

APPENDIX

L

Terrestrial and Aquatic Ecology Technical Report

Part 2 of 7

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX

L

Terrestrial and Aquatic Ecology Technical Report

Appendix A Additional ecological investigations

CONTINUED

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix A - GTRE mapping



Appendix A-2 - Regional Ecosystem Mapping



0 250 500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

 HVR - Endangered

 Non Remnant

 B2G Footprint

 Chainage Points

 Major Watercourse Lines

 Bringalily state forest

 Whetstone state forest

Data Sources:

Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

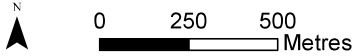


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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-3 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Endangered
 - HVR - Endangered
 - Regrowth - Endangered
 - Non Remnant
- B2G Footprint**
- Chainage Points
 - Major Watercourse Lines
 - Bringalilly state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage



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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-4 - Regional Ecosystem Mapping



0 250 500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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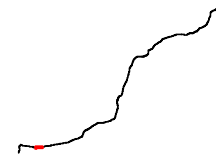
Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Endangered
- HVR - Endangered
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage



Document History:

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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-5 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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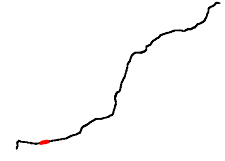
Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Endangered
- HVR - Endangered
- Regrowth - Endangered
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringality state forest
- Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

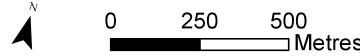


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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-6 - Regional Ecosystem Mapping



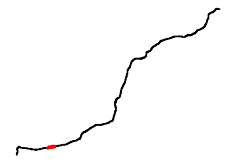
Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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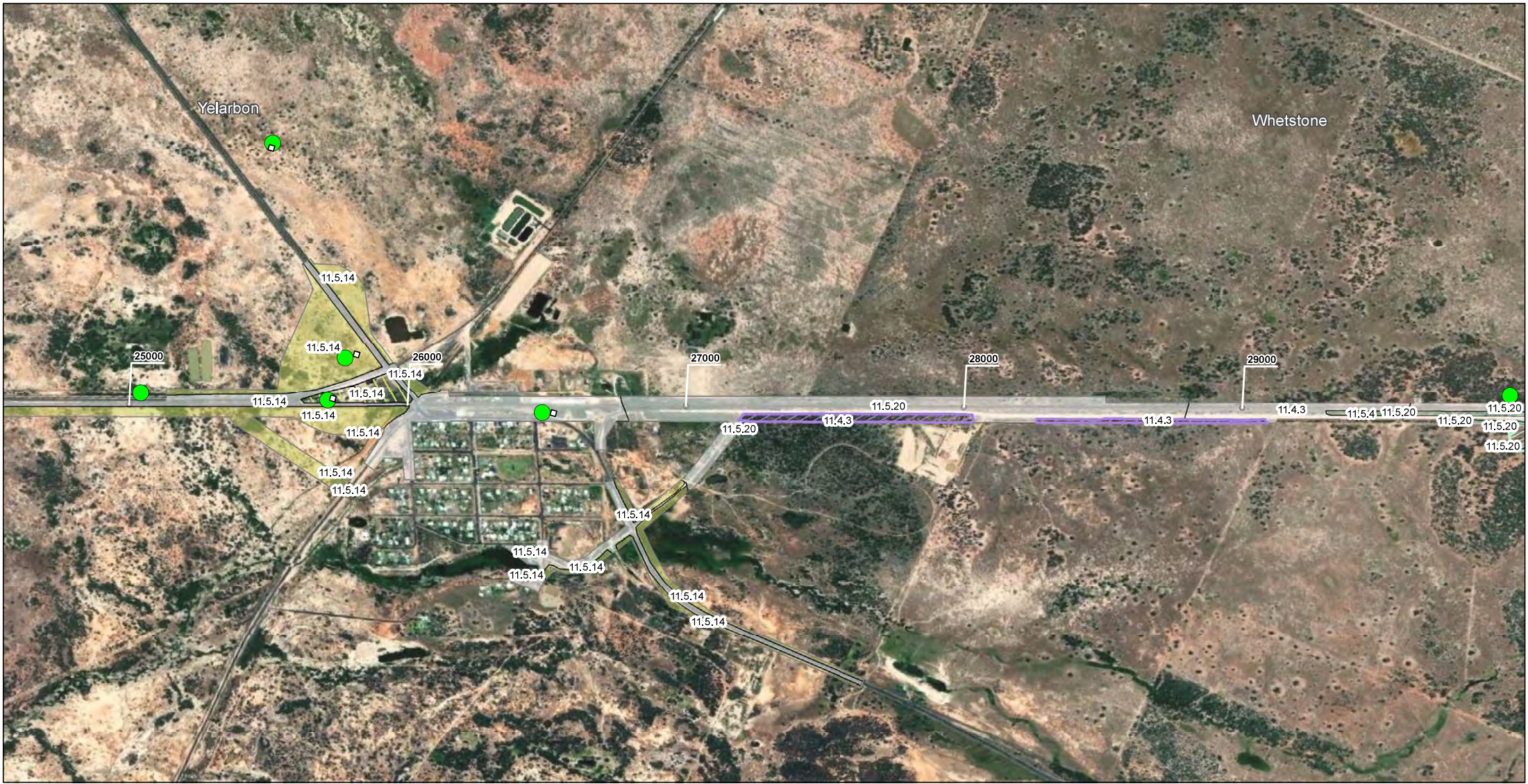
Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Endangered
 - Remnant - Of Concern
 - HVR - Endangered
 - Regrowth - Endangered
 - Non Remnant
- B2G Footprint**
- Habitat Assessment
 - Bioconditions
 - Chainage Points
 - Major Watercourse Lines
 - Bringalily state forest
 - Whetstone state forest

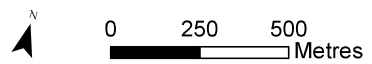
Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



Document History:					
Rev	Reason for Issue	Author	Reviewer	Approver	Date
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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-7 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Of Concern
 - Remnant - Least Concern
 - HVR - Endangered
 - HVR - Least Concern
 - Regrowth - Of Concern
 - Regrowth - Least Concern
 - Non Remnant
- B2G Footprint**
- Habitat Assessment
 - Bioconditions
 - Chainage Points
 - Major Watercourse Lines
 - Bringality state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage



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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-8 - Regional Ecosystem Mapping



0 250 500
Metres

Scale 1:10,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

Chainage Points

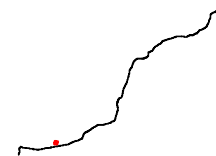
Major Watercourse Lines

Bringalily state forest

Whetstone state forest

Data Sources:

Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



Document History:

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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-9 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Endangered
- Remnant - Of Concern
- Remnant - Least Concern
- HVR - Endangered
- HVR - Of Concern
- HVR - Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringality state forest
- Whetstone state forest

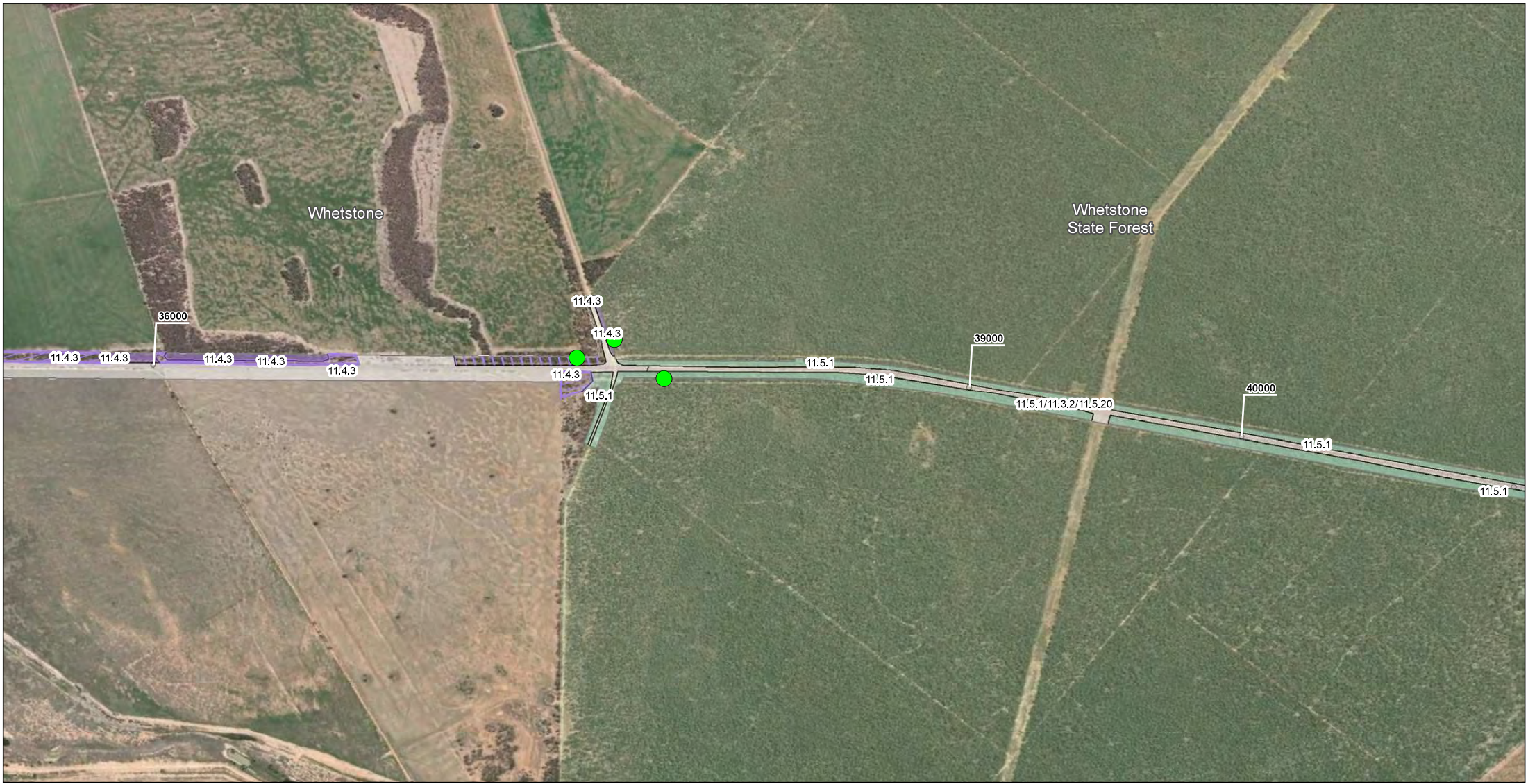
Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



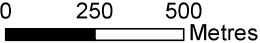
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Appendix A-10 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

