
Lichenostomus penicillatus	white-plumed honeyeater			
Lichmera indistincta	brown honeyeater			
Manorina melanocephala	noisy miner			
Philemon citreogularis	little friarbird			
Philemon corniculatus	noisy friarbird			
Plectorhyncha lanceolata	striped honeyeater			
Acanthizidae				
Acanthiza sp.	a thornbill			
Smicrornis brevirostris	weebill			
Sericornis frontalis	white-browed scrubwren			
Pomatostomidae				
Pomatostomus temporalis temporalis	grey-crowned babbler (eastern subsp.)	V		
Neosittidae				
Daphoenositta chrysoptera	varied sittella	V		
Artamidae				
Artamus leucorynchus	white-breasted woodswallow			
Artamus superciliosus	white-browed woodswallow			
Cracticus tibicen	Australian magpie			
Cracticus nigrogularis	pied butcherbird			
Campephagidae				
Struthidea cinerea	black-faced cuckoo-shrike			
Corcoracidae				
Corcorax melanorhamphos	white-winged chough			
Struthidea cinerea	apostlebird			
Corvidae				
Corvus bennetti	little crow			
Corvus coronoides	Australian raven			
Ptilonorhynchidae				
Ptilonorhynchus maculatus	spotted bowerbird			

Scientific name	Common name	TSC Act	EPBC Act	Confidence
Rhipiduridae				
Rhipidura albiscapa	grey fantail			
Rhipidura leucophrys	willie wagtail			
Monarchidae				
Grallina cyanoleuca	magpie-lark			
Maluridae				
Malurus cyaneus	superb fairy-wren			
Megaluridae				
Cincloramphus mathewsi	rufous songlark			
Timaliidae				
Zosterops lateralis	silvereye			
Sturnidae				
Sturnus tristis	common myna			
Hirundinidae				
Hirundo neoena	welcome swallow			
Passeridae				
Passer domesticus	house sparrow			
Estrildidae				
Taeniopygia bichenovii	double-barred finch			
Taeniopygia guttata	zebra finch			
MAMMALIA				
Tachyglossidae				
Tachyglossus aculeatus	short-beaked echidna			
Macropodidae				
Macropus giganteus	eastern grey kangaroo			
Wallabia bicolor	swamp wallaby			
Macropus sp.	a kangaroo			
Phalangeridae				
Trichosurus vulpecula	common brushtail possum			
Phascolarctidae				
Phascolarctos cinereus cinereus	koala	V	V	
Scuidae				
**Sus scrofa*	pig			
Emballonuridae				
Saccolaimus flaviventris	yellow-bellied sheathtail-bat	V		D
Molossidae				

Scientific name	Common name	TSC Act	EPBC Act	Confidence
Mormopterus planiceps	southern freetail-bat			Pr
Tadarida australis atratus	white-striped freetail-bat			D
Mormopterus petersii	inland freetail bat			D
Pteropodidae				
Pteropus poliocephalus	grey-headed flying-fox	V		
Vespertilionidae				
Chalinolobus gouldii	gould's wattled bat			D
Chalinolobus morio	chocolate wattled bat			D
Chalinolobus picatus	little pied bat	V		D
Miniopterus schreibersii oceanensis	eastern bent-wing bat	V		Po
Scotorepens balstoni	inland broad-nosed bat			Pr
Scotorepens greyii	little broad-nosed bat			D
Vespadelus vulturnus	little forest bat			D
Canidae				
**Vulpes vulpes*	red fox			
Felidae				
**Felis catus*	cat			
Leporidae				
**Lepus capensis*	brown hare			
Muridae				
**Mus musculus*	house mouse			
Bovidae				
**Ovis aries*	sheep			



APPENDIX F

Biodiversity Credit Reports

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/07/2016 Time: 2:59:56PM Calculator version: v4.0

Major Project details

Proposal ID:	0113/2016/3684MP
Proposal name:	NNS Assessment Area 1 Namoi CMA/Northern Basalts IBRA Subregion
Proposal address:	na Narrabri NSW 2309
Proponent name:	ARTC
Proponent address:	TBD Narrabri NSW 2309
Proponent phone:	na
Assessor name:	Ryan Parsons
Assessor address:	75 York Street TERALBA NSW 2284
Assessor phone:	02 4950 5322
Assessor accreditation:	0113