 Remnant - Endangered

 Remnant - Least Concern

 HVR - Endangered

 Regrowth - Endangered

 Non Remnant

 Bioconditions

 Chainage Points

 Major Watercourse Lines

 Bringalily state forest

 Whetstone state forest

 B2G Footprint

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



Document History:

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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-11 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

	Remnant - Of Concern
	Remnant - Least Concern
	HVR - Of Concern
	HVR- Least Concern
	Regrowth - Of Concern
	Non Remnant

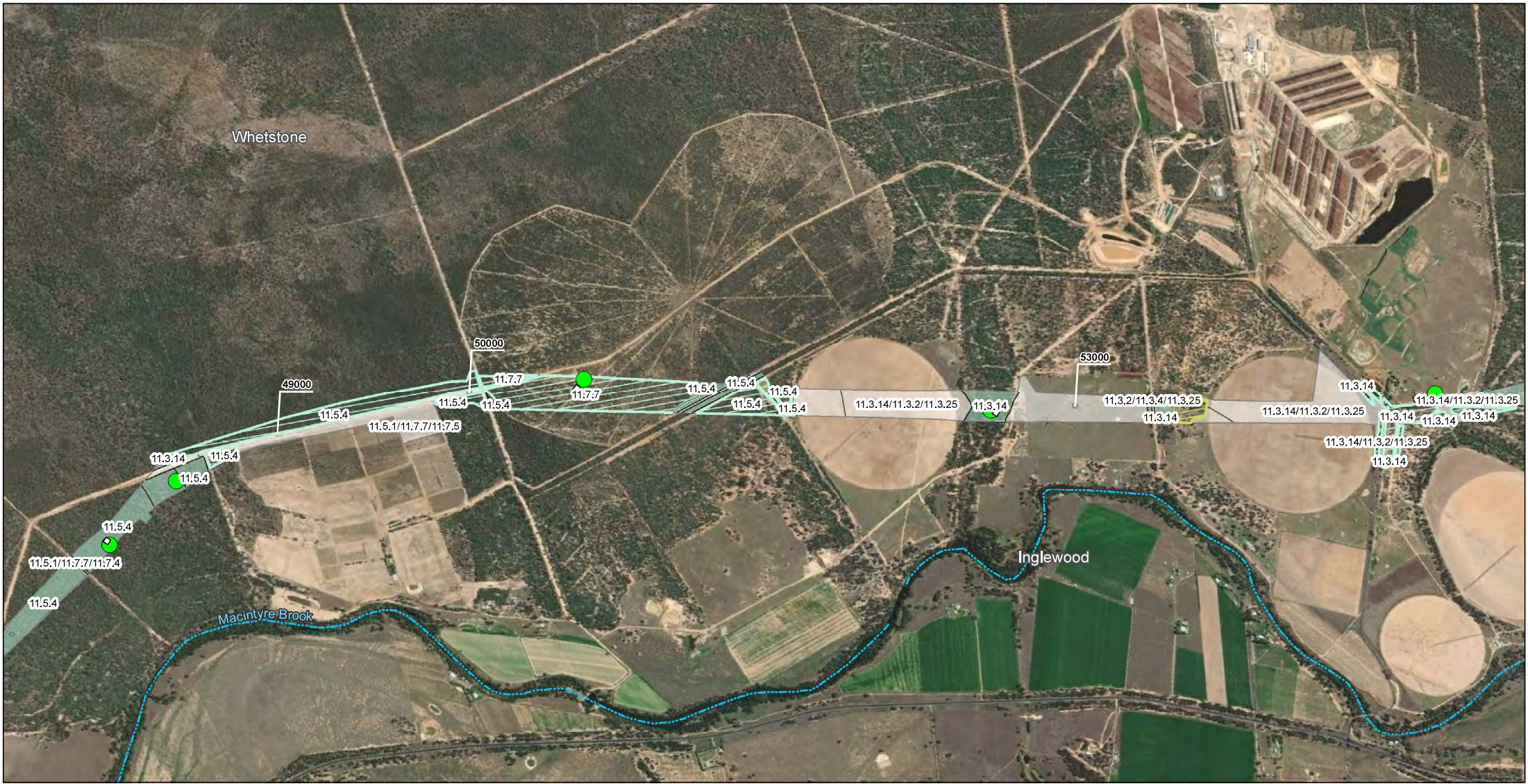
	B2G Footprint
	Habitat Assessment
	Bioconditions
	Chainage Points
	Major Watercourse Lines
	Bringality state forest
	Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



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Appendix A-12 - Regional Ecosystem Mapping



02505007501,000Metres

Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Least Concern
- HVR - Of Concern
- HVR- Least Concern
- Regrowth - Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringality state forest
- Whetstone state forest

Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



Document History:

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Appendix A-13 - Regional Ecosystem Mapping

0 250 500 750 1,000 Metres

Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)
 Remnant - Least Concern
 HVR - Of Concern
 HVR- Least Concern
 Regrowth - Of Concern
 Regrowth - Least Concern
 Non Remnant

B2G Footprint
 Habitat Assessment
 Bioconditions
 Chainage Points
 Major Watercourse Lines
 Bringalily state forest
 Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-14 - Regional Ecosystem Mapping


0 250 500 750 1,000
Metres

Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Of Concern
- Remnant - Least Concern
- HVR - Of Concern
- Regrowth - Least Concern
- Non Remnant

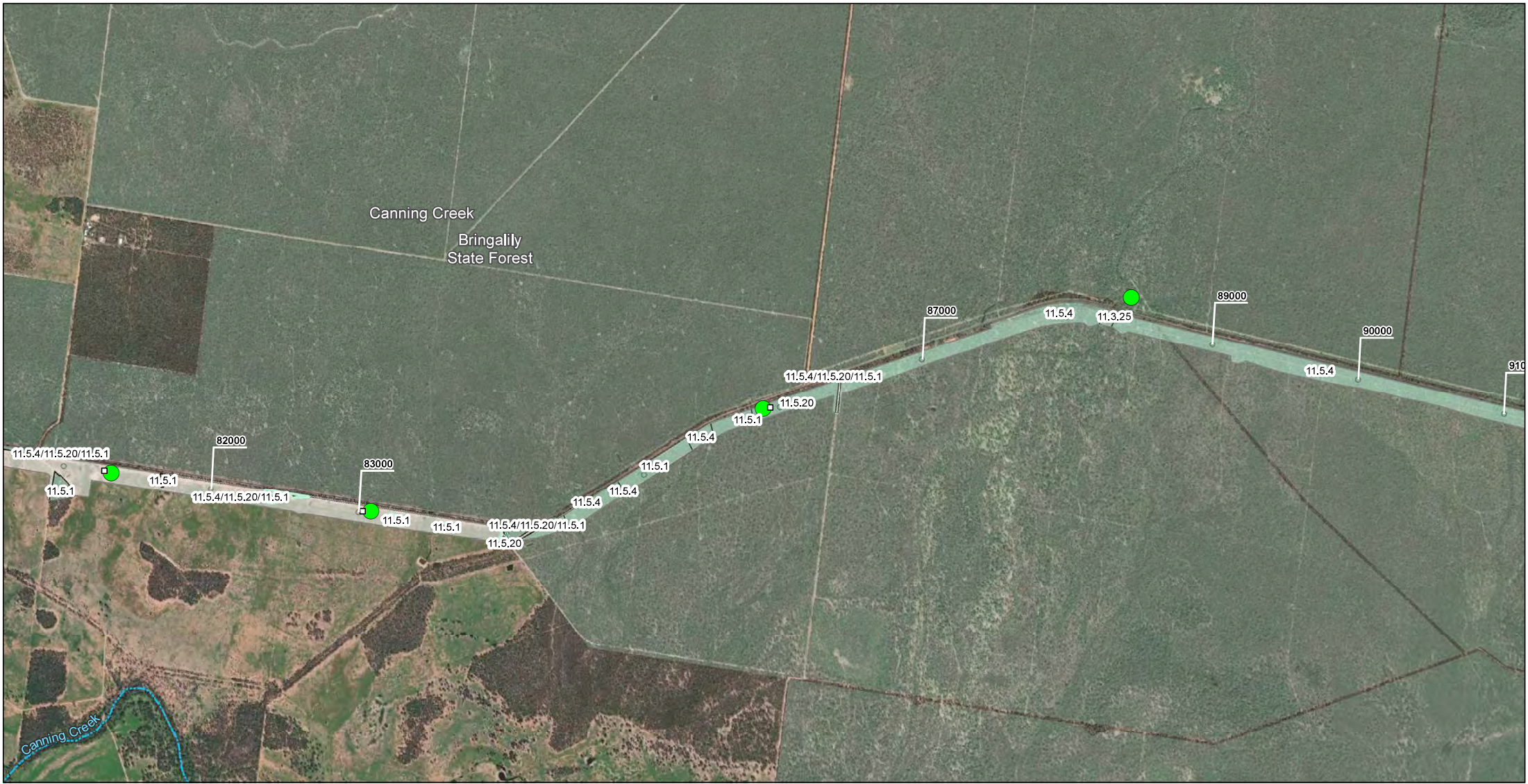
- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



Document History:					
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Appendix A-16 - Regional Ecosystem Mapping


0 250 500 750 1,000
Metres

Scale 1:25,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Least Concern
- HVR- Least Concern
- Regrowth - Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

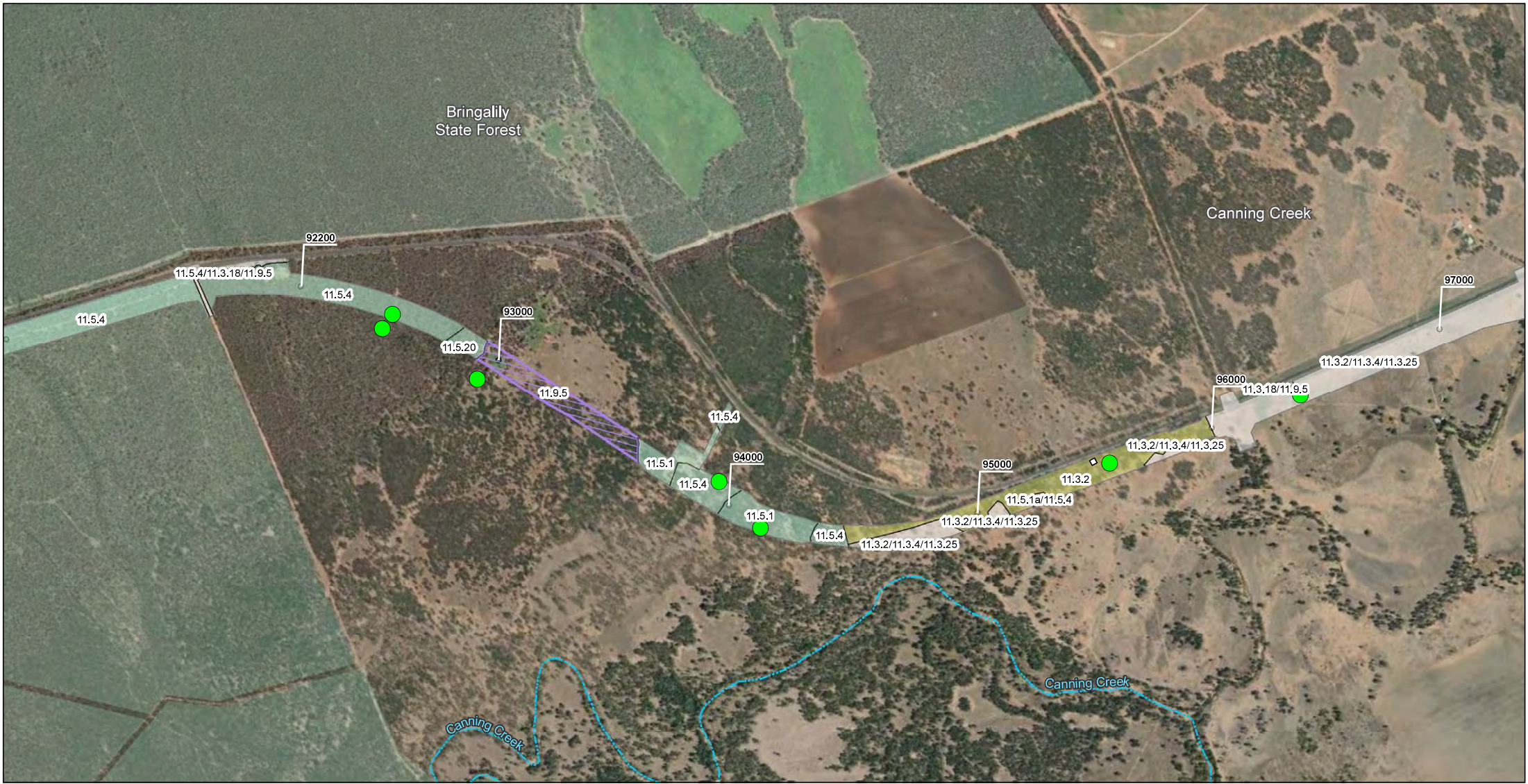
Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



Document History:

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Appendix A-17 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

Remnant - Of Concern

Remnant - Least Concern

HVR - Endangered

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

Chainage Points

Major Watercourse Lines

Bringally state forest

Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



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Appendix A-18 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

Remnant - Endangered

Remnant - Of Concern

Remnant - Least Concern

HVR - Of Concern

Regrowth - Endangered

Regrowth - Of Concern

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

Chainage Points

Major Watercourse Lines

Bringalily state forest

Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-19 - Regional Ecosystem Mapping



0250500
Metres

Scale 1:15,000 at A3

Coordinate System: GCS GDA 1994

Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

Remnant - Endangered

Remnant - Least Concern

HVR - Endangered

Regrowth - Endangered

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

Chainage Points

Major Watercourse Lines

Bringalily state forest

Whetstone state forest

Data Sources:

Ausecology

Survey Layers

State of Queensland Department of Environment

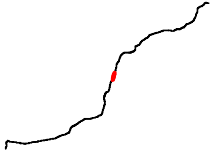
Major WatercourseLines

State Forest

ARTC

Footprint

Chainage



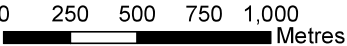
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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-20 - Regional Ecosystem Mapping



0 250 500 750 1,000 Metres

Scale 1:20,000 at A3

Coordinate System: GCS GDA 1994

Datum: GDA 1994

Page 20 of 34

Legend

GTRE (Vegetation Condition, VM Status)

 HVR - Endangered

 HVR - Of Concern

 Non Remnant

 B2G Footprint

 Habitat Assessment

 Bioconditions

 Chainage Points

 Major Watercourse Lines

 Bringality state forest

 Whetstone state forest

Data Sources:

Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



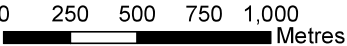
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D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-21 - Regional Ecosystem Mapping



Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Endangered
- Remnant - Least Concern
- HVR - Endangered
- Regrowth - Endangered
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringality state forest
- Whetstone state forest

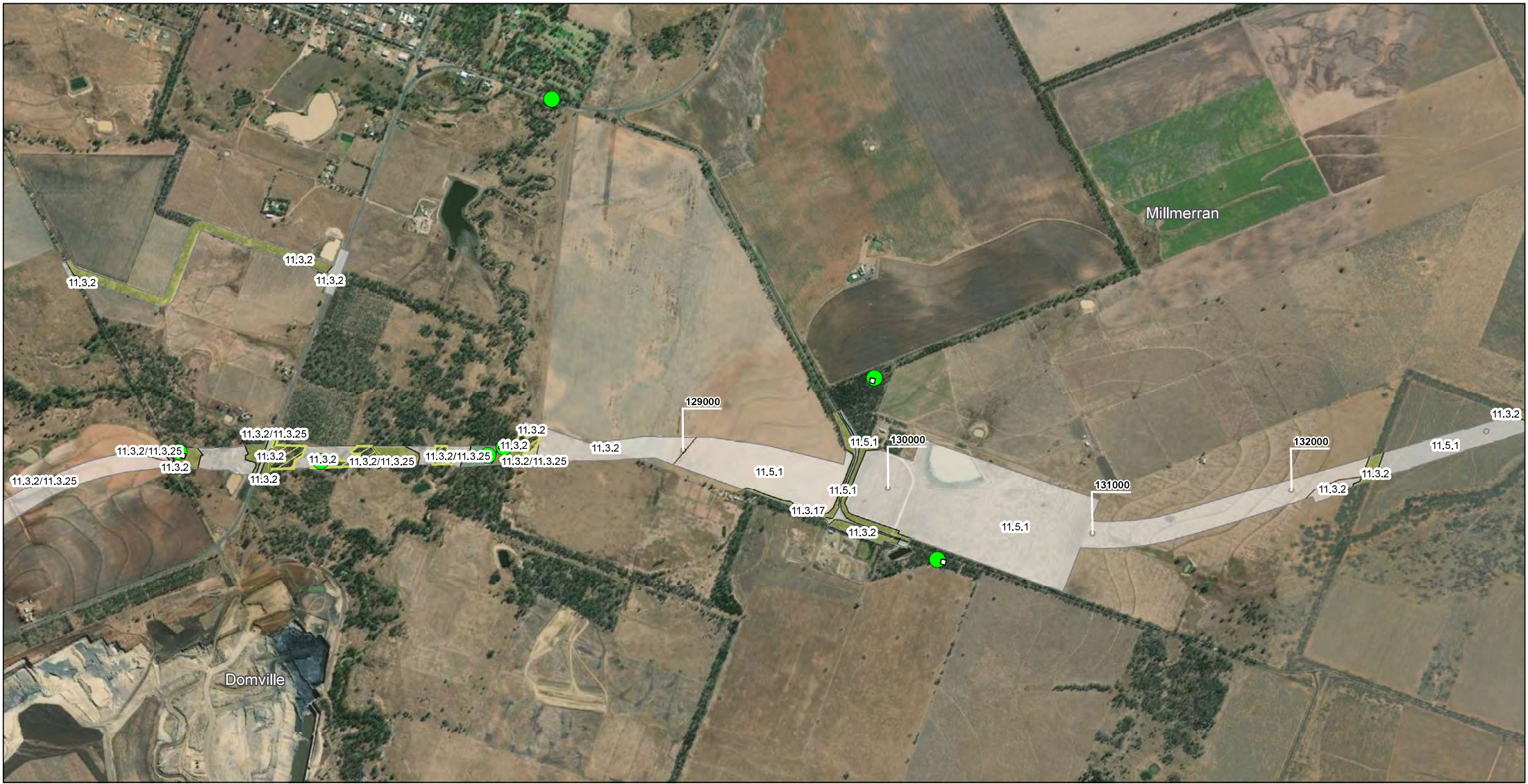
Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



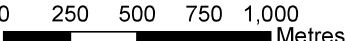
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Appendix A-22 - Regional Ecosystem Mapping



Scale 1:20,000 at A3

Coordinate System: GCS GDA 1994

Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

 Remnant - Of Concern

 Remnant - Least Concern

 HVR - Of Concern

 Regrowth - Of Concern

 Non Remnant

 B2G Footprint

 Habitat Assessment

 Bioconditions

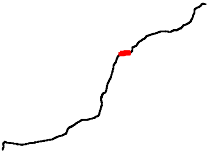
 Chainage Points

 Major Watercourse Lines

 Bringality state forest

 Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage



Document History:

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Appendix A-23 - Regional Ecosystem Mapping



02505007501,000
Metres

Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend
GTRE (Vegetation Condition, VM Status)

Remnant - Of Concern

Remnant - Least Concern

Regrowth - Of Concern

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

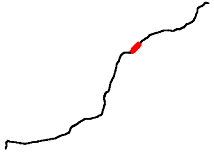
Chainage Points

Major Watercourse Lines

Bringalily state forest

Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

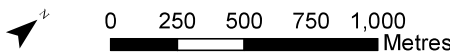


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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-24 - Regional Ecosystem Mapping



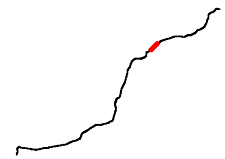
Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

- GTRE (Vegetation Condition, VM Status)
- Remnant - Least Concern
 - Non Remnant
- B2G Footprint
- Habitat Assessment
 - Bioconditions
 - Chainage Points
- Major Watercourse Lines
- Bringality state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage

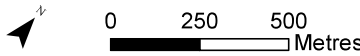


Document History:

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A	Internal Draft	JS	AD	LG	20/12/2021
B	Internal Draft	JS	AD	LG	22/12/2021
C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-25 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Of Concern
 - HVR- Least Concern
 - Non Remnant
- B2G Footprint**
- Habitat Assessment
 - Bioconditions
 - Chainage Points
- Major Watercourse Lines**
- Bringality state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

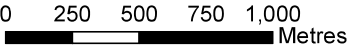


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B	Internal Draft	JS	AD	LG	22/12/2021
C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-26 - Regional Ecosystem Mapping



Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Of Concern
- HVR - Of Concern
- Regrowth - Of Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



Document History:

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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-27 - Regional Ecosystem Mapping



0 250 500 750 1,000 Metres

Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

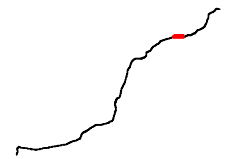
GTRE (Vegetation Condition, VM Status)