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	7.77	284.00
Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion	0.68	30.00
Total	8.45	314

Credit profiles

1. Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (NA182)

Number of ecosystem credits created	284
IBRA sub-region	Northern Basalts - Namoi

Offset options - Plant Community types	Offset options - IBRA sub-regions
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (NA182) Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion, (NA146) Carbeen +/- Coolabah grassy woodland on floodplain clay loam soil on north-western NSW floodplains, mainly Darling Riverine Plain Bioregion, (NA268)	Northern Basalts - Namoi and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (NA348)

Number of ecosystem credits created	30
IBRA sub-region	Northern Basalts - Namoi

Offset options - Plant Community types	Offset options - IBRA sub-regions

Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (NA348) Narrow-leaved Ironbark grassy woodland of the Brigalow Belt South bioregion, (NA164) Silvertop Stringybark - Orange Gum shrubby open forest of the central parts of the Nandewar Bioregion, (NA206) White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA222) White Box - White Cypress Pine shrubby open forest of the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA225) White Cypress Pine - White Box - Silver-leaved Ironbark shrubby open forest of the Nandewar Bioregion, (NA232) Semi-mesic woodland on basalt hills of the dry subtropical climate zone, north western slopes of NSW, (NA242) Rough-barked Apple - Yellow Box grass/shrub footslope open forest, Brigalow Belt South Bioregion, (NA343) Warrumbungle trachyte hillcrest Tumbledown Red Gum - Black Cypress Pine - White Bloodwood shrubby woodland, (NA382) White Box shrubby woodland of the western Liverpool Range, Warrumbungle Range and south-west Pilliga forests, Brigalow Belt South Bioregion, (NA402) Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions, (NA317) White Box - Black Cypress Pine shrubby hill woodland in the east Pilliga - Mendooran - Gulgong regions, mainly Brigalow Belt South Bioregion, (NA392) White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion, (NA407) White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion, (NA397) Black Cypress Pine - White Box - Tumbledown Gum shrubby open forest / woodland mainly in the Mt Kaputar region, Nandewar Bioregion, (NA250) Mugga Ironbark - stringybark shrubby open forest of the far southern Nandewar Bioregion and New England Tableland Bioregion, (NA305) Rough-barked Apple - White Box - Rusty Fig shrubby open forest in the Kaputar area of Brigalow Belt South and Nandewar Bioregions, (NA341) Tumbledown Red Gum - White Cypress Pine - Caley's Ironbark shrubby open forest of the Nandewar Bioregion and western New England Tableland Bioregion, (NA376) White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest of the southern Nandewar Bioregion and New England Tableland Bioregion, (NA393) White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion, (NA408) White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion, (NA398) White Box shrubby open forest on hills mainly in the Nandewar Bioregion,	Northern Basalts - Namoi and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

(NA401) Silver-leaved Ironbark - White Cypress Pine shrubby open forest of Brigalow Belt South Bioregion and Nandewar Bioregion, (NA349) White Box - cypress pine - Silver-leaved Ironbark shrub grass open forest / woodland of the northern Brigalow Belt South Bioregion and Nandewar Bioregion, (NA396) Silver-leaved Ironbark - White Box - White Cypress Pine viney scrub woodland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA347)	

Summary of species credits required

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/07/2016 Time: 3:03:23PM Calculator version: v4.0

Major Project details

Proposal ID:	0113/2016/3685MP
Proposal name:	NNS Assessment Area 2 - Namoi CMA/Northern Outwash IBRA Subregion
Proposal address:	na Narrabri NSW 2309
Proponent name:	ARTC
Proponent address:	TBD Narrabri NSW 2309
Proponent phone:	na
Assessor name:	Ryan Parsons
Assessor address:	75 York Street TERALBA NSW 2284
Assessor phone:	02 4950 5322
Assessor accreditation:	0113

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion.	1.42	51.00
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	3.88	130.00
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	0.65	30.00
Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion	0.48	21.00
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	0.08	4.01
Total	6.51	236

Credit profiles

1. Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (NA182)