- Remnant - Endangered
- Remnant - Of Concern
- Remnant - Least Concern
- HVR - Endangered
- HVR - Least Concern
- Regrowth - Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage



Document History:

Rev	Reason for Issue	Author	Reviewer	Approver	Date
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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-28 - Regional Ecosystem Mapping



02505007501,000Metres

Scale 1:20,000 at A3

Coordinate System: GCS GDA 1994

Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

Remnant - Of Concern

Remnant - Least Concern

HVR- Least Concern

Non Remnant

B2G Footprint

Habitat Assessment

Bioconditions

Chainage Points

Major Watercourse Lines

Bringality state forest

Whetstone state forest

Data Sources:

Ausecology

Survey Layers

State of Queensland Department of Environment

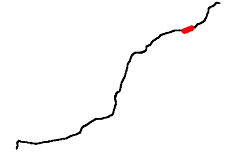
Major WatercourseLines

State Forest

ARTC

Footprint

Chainage

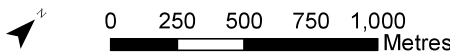


Document History:

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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-29 - Regional Ecosystem Mapping



Scale 1:20,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Least Concern
 - HVR- Least Concern
 - Regrowth - Least Concern
 - Non Remnant
- Legend**
- B2G Footprint
 - Habitat Assessment
 - Bioconditions
 - Chainage Points
 - Major Watercourse Lines
 - Bringality state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage

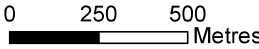


Document History:					
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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix A-30 - Regional Ecosystem Mapping



Scale 1:15,000 at A3

Coordinate System: GCS GDA 1994

Datum: GDA 1994

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Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Least Concern
- HVR- Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:

- Ausecology
- Survey Layers
- State of Queensland Department of Environment
- Major WatercourseLines
- State Forest
- ARTC
- Footprint
- Chainage

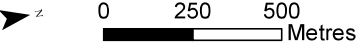


Document History:

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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-31 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Of Concern
 - Remnant - Least Concern
 - HVR- Least Concern
 - Non Remnant
- B2G Footprint**
- Bioconditions
 - Chainage Points
 - Major Watercourse Lines
 - Bringalily state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

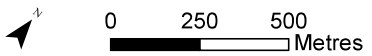


Document History:

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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-32 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

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Legend

- GTRE (Vegetation Condition, VM Status)**
- Remnant - Of Concern
 - Non Remnant
- B2G Footprint**
- Habitat Assessment
 - Bioconditions
 - Chainage Points
 - Major Watercourse Lines
 - Bringality state forest
 - Whetstone state forest

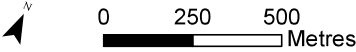
Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major Watercourse Lines
State Forest
ARTC
Footprint
Chainage



Document History:					
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C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix A-33 - Regional Ecosystem Mapping



Scale 1:15,000 at A3
Coordinate System: GCS GDA 1994
Datum: GDA 1994

Legend

GTRE (Vegetation Condition, VM Status)

- Remnant - Of Concern
- HVR- Least Concern
- Regrowth - Least Concern
- Non Remnant

- B2G Footprint
- Habitat Assessment
- Bioconditions
- Chainage Points
- Major Watercourse Lines
- Bringalily state forest
- Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

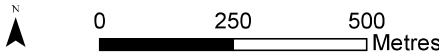


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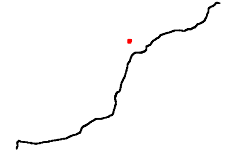
Appendix A-34 - Regional Ecosystem Mapping



Legend

- GTRE (Vegetation Condition, VM Status)**
- Regrowth - Of Concern
 - Non Remnant
- B2G Footprint**
- Habitat Assessment
 - Bioconditions
 - Chainage Points
- Major Watercourse Lines**
- Major Watercourse Lines
- Bringally state forest**
- Bringally state forest
 - Whetstone state forest

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
Major WatercourseLines
State Forest
ARTC
Footprint
Chainage

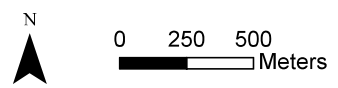


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B	Internal Draft	JS	AD	LG	22/12/2021
C	Internal Draft	JS	LG	LG	06/01/2022
D	Internal Draft	JS	LG	LG	12/05/2022

Appendix B – Threatened Ecological Communities



Appendix B-1 - Threatened Ecological Communities
ARTC - B2G

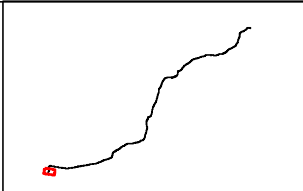


Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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- Legend**
- TEC Type**
-  Poplar Box TEC
 -  B2G Alignment
 -  Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:					
Rev	Reason for Issue	Author	Reviewer	Approver	Date
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B	Internal Draft	JS	LG	LG	5/1/2022
C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-2 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 2 of 21

Legend

TEC Type

Brigalow TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

Rev	Reason for Issue	Author	Reviewer	Approver	Date
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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-3 - Threatened Ecological Communities

ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 3 of 21

Legend

TEC Type

Brigalow TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-4 - Threatened Ecological Communities

ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 4 of 21

Legend

TEC Type

Brigalow TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage

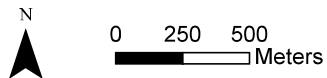


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D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-5 - Threatened Ecological Communities
ARTC - B2G



Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 5 of 21

Legend

TEC Type

Brigalow TEC

B2G Alignment

Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

Rev	Reason for Issue	Author	Reviewer	Approver	Date
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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-6 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 6 of 21

Legend

TEC Type

Brigalow TEC

B2G Alignment

State Forest

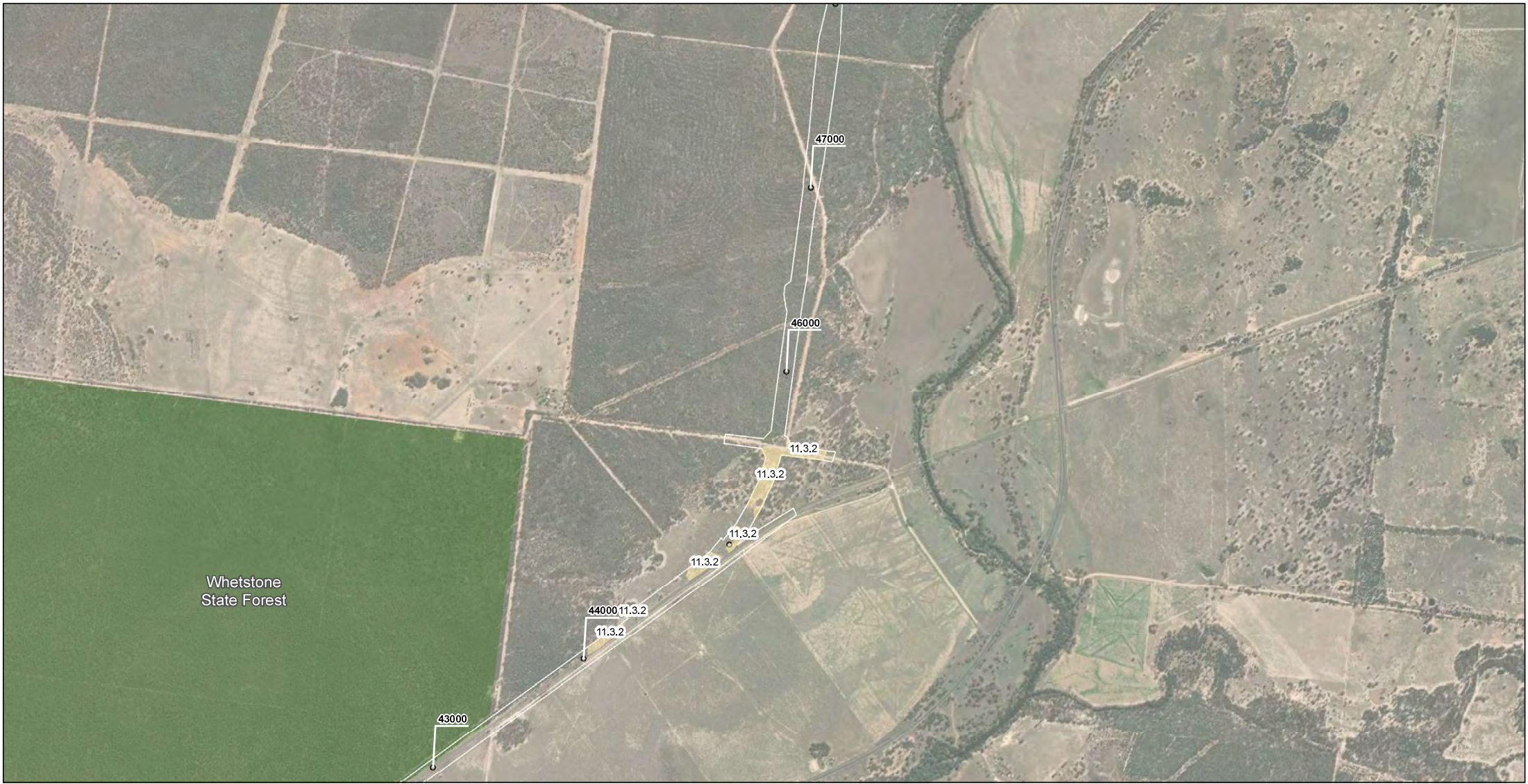
Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage

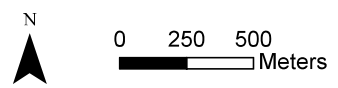


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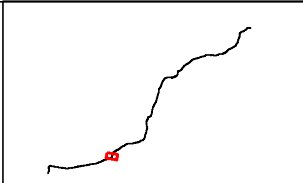


Appendix B-7 - Threatened Ecological Communities
ARTC - B2G



- Legend**
- TEC Type**
- Poplar Box TEC
 - State Forest
 - B2G Alignment
 - Chainage Points

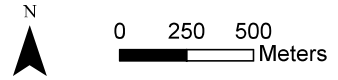
Data Sources:
 Ausecology
 Survey Layers
 State of Queensland Department of Environment
 major watercourse lines
 Vegetation Management Act 1999 Status
 ARTC
 Footprint
 Chainage



Document History:					
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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



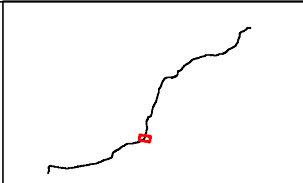
Appendix B-8 - Threatened Ecological Communities
ARTC - B2G



- Legend**
- TEC Type**
- Brigalow TEC
 - State Forest
 - Chainage Points

- B2G Alignment
- State Forest
- Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:					
Rev	Reason for Issue	Author	Reviewer	Approver	Date
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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022





Appendix B-9 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 9 of 21

Legend

TEC Type

 Brigalow TEC
 Poplar Box TEC

 State Forest
 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage

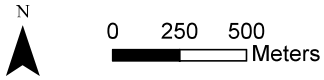


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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-10 - Threatened Ecological Communities
ARTC - B2G



- Legend**
- TEC Type**
-  Brigalow TEC
 -  B2G Alignment
 -  Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:					
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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-11 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 11 of 21

Legend

TEC Type

Brigalow TEC



B2G Alignment

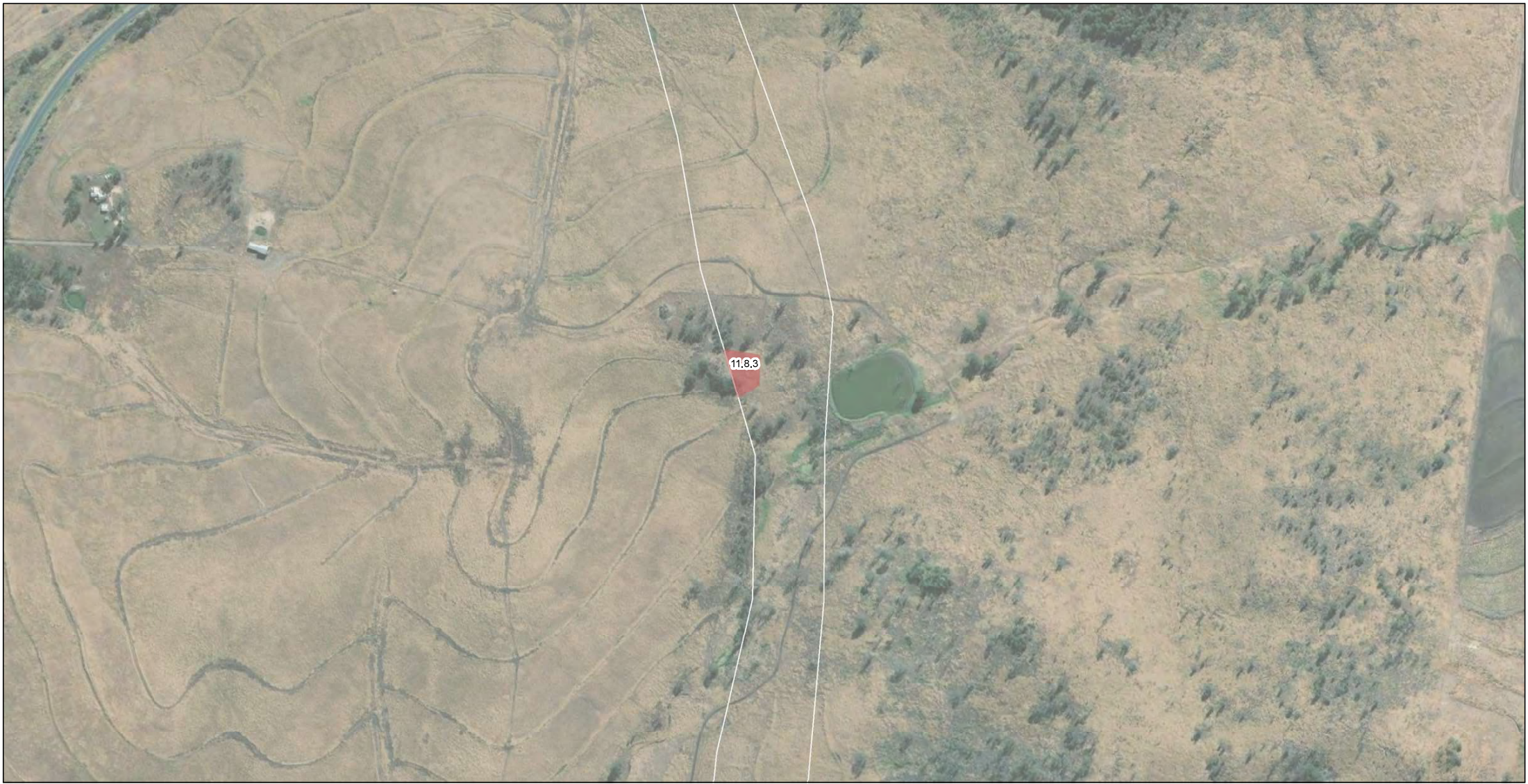
Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-12 - Threatened Ecological Communities
ARTC - B2G



0 80 160
Meters

Scale 1:4,500 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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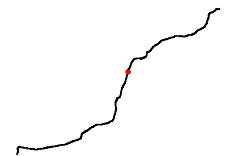
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TEC Type

 SEVT TEC

 B2G Alignment

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

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C	Internal Draft	JS	LG	LG	31/03/2022
D	Internal Draft	JS	LG	LG	12/05/2022



Appendix B-13 - Threatened Ecological Communities
ARTC - B2G



0 80 160
Meters

Scale 1:4,500 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

Page 13 of 21

Legend

TEC Type

 Box-Gum Grassy Woodland TEC

 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



Document History:

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Appendix B-14 - Threatened Ecological Communities
ARTC - B2G



Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

 Poplar Box TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



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Appendix B-15 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

 Poplar Box TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage

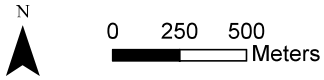


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Appendix B-16 - Threatened Ecological Communities
ARTC - B2G



Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

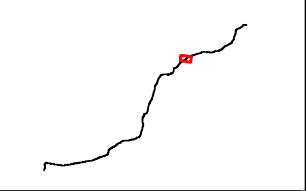
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TEC Type

 Natural Grasslands NSW and QLD TEC

 B2G Alignment
 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



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Appendix B-17 - Threatened Ecological Communities
ARTC - B2G



0 165 330 Meters

Scale 1:9,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

 Natural Grasslands NSW and QLD TEC

 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



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Appendix B-18 - Threatened Ecological Communities ARTC - B2G



Scale 1:6,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

Brigalow TEC



B2G Alignment



Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
ARTC
Footprint
Chainage



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Appendix B-19 - Threatened Ecological Communities
ARTC - B2G



0 112.5 225
Meters

Scale 1:6,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

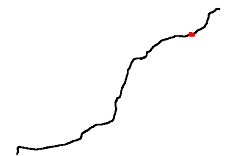
TEC Type

 Natural Grasslands NSW and QLD TEC

 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
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Appendix B-20 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

 Natural Grasslands NSW and QLD TEC

 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
State of Queensland Department of Environment
major watercourse lines
Vegetation Management Act 1999 Status
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Appendix B-21 - Threatened Ecological Communities
ARTC - B2G



0 250 500
Meters

Scale 1:20,000 at A3
Coordinate System: GDA2020 MGA Zone 56
Datum: GDA2020

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Legend

TEC Type

 Natural Grasslands NSW and QLD TEC

 B2G Alignment

 Chainage Points

Data Sources:
Ausecology
Survey Layers
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major watercourse lines
Vegetation Management Act 1999 Status
ARTC
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Chainage



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Appendix C – Cardno Ecological Survey Report

Ecological Assessment Report

Border to Gowrie

NE30044

2-093-310-EAP-00-RP-001_D



Prepared for
Australian Rail Track Corporation

30 July 2021

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By:



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Senior Principal -

Environment

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

Executive Summary

During the period 19 October and 13 November 2020 (the Spring Survey Period), and 8 March to 27 March 2021 (the Post-Wet Survey Period), Cardno delivered a series of terrestrial ecology assessments on behalf of Australian Rail Track Corporation (ARTC). The purpose of these assessments was to build upon the studies undertaken for the draft Environmental Impact Statement for the Inland Rail Border to Gowrie (B2G) project (the Project), and are required to inform the detailed design and construction of the Project. More specifically, the objective of these surveys was to determine the presence or likelihood of presence for species and/or ecological communities protected under relevant State and Commonwealth legislation and local government environmental planning requirements.

The 'Survey Area' included the:

- > 'Project footprint' (as defined in the Environmental Impact Statement (EIS)).
- > A 100m buffer to centreline of the proposed rail combined with the Project footprint being the 'Flora Study Area'.
- > Targeted terrestrial fauna survey sites, which comprise a number of locations that extend 1km from a mid-point centred on the alignment.

The key findings of the surveys completed for the Project have been outlined below.

Vegetation Communities

A total of 20 Regional Ecosystems (RE) were recorded and mapped within the project footprint, including two listed as Endangered under the *Vegetation Management Act 1999* (VM Act) and five listed as Of Concern. The REs recorded and mapped include the following:

- > Endangered REs: 11.4.3 and 11.9.5;
- > Of Concern REs: 11.3.2, 11.3.4, 11.3.21, 11.5.14, 11.8.11 and 11.9.7; and
- > Least Concern REs: 11.3.14, 11.3.18, 11.3.25, 11.3.27b, 11.5.1, 11.5.1a, 11.5.4, 11.5.20, 11.7.4, 11.7.7, 11.8.4 and 11.8.5.

The following Threatened Ecological Communities (TECs) scheduled under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the Flora Study Area:

- > Brigalow (*Acacia harpophylla* dominant and co-dominant) (Endangered)
- > Poplar Box Grassy Woodland on Alluvial Plains (Endangered);
- > Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Critically Endangered);
- > Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (Endangered); and
- > White box-yellow box- Blakely's red gum grassy woodland and derived native grasslands (Critically Endangered).

Flora Species

Over the course of the surveys, a total of ten threatened flora species listed under either the EPBC Act and/or *Nature Conservation Act 1992* (NC Act) were observed. Individual samples from populations of suspected threatened flora were verified during field surveys or identified upon completion of field work. A small number of samples were also submitted to the Queensland Herbarium for verification of 'in field' identifications made by Cardno. Of these species; seven are listed under the EPBC Act, and are considered to be Matters of National Environmental Significance (MNES). Six of the EPBC listed species are also listed under NC Act. Two species are listed solely under the NC Act, however only one, *Picris barbarorum* is a Matter of State Environmental Significance (MSES) as *Digitaria porrecta* (Finger Panic) is listed as Near Threatened which do not constitute MSES. The ten threatened species recorded during Cardno's surveys included:

- > *Cyperus clarus* (NC Act);
- > *Dichanthium queenslandicum* (King Bluegrass; NCA and EPBC Act);
- > *Digitaria porrecta* (Finger Panic; NC Act);
- > *Homopholis belsonii* (Belson's Panic; EPBC Act);

- > *Lepidium monolocoides* (Winged peppergrass; NCA and EPBC Act);
- > *Picris barbarorum* (NC Act);
- > *Picris evae* (Hawkweed; NCA and EPBC Act);
- > *Rhaponticum australe* (Austral cornflower; NCA and EPBC Act);
- > *Westringia parvifolia* (NCA and EPBC Act); and
- > *Xerothamnella herbacea* (NCA and EPBC Act).