Number of ecosystem credits created	130
IBRA sub-region	Liverpool Plains (Part B)

Offset options - Plant Community types	Offset options - IBRA sub-regions
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (NA182) Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion, (NA146) Carbeen +/- Coolabah grassy woodland on floodplain clay loam soil on north-western NSW floodplains, mainly Darling Riverine Plain Bioregion, (NA268)	Liverpool Plains (Part B) and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (NA348)

Number of ecosystem credits created	21
IBRA sub-region	Liverpool Plains (Part B)

Offset options - Plant Community types	Offset options - IBRA sub-regions

Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (NA348) Narrow-leaved Ironbark grassy woodland of the Brigalow Belt South bioregion, (NA164) Silvertop Stringybark - Orange Gum shrubby open forest of the central parts of the Nandewar Bioregion, (NA206) White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA222) White Box - White Cypress Pine shrubby open forest of the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA225) White Cypress Pine - White Box - Silver-leaved Ironbark shrubby open forest of the Nandewar Bioregion, (NA232) Semi-mesic woodland on basalt hills of the dry subtropical climate zone, north western slopes of NSW, (NA242) Rough-barked Apple - Yellow Box grass/shrub footslope open forest, Brigalow Belt South Bioregion, (NA343) Warrumbungle trachyte hillcrest Tumbledown Red Gum - Black Cypress Pine - White Bloodwood shrubby woodland, (NA382) White Box shrubby woodland of the western Liverpool Range, Warrumbungle Range and south-west Pilliga forests, Brigalow Belt South Bioregion, (NA402) Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions, (NA317) White Box - Black Cypress Pine shrubby hill woodland in the east Pilliga - Mendooran - Gulgong regions, mainly Brigalow Belt South Bioregion, (NA392) White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion, (NA407) White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion, (NA397) Black Cypress Pine - White Box - Tumbledown Gum shrubby open forest / woodland mainly in the Mt Kaputar region, Nandewar Bioregion, (NA250) Mugga Ironbark - stringybark shrubby open forest of the far southern Nandewar Bioregion and New England Tableland Bioregion, (NA305) Rough-barked Apple - White Box - Rusty Fig shrubby open forest in the Kaputar area of Brigalow Belt South and Nandewar Bioregions, (NA341) Tumbledown Red Gum - White Cypress Pine - Caley's Ironbark shrubby open forest of the Nandewar Bioregion and western New England Tableland Bioregion, (NA376) White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest of the southern Nandewar Bioregion and New England Tableland Bioregion, (NA393) White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion, (NA408) White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion, (NA398) White Box shrubby open forest on hills mainly in the Nandewar Bioregion,	Liverpool Plains (Part B) and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

(NA401) Silver-leaved Ironbark - White Cypress Pine shrubby open forest of Brigalow Belt South Bioregion and Nandewar Bioregion, (NA349) White Box - cypress pine - Silver-leaved Ironbark shrub grass open forest / woodland of the northern Brigalow Belt South Bioregion and Nandewar Bioregion, (NA396) Silver-leaved Ironbark - White Box - White Cypress Pine viney scrub woodland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA347)	

3. Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (NA219)

Number of ecosystem credits created	4
IBRA sub-region	Liverpool Plains (Part B)

Offset options - Plant Community types	Offset options - IBRA sub-regions
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (NA219)	Liverpool Plains (Part B) and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

4. Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion., (NA271)

Number of ecosystem credits created	51
IBRA sub-region	Liverpool Plains (Part B)

Offset options - Plant Community types	Offset options - IBRA sub-regions
Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion., (NA271)	Liverpool Plains (Part B) and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

5. River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA193)

Number of ecosystem credits created	30
IBRA sub-region	Liverpool Plains (Part B)

Offset options - Plant Community types	Offset options - IBRA sub-regions
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (NA193)	Liverpool Plains (Part B) and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/07/2016 Time: 3:04:22PM Calculator version: v4.0