Fauna Species and Habitat

A total of 281 fauna species were observed during the surveys. Of the species observed, eight are listed under either the EPBC Act or NC Act. All observations of fauna species were verified during field surveys by fauna specialists. Two suspected observations of the threatened New Holland mouse (*Pseudomys novaehollandiae*) were submitted to the Queensland Museum for verification and ultimately determined to be Delicate mouse (*Pseudomys delicatulus*). Five of these are listed under both the EPBC Act and the NC Act and are considered to be both MNES and MSES, while four of the species found are listed under the NC Act only and are considered to be as MSES. Threatened fauna species recorded during Cardno's fauna surveys included:

- > *Calyptorhynchus lathami lathami* (Glossy black-cockatoo (eastern); NC Act);
- > *Pteropus poliocephalus* (Grey-headed Flying-fox; NCA and EPBC Act);
- > *Grantiella picta* (Painted honeyeater; NC Act);
- > *Hirundapus caudacutus* (White-throated needletail; NCA and EPBC Act);
- > *Nyctophilus corbeni* (South-eastern long-eared bat; NCA and EPBC Act);
- > *Phascolarctos cinereus* (Koala; NCA and EPBC Act);
- > *Tachyglossus aculeatus* (Short-beaked echidna; NC Act); and
- > *Hemiaspis damelii* (Grey snake; NC Act).

High quality fauna habitat was identified in various locations throughout the project area particularly within areas of remnant and regrowth vegetation, but also within narrow and moderately disturbed environments associated with the existing road reserve and rail line. Observations of recognised fauna habitat features included the opportunistic recording of 1,824 potential animal breeding places within close proximity to the proposed alignment. Hollows within hollow-bearing trees and stags were the most frequently recorded animal breeding place during the surveys.

Weeds and Pests

An array of exotic flora and fauna species was observed during the survey period. In terms of flora, this included 12 Category 3 – Restricted invasive pest plants listed under the *Biosecurity Act 2014*; four of which are also listed as Weeds of National Significance (WONS; denoted with an Asterix), with *Opuntia tomentosa* being the most widely distributed and having the highest density throughout the alignment. Observed Restricted invasive pest plants included:

- > *Asparagus africanus* (Climbing asparagus fern);
- > *Harrisia martinii* (Harrisia);
- > *Harrisia pomanensis* (Harrisia);
- > *Harrisia tortuosa* (Harrisia);
- > *Opuntia aurantiaca* (Tiger pear) *;
- > *Opuntia stricta* (Prickly pear) *;
- > *Opuntia tomentosa* (Velvety tree pear) *;
- > *Bryophyllum delagoense* (Mother of millions);
- > *Lycium ferocissimum* (African boxthorn) *;
- > *Dolichandra unguis-cati* (Cat's claw creeper);
- > *Celtis sinensis* (Chinese elm); and

- > *Lantana montevidensis* (Creeping lantana).

Five restricted invasive fauna species listed under the *Biosecurity Act 2014* were recorded within the survey area, including:

- > *Canis lupus* (Dingo);
- > *Felis catus* (Cat);
- > *Mus musculus* (House mouse);
- > *Sus scrofa* (Feral pig); and
- > *Vulpes vulpes* (European fox).

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1 Introduction

Cardno has been commissioned by Australian Rail Track Corporation (ARTC) to complete ecological assessments for the Inland Rail - Border to Gowrie (B2G) Project (the Project), including both the temporary and permanent disturbance footprints of the reference design used in the Project's Environmental Impact Statement (EIS) reporting. The aim of these assessments is to determine the presence, location, extent, quality and significance of any species or ecological communities protected under relevant State, Commonwealth or local government environmental planning legislation. The aim of these ecological assessments is to provide information to the Project that will allow it to:

- > avoid, minimise and mitigate impacts to these species and/or communities; and
- > determine the resulting significant residual impacts (where impacts have been deemed unavoidable) for the purpose of establishing the offset obligation associated with the Project.

The field survey methods used to complete this assessment incorporate seasonal surveys for the purpose of identifying certain fauna and flora species as identified in Commonwealth, State and industry guidelines. The surveys were completed in spring (Spring Survey Period) and autumn (Post-wet Survey Period) to coincide with the preferred seasonal survey timeframes for threatened fauna, flora and ecological communities that may occur in the Project area.

1.1 Ecological Assessment Report Scope

This Ecological Assessment Report (EAR) provides a summary of the methodologies and results of the targeted flora and fauna surveys that were completed following the Stage 1 - Detailed Desktop Assessment and Gap Analysis stage of the Project.

Specifically, the objectives of the field assessments were to provide information relating to the following:

- > Presence and distribution of Matters of National, State and Local Government Environmental Significance (MNES, MSES and MLES) and/or their associated habitats;
- > Collection of data that will ultimately help inform ARTC's Offset Strategy planning requirements and Project offset obligations for both State and Commonwealth requirements;
- > Presence and distribution of invasive plants and animals listed under the *Biosecurity Act 2014* (Biosecurity Act) or as key threatening processes under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- > Collection of data that will ultimately be used to support preparation of compliance and approvals, including secondary approvals; and
- > Collection of baseline data that may be used to support site restoration, rehabilitation and landscaping practices.

This EAR describes the environmental values present within the bounds of the 'Survey Area' for the Project, which specifically includes the following:

- > 'Project footprint' (as defined in the Environmental Impact Statement (EIS)). This incorporates the construction compound, permanent and temporary construction impact zones, laydown, stockpile and storage areas
- > A 100m buffer to centreline of the proposed rail combined with the Project footprint being the 'Flora Study Area'.
- > Targeted terrestrial fauna survey sites, which comprise a number of locations that extend 1km from a mid-point centred on the alignment.

It is understood that the Project's EIS will be updated using the findings of this report to address the implications of the ecological findings, particularly with regards to offset obligations, while a range of Project specific flora and fauna management plans will be prepared that address potential impacts and the associated impact avoidance and minimisation measure that can be employed by the Project.

1.2 Site Locality

The Project extends from the Queensland and New South Wales border (approximately 18 km to the south-east of Goondiwindi) to Gowrie (before the Inland Rail connection to Queensland Rail's West Moreton line on the south-eastern outskirts of Kingsthorpe). The Project provides a link between the adjacent Inland Rail projects of:

- > North Star to New South Wales/Queensland border, in the south at the Macintyre River; and
- > Gowrie to Helidon project in the north, which connects into Queensland Rail's (QR) West Moreton Line.

The Project occurs within the Goondiwindi Regional Council (GRC) and Toowoomba Regional Council (TRC) local government areas (LGAs). The project area is entirely within the Brigalow Belt South bioregion. From the west to east, the Project is located within the Commoroon Creek Floodout subregion, Inglewood Sandstones subregion and the Eastern Darling Downs subregion. The extent of the Project is shown in **Figure 1-1**.

The Project footprint traverses approximately 216 km across multiple lots of varying land uses, and is situated close to a number of towns, rivers and state forests.

- > The following towns are in close proximity to the Project footprint:
 - > Yelarbon;
 - > Inglewood;
 - > Millmerran;
 - > Pampas;
 - > Brookstead;
 - > Pittsworth;
 - > Southbrook;
 - > Wellcamp; and
 - > Gowrie Junction.
- > The following rivers and forests traverse the Project alignment:
 - > Macintyre River and Macintyre Brook;
 - > Condamine River and Condamine River – North Branch and associated flood plains; and
 - > Bringalily and Whetstone State Forests.
- > The dominant land-uses surrounding the Project footprint are primarily:
 - > agricultural, including grazing and cropping;
 - > light commercial and industrial;
 - > rural residential settlements; and
 - > the Wellcamp Airport and nearby quarry operations.

The Project is located within the Brigalow Belt South bioregion and as such is characterised by a subhumid climate with no pronounced Spring season. It consists of landscapes derived from extensive basalt flows and quartz sandstones with variable soils and vegetation depending on the local rock type or sediment present. The land within the broad locality of the Project has undergone extensive modification, with much of the land either cleared or modified for agricultural or resource development purposes. Most remaining areas of intact vegetation occur within State forests, along roadsides or as isolated remnant patches (ARTC, 2019).

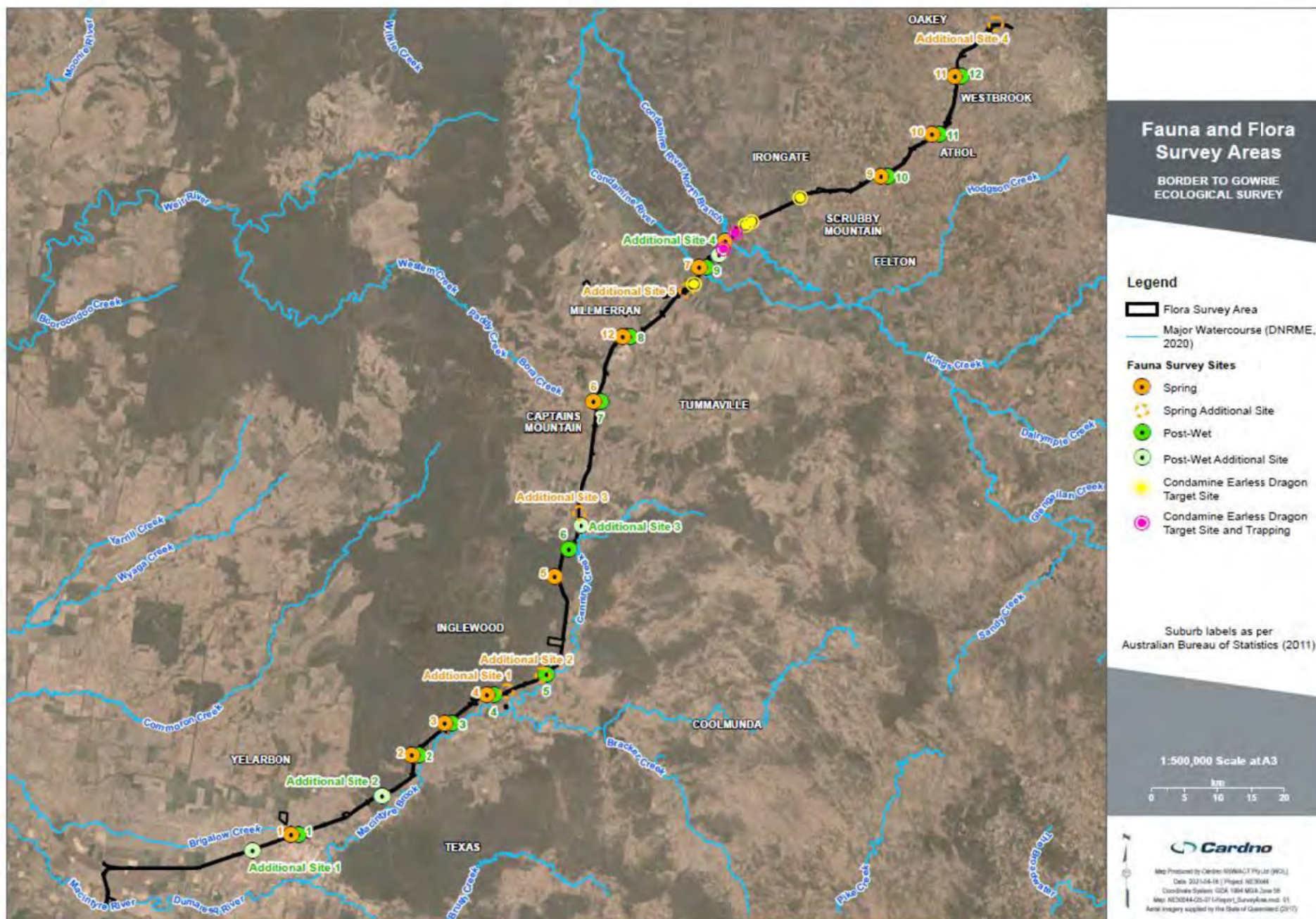


Figure 1-1 Ecological Survey Area

1.3 Proposed Works

The Project is one of the 13 projects that make up the Inland Rail Program for the delivery of 1,700 km of freight rail line. Five of these projects are located in Queensland. The Project will provide one of the missing links within the Inland Rail Program, which provides a more direct route between the Melbourne and Brisbane when compared to existing inland and coastal road and rail networks. The Project connects directly to the North Star to Border (NS2B) project to the south and the Gowrie to Helidon (G2H) project in the northeast.

The B2G Project has been intentionally located along the existing South Western Line and Millmerran Branch Line rail corridors where possible to minimise the extent and number of new properties requiring acquisition. The construction will include a 216.2 km section of new single-track railway between the NSW/QLD border and Gowrie, Queensland. Specifically, the Project includes the below-listed elements:

- > Construction of a ballasted track system (including bridges) consisting of continuously welded rail, fasteners, rail pads and concrete sleepers at 600 m centres;
- > Use of 7 km of standard-gauge rail and 209.2 km of dual standard/ narrow-gauge rail;
- > Establishment of 145 km of new rail corridor and use of 71.2 km of existing rail corridor (currently in use by Queensland Rail);
- > Rail corridor widening within existing rail corridor areas; and
- > Construction of new rail infrastructure, including crossing loops, turnouts, bridges, drainage infrastructure, road-rail interfaces, rain maintenance access roads, utility/service crossings, and fencing.

Additional information relating to the activities involved, the permanent and temporary disturbance footprints, and project chainages for the Project is provided in The Border to Gowrie Environmental Impact Statement (EIS) (ARTC, 2019).

2 Methodology

2.1 Desktop Assessment

Following review of the Project EIS, a Field Action Plan – Ecological Surveys (Field Action Plan) was prepared to provide a framework for the flora and fauna surveys within the Project footprint (Cardno, 2020). The Field Action Plan included a gap analysis and proposed additional flora and fauna survey efforts targeting threatened species that are known, likely, or have the potential to occur within the Survey Area. The process of identifying species that are known, or have the potential to occur within the Survey Area involved the below-listed actions:

- > Identifying those species listed in the Initial Advice Statement (IAS) Inland Rail – Border to Gowrie as potential, likely, or known to occur (ARTC, 2018).
- > Comparing those listed in the IAS with those presented in the EIS to identify whether all species have been considered in the EIS and/or whether the likelihood of presence was adjusted between the IAS and EIS. Specifically, the following sections of the EIS were considered:
- > Appendix J of the EIS (Terrestrial Ecology Technical Report) in Table 4.2, Table 4.5 and Appendix A (Tables 2.1 & 2.2) ('possible', 'likely' and 'known' species only); and
- > Appendix L of the EIS (Matters of National Environmental Significance Technical Report) in Appendix A (Table 2.1)
- > A review of contemporary information (i.e. Commonwealth's Protected Matters Search Tool [PSMT] and the Department of Environment and Science's WildNet database) consistent with the impact assessment area (i.e. 1 km radius from Project footprint) as defined in the EIS (Chapter 10 – Flora and Fauna) to determine whether additional species required assessment. Searches were expanded to include a 1 km buffer from laydown areas and the construction footprint, to ensure species captured included those impacted by additional infrastructure not previously addressed in the EIS.

The assessment also extended to identification of known and likely Regional Ecosystems (REs) scheduled under the *Vegetation Management Act 1999* and Threatened Ecological Communities (TECs) scheduled under the EPBC Act. REs include those mapped as remnant (Category B) and high-value-regrowth (Category C) by the Department of Resources. Likely TECs include those identified in the PMST output and can include vegetation that, at a State level, is mapped as remnant, High Value Regrowth or non-remnant.

Field assessment survey effort was determined following completion of the gap analysis detailed above. This analysis identified that Spring and Post-wet season surveys would be most appropriate for detection of the target species and to comply with relevant Commonwealth and State guidelines.

More detailed information regarding the desktop assessment process is provided in the Project's Field Action Plan (Cardno, 2020), which is provided in **Appendix A**.

2.2 Survey Area

Surveys were undertaken at a variety of sites within the Survey Area over the course of the Spring and Post-wet Survey Periods. The locations of the survey sites were determined following consideration of areas which had not been previously subject to adequate surveys as part of the EIS, ensuring inclusion of:

- > Representative examples of each distinct vegetation community (REs and/or TECs) and, where appropriate, accounting for remnant, regrowth and non-remnant areas;
- > Landscape features that were considered likely to support threatened species based on known habitat preferences; and
- > Areas known or predicted to support threatened species and other MNES and MSES.

The extent of the Survey Area, showing sites surveyed during both the Spring and Post-wet Survey Periods is shown in **Figure 1-1**.

2.3 Field Assessment - Flora

Targeted flora and vegetation community surveys were undertaken over a 26-day period from 19 October to 13 November 2020 (the Spring Survey Period) and a 30-day period from 25 February to 27 March 2021 (the Post-wet Survey Period). In addition to the two main survey periods, a targeted threatened flora survey was completed within a portion of the existing rail line between Millmerran and Pittsworth between 26 February and 13 March 2021.

All surveys involved traversing the Survey Area by two teams of two suitably qualified ecologists. Specifically, areas within the Survey Area were surveyed to assess the locations of TECs; presence, accuracy and habitat quality of REs containing remnant and both regulated and unregulated regrowth vegetation; and locations of protected flora and declared weeds identified as likely to occur in the EIS.

2.3.1 Vegetation Communities

2.3.1.1 Regional Ecosystems

The floristics and structure of RE mapped areas within the Survey Area was captured using Quaternary plots as described within the *Methodology for surveying and mapping Regional Ecosystems and vegetation communities in Queensland (Version 5.1)*, (Neldner *et al.* 2020). Particular focus was given to Endangered (11.3.21, 11.4.3 & 11.9.5) and Of Concern (11.3.2, 11.3.4 & 11.9.7) REs mapped as being within the Survey Area. Where access was not permitted, or impracticable, data points were collected from adjacent accessible areas (with the aid of binoculars where necessary) and the point manually shifted to the relevant target 'patch' using the editing capabilities of Arc Collector software in the field.

2.3.1.2 Biocondition

Vegetation quality was assessed and scored in accordance with the methodology contained within Chapter 1 of the *Guide to Determining Terrestrial Habitat Quality – version 1.3 February 2020*, which necessitated the use of Biocondition Assessment Sites. These Sites were primarily positioned within the construction footprint, with some extending into the 100m buffer associated with the Survey Area.

Following collection of field data further analysis was conducted to determine the overall Biocondition Score which required the calculation of landscape attributes.

In accordance with the *Guide to Determining Terrestrial Habitat Quality (2020; Version 1.3)*, site-based and landscape attributes are weighted to standardise relative 'importance', meaning the degree to which the attribute:

- > Has a potential impact upon long-term condition (e.g. non-native plants);
- > Is difficult or takes a long time to replace in a system if lost (e.g. large trees); and
- > Has habitat value based on empirical research.

The environmental attributes and their relative weightings have been displayed in **Table 2-1**.

Table 2-1 Biocondition Attributes and Relative Weightings

Field / Desktop	Attribute	Weighting (%)	Total (%)
Site-based condition attributes	Large Tress	15	80
	Tree canopy height	5	
	Recruitment of canopy species	5	
	Tree canopy cover	5	
	Shrub layer cover	5	
	Course woody debris	5	
	Native plant species richness for four lifeforms	20	
	Non-native plant cover	20	
	Native perennial grass cover (%)	5	
	Litter cover	5	
Landscape attributes (fragmented subregions)	Size of patch	10	20
	Context	5	
	Connectivity	5	

Field / Desktop	Attribute	Weighting (%)	Total (%)
TOTAL			100

BioCondition scores also consider Regional Ecosystem Benchmarks which provide quantitative values that are derived from reference or 'Best on Offer' sites relating to each BioCondition attribute. According to the *Guide to Determining Terrestrial Habitat Quality (2014)*, if there is no benchmark then a reference site must be established in accordance with the *Methodology for Establishment and Survey of Reference Sites for Biocondition (2017)*. Reference sites were chosen based on the 'best on offer' within the Flora Survey Area. Benchmarks were available for all REs assessed with the exception of 11.3.14 and 11.5.14.

2.3.1.3 Threatened Ecological Communities

For each TEC identified by the desktop assessment, corresponding REs (as described by the Commonwealth) were highlighted as potential TEC locations using the pre-clearing Regional Ecosystem spatial layer (QSpatial, 2018). Verification of TEC presence was completed via on-foot surveys. The steps used to assess the presence or absence of the TECs potentially present in the Study Area are outlined in **Table 2-2**, **Table 2-3** and **Table 2-4** below. This includes an additional TEC not identified as part of the desktop assessment, but identified during field work.