Major Project details

Proposal ID:	0113/2016/3626MP
Proposal name:	NNS Assessment Area 3 - Border Rivers Gwydir CMA/Northern Outwash IBRA SR
Proposal address:	na Narrabri NSW 2309
Proponent name:	ARTC
Proponent address:	TBC Narrabri NSW 2309
Proponent phone:	na
Assessor name:	Ryan Parsons
Assessor address:	75 York Street TERALBA NSW 2284
Assessor phone:	02 4950 5322
Assessor accreditation:	0113

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	3.54	250.04
Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and eolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	0.04	2.00
Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion.	2.16	82.00
Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion	1.19	63.41
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	121.35	5,497.41
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion	212.55	9,889.00
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	13.14	609.00
Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion	1.13	49.00
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	4.88	244.70
Total	359.98	16,687

Credit profiles

1. Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (BR186)

Number of ecosystem credits created	5,497
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (BR186) Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion, (BR150) Carbeen +/- Coolabah grassy woodland on floodplain clay loam soil on north-western NSW floodplains, mainly Darling Riverine Plain Bioregion, (BR282)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (BR346)

Number of ecosystem credits created	49
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions

Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion, (BR346) Grey Box - Rough-barked Apple shrub/grass open forest of northern parts of the Nandewar Bioregion and New England Tableland Bioregion, (BR146) Silvertop Stringybark - Orange Gum shrubby open forest of the central parts of the Nandewar Bioregion, (BR211) White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR236) White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion, (BR239) White Cypress Pine - White Box - Silver-leaved Ironbark shrubby open forest of the Nandewar Bioregion, (BR246) Semi-mesic woodland on basalt hills of the dry subtropical climate zone, north western slopes of NSW, (BR257) White Cypress Pine - Silver-leaved Ironbark - Wilga shrub grass woodland of the Narrabri-Yetman region, Brigalow Belt South Bioregion, (BR395) White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion, (BR393) Black Cypress Pine - White Box - Tumbledown Gum shrubby open forest / woodland mainly in the Mt Kaputar region, Nandewar Bioregion, (BR268) Grey Box shrubby open forest of northern parts of the Nandewar Bioregion and New England Tableland Bioregion, (BR297) Mugga Ironbark - Black Cypress Pine shrubby open forest mainly in the Nandewar Bioregion and northern Brigalow Belt South Bioregion, (BR310) Rough-barked Apple - White Box - Rusty Fig shrubby open forest in the Kaputar area of Brigalow Belt South and Nandewar Bioregions, (BR336) Silver-leaved Ironbark - Black Cypress Pine +/- White Box shrubby open forest mainly in the northern Nandewar Bioregion, (BR343) Tumbledown Red Gum - White Cypress Pine - Caley's Ironbark shrubby open forest of the Nandewar Bioregion and western New England Tableland Bioregion, (BR372) White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest of the southern Nandewar Bioregion and New England Tableland Bioregion, (BR386) White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion, (BR394) White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion, (BR390) White Box shrubby open forest on hills mainly in the Nandewar Bioregion, (BR392) Silver-leaved Ironbark - White Cypress Pine shrubby open forest of Brigalow Belt South Bioregion and Nandewar Bioregion, (BR349) Silver-leaved Ironbark - White Cypress Pine - tea tree shrubby woodland mainly in the northern Nandewar Bioregion, (BR347) Tumbledown Red Gum - White Cypress Pine - Silver-leaved Ironbark shrubby woodland mainly in the northern Nandewar Bioregion, (BR374)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

White Box - cypress pine - Silver-leaved Ironbark shrub grass open forest / woodland of the northern Brigalow Belt South Bioregion and Nandewar Bioregion, (BR385) Silver-leaved Ironbark - White Box - White Cypress Pine viney scrub woodland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR345)	

3. Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion, (BR120)

Number of ecosystem credits created	250
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion, (BR120)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

4. Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion, (BR130)

Number of ecosystem credits created	63
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion, (BR130) Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions, (BR102)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

5. Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR233)

Number of ecosystem credits created	245
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR233)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

6. Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and eolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion, (BR127)

Number of ecosystem credits created	2
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and eolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion, (BR127) Silver-leaved Ironbark - White Cypress Pine - Rough-barked Apple woodland on alluvial terraces in central-north NSW, (BR208)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

7. Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion., (BR284)

Number of ecosystem credits created	82
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Coobah - Western Rosewood low open tall shrubland or woodland mainly on outwash areas in the Brigalow Belt South Bioregion., (BR284)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

8. Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191)

Number of ecosystem credits created	9,889
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191) Mitchell Grass grassland - chenopod low open shrubland on floodplains in the semi-arid (hot) and arid zones, (BR157) Native Millet - Cup Grass grassland of the Darling Riverine Plains Bioregion, (BR167) Rats Tail Couch sod grassland wetland of inland floodplains, (BR192) Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR251)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

9. River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)

Number of ecosystem credits created	609
IBRA sub-region	Northern Outwash

Offset options - Plant Community types	Offset options - IBRA sub-regions
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)	Northern Outwash and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Belson's Panic	Homopholis belsonii	73.00	1,898
Finger Panic Grass	Digitaria porrecta	28.00	364
Creeping Tick-trefoil	Desmodium campylocaulon	237.00	2,607
Koala	Phascolarctos cinereus	62.77	1,632

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/07/2016 Time: 3:05:25PM Calculator version: v4.0

Major Project details

Proposal ID:	0113/2016/3681MP
Proposal name:	NNS Assessment Area 4 - Border Rivers Gwydir/Castlereagh-Barwon IBRA Subregion
Proposal address:	na Narrabri NSW 2309
Proponent name:	ARTC
Proponent address:	TBD Narrabri NSW 2309
Proponent phone:	na
Assessor name:	Ryan Parsons
Assessor address:	75 York Street TERALBA NSW 2284
Assessor phone:	02 4950 5322
Assessor accreditation:	0113

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion	5.44	253.00
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	0.72	33.00
Total	6.16	286

Credit profiles

1. Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191)

Number of ecosystem credits created	253
IBRA sub-region	Castlereagh-Barwon - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191) Mitchell Grass grassland - chenopod low open shrubland on floodplains in the semi-arid (hot) and arid zones, (BR157) Native Millet - Cup Grass grassland of the Darling Riverine Plains Bioregion, (BR167) Rats Tail Couch sod grassland wetland of inland floodplains, (BR192) Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR251)	Castlereagh-Barwon - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)

Number of ecosystem credits created	33
IBRA sub-region	Castlereagh-Barwon - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)	Castlereagh-Barwon - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

Biodiversity credit report

This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/07/2016 Time: 3:06:43PM Calculator version: v4.0

Major Project details

Proposal ID:	0113/2016/3676MP
Proposal name:	NNS Assessment Area 5 - Border Rivers Gwydir CMA/Northern Basalts IBRA SR
Proposal address:	
Proponent name:	ARTC
Proponent address:	TBD Narrabri NSW 2309
Proponent phone:	na
Assessor name:	Ryan Parsons
Assessor address:	75 York Street TERALBA NSW 2284
Assessor phone:	02 4950 5322
Assessor accreditation:	0113

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	9.93	392.00
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion	19.42	904.00
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	0.07	3.00
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	0.09	5.00
Total	29.51	1,304

Credit profiles

1. Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (BR186)

Number of ecosystem credits created	392
IBRA sub-region	Northern Basalts - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW, (BR186) Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion, (BR150) Carbeen +/- Coolabah grassy woodland on floodplain clay loam soil on north-western NSW floodplains, mainly Darling Riverine Plain Bioregion, (BR282)	Northern Basalts - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR233)

Number of ecosystem credits created	5
IBRA sub-region	Northern Basalts - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR233)	Northern Basalts - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

3. Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191)

Number of ecosystem credits created	904
IBRA sub-region	Northern Basalts - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion, (BR191) Mitchell Grass grassland - chenopod low open shrubland on floodplains in the semi-arid (hot) and arid zones, (BR157) Native Millet - Cup Grass grassland of the Darling Riverine Plains Bioregion, (BR167) Rats Tail Couch sod grassland wetland of inland floodplains, (BR192) Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, (BR251)	Northern Basalts - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

4. River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)

Number of ecosystem credits created	3
IBRA sub-region	Northern Basalts - Border Rivers/Gwydir

Offset options - Plant Community types	Offset options - IBRA sub-regions
River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR196)	Northern Basalts - Border Rivers/Gwydir and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

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