Table 2-2 Key diagnostic criteria and condition thresholds

TEC	Key diagnostic characteristics	Condition thresholds	Assessment approach
Brigalow (<i>Acacia harpophylla</i> dominant and codominant	The presence of Brigalow <i>Acacia harpophylla</i> as one of the most abundant tree species in the patch. <i>A. harpophylla</i> is either dominant in the tree layer, or co-dominant with other species (Notably Belah <i>Casuarina cristata</i> , other species of <i>Acacia</i> or <i>Eucalyptus</i> ; <u>and</u>	The patch is 0.5 ha or more in size; <u>and</u>	The approach utilised multiple streams of evidence to delineate patches of the TEC. This included: 1. Accepting an area as the TEC where there was a direct correlation with the remnant RE and the RE was ground truthed; and/or 2. Undertaking Biocondition Assessment Sites in patches of woody vegetation supporting Brigalow and/or Belah to measure floristics, exotic cover and height ¹ ; and/or 3. Quaternary assessments in patches of woody vegetation supporting Brigalow and/or Belah to ascertain floristics, exotic cover and height; or 4. Aerial photographic review where the vegetation 'signature' is consistent with areas confirmed in the above three approaches. Patches <0.5ha were not included.
	In Qld Brigalow Belt Bioregion and meets the description of one of the following REs: — 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21. <u>and/or</u>	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 ha (100 m by 50 m), that is representative of the patch.	
	The vegetation in the patch is brigalow regrowth with species composition and structural elements broadly typical of one of the identified Qld REs (although species density may be reduced). This can be assumed to be the case where it has been at least 15 years since it was last comprehensively cleared (not just thinned); unless direct evidence proves otherwise.		
Natural grassland on basalt and fine-textured alluvial plains of northern New	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	Refer to condition thresholds detailed in Table 2-3 .	A preliminary TEC map was prepared based on:

¹ Studies in the region indicate that Brigalow regrowth of >2-3m in height approximates with regrowth that is 15 years old (J.Dwyer, unpublished data). Data collected in the Tara, Taroom and Dingo districts between September and December 2007.

TEC	Key diagnostic characteristics	Condition thresholds	Assessment approach
South Wales and southern Queensland	textured, often cracking clay soils derived from either basalt or alluvium. Occurrence on landforms that are typically flat to very low slopes (less than 5 percent/1 degree). Tree canopy usually absent to sparse, comprising less than 10% projective crown cover. The ground layer is typically dominated by perennial native grasses and contains 3 or more of the indicator native species listed below: – <i>Aristida leptopoda</i> – <i>Astrebla elymoides</i> – <i>Astrebla lappacea</i> – <i>Austrodanthonia bipartita</i> – <i>Austrostipa aristiglumis</i> – <i>Bothriochloa biloba</i> – <i>Bothriochloa erianthoides</i> – <i>Dichanthium sericeum</i> – <i>Digitaria divaricatissima</i> – <i>Elymus plurinervis</i> – <i>Eriochloa crebra</i> – <i>Eulalia aurea</i> Silky – <i>Panicum decompositum</i> – <i>Panicum queenslandicum</i> – <i>Thellungia advena</i> – <i>Themeda avenacea</i> – <i>Themeda triandra</i> (synonym. <i>T. australis</i>) – <i>Walwhalleya proluta</i>		1. The pre-clearing extent of RE 11.3.21; and 2. Identification of areas not impacted by disturbance (e.g. regular cropping, road surfaces, infrastructure). These largely included road and rail reserves. Ground truthing of all patches was undertaken through Quaternary sites and transects. The start and end of 100m transects were 'captured' as Biocondition Sites in Arc Collector. Consistent with the "Nationally Threatened Ecological Communities: Natural Grasslands on Basalt and Fine-textured Alluvial Plains of Northern New South Wales and Southern Queensland, and Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin - A guide to the identification, assessment and management of nationally threatened ecological communities" a 0.1ha area was assessed by assessing 5m either side of the 100m transect. Diagnostic species were identified within the 0.1ha area, and where insufficient diagnostic species were encountered in adjacent and contiguous areas within the patch. The number of clumps and weed cover were measured in six 1x1m quadrats placed at 0, 20, 40, 60, 80 and 100m (noting one transect did not employ quadrats). Depending on species/weed/woody vegetation cover criteria outlined in Table 2-3 patches >0.5 or 2ha were included in the mapping. Where Quaternary sites were the primary means of demarcation data captured included diagnostic species, weed abundance and extent of woody vegetation. Another important consideration was the substrate. Areas of anthropogenic fill (e.g. rail ballast) were disregarded even if diagnostic species were present.

TEC	Key diagnostic characteristics	Condition thresholds	Assessment approach
Weeping Myall Woodlands	The dominant overstorey species, Weeping Myall, goes through regular cycles of senescence and regeneration. As such, percentage canopy cover will fluctuate from very sparse to 30 percent. The death of canopy trees is not considered to be an indicator of poor condition. Consequently, a patch must fit the following criteria in order to be included in the listed ecological community: - the tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated Weeping Myall trees; and - the overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha; and - the area is at least 0.5 ha in size; and - the 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 m tall and of the vegetative cover present, 50% is comprised of native species.		The occurrence of Weeping Myall was recorded where encountered during field work. Where encountered diagnostic criteria (e.g. presence of >24 Weeping Myall/ha) was considered.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	The White Box – Yellow Box – Blakely's Red Gum grassy woodlands that existed prior to European settlement now exists as remnants in three different states. The three states are: - An overstorey of eucalypt trees exists, but there is no substantial native understorey. - A native understorey exists, but the trees have been cleared. - Both a native understorey and an overstorey of eucalypts exist in conjunction. In order for an area to be included in the listed ecological community, a patch must have a predominantly native understorey.		Note: Only one patch of this community was identified during field work located on land to which access was not granted. The assessment was therefore undertaken from the edge of the land where <i>Eucalyptus albens</i> was the dominant canopy element. Binoculars were used to ascertain whether the patch met the TEC in accordance with the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland information guide. Specifically, the assessment focused on: - The presence of an understorey that is predominantly native perennial vegetation (i.e. >50% cover); and - The presence or otherwise of 12 or more understorey species (excluding grasses) and the presence of at least one 'important species'; or - The presence of 20 or more mature trees/ha. Quaternary points and weed observation points were used to capture this diagnostic information.
Poplar Box Grassy Woodland on Alluvial Plains	Occurs in the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Penepains, Darling Riverine Plains, NSW South Western Slopes, Riverina and Murray Darling Depression IBRA bioregions Associated with ancient and recent depositional alluvial plains with clay, clay-loam, loam and sandy loam, typically duplex soils or sodosols. This includes areas that may not be part of currently defined floodplains.	The minimum condition thresholds (Moderate and High condition categories A, B, or C) are provided in Table 2-4.	The approach utilised multiple streams of evidence to delineate patches of the TEC. This included: Accepting an area as the TEC where there was a direct correlation with the remnant RE and the RE was ground truthed (i.e. RE 11.3.2

TEC	Key diagnostic characteristics	Condition thresholds	Assessment approach
	A grassy woodland to grassy open woodland with a tree crown cover of 10% or more at patch scale. A tree canopy must be present that shows these features: - Canopy tree species are capable of reaching 10 m or more in height; - Poplar Box (<i>Eucalyptus populnea</i>) must be present in the canopy and is the dominant tree species; - Where hybrids of Poplar Box with other <i>Eucalyptus</i> spp. are present, they should be counted as part of the <i>Eucalyptus populnea</i> component of the tree canopy when assessing the previous criterion. Mid layer (1-10 m) crown cover of shrubs to small trees is low, about 30% or less. A ground layer (<1 m) mostly dominated across a patch by native grasses, other herbs and occasionally chenopods (during extended Spring periods), ranging from sparse to thick (in response to canopy development, soil moisture, disturbance and/or management history). A list of diagnostic native plant species and some of the key native fauna that make up the ecological community is provided as an appendix to the Conservation Advice (DEWHA, 2019).		which is wholly consistent with the TEC); and/or - Undertaking Biocondition Assessment Sites in patches of woody vegetation dominated by Poplar Box to measure floristics, exotic cover and tree density; and/or - Quaternary assessments in patches of woody vegetation dominated by Poplar Box to ascertain floristics, exotic cover and tree density (nb number of plant species were counted up to a maximum of 30 species); or - Aerial photographic review where the vegetation 'signature' is consistent with areas confirmed in the above three approaches. Patch sizes were ascertained in a GIS platform.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	The recovery plan² for the community includes the following passage regarding the southern occurrence of the TEC: "The vine thickets occur mainly on hills on light clay soils derived from basalt (Benson et al. 1996) but also occur in areas with sandy loams derived from sediments (Williams 1999). The vine thickets are dominated by a variety of low tree and shrub species, with the species composition varying from north to south, possibly due to rainfall differences (Benson et al. 1996). Characteristic canopy species include red olive plum <i>Elaeodendron australe</i> var. <i>integrifolium</i>, peach bush <i>Ehretia membranifolia</i>, wilga <i>Geijera parviflora</i>, native olive <i>Notelaea microcarpa</i>, yellow lemon <i>Pouteria cotinifolia</i> var. <i>pubescens</i> and wallaby apple <i>Pittosporum spinescens</i>. The trees and tall shrubs are usually 2–10m tall (Floyd 1990)" Further, the listing advice states "To determine whether a vine thicket remnant is part of a listed regional ecosystem in Queensland its location should be checked against the distribution maps of the Queensland Environmental Protection Authority and/or against geology, soil or land system maps".	Not applicable	Species and structure were assessed in the field. The TEC is consistent with RE 11.8.3-Semi-evergreen vine thicket on Cainozoic igneous rocks. There is no minimum patch size prescribed in the listing advice.

² McDonald, W.J.F. 2010. National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community. Report to Department of the Environment, Water, Heritage and the Arts

Table 2-3 Condition thresholds for the Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Queensland ecological community (extract from TEC Listing Advice (TSSC, 2009))

	Best quality	Good quality
Patch size	Patch size Minimum patch size at least 0.5 ha AND	Minimum patch size at least 2 ha AND
Grasses	At least 4 native perennial grass species from the indicator species list AND	At least 3 native perennial grass species from the indicator species list AND
Tussock cover	At least 200 native perennial grass tussocks AND	At least 200 native perennial grass tussocks AND
Woody shrub cover ¹	Total projected canopy cover of shrubs is less than 30% AND	Total projected canopy cover of shrubs is less than 50% AND
Introduced species	Perennial non-woody introduced weed species are less than 5% of the total projected crown cover	Perennial non-woody introduced weed species are less than 30% of the total projected crown cover
¹ Shrubs are typically absent. When present, they are defined as woody plants more than 0.5 m tall that occupy the mid vegetation layer. The upper, tree canopy layer also is typically absent but may comprise scattered trees to less than 10% projective crown cover.		
Sampling should be based upon a quadrat size of 0.1 ha (e.g. 50 m x 20 m) selected in an area with the most apparent native perennial grass species. Unless exceptional circumstances apply, to maximise the assessment of condition, a site must be assessed during a good season, two months after cessation of disturbance (fire, grazing, mowing or slashing) and within two months of effective rain.		

Table 2-4 Condition categories and thresholds for the Poplar Box Grassy Woodland on Alluvial Plains ecological community (extract from the TEC Conservation Advice (DEWHA, 2019))

Category and rationale	Native cover and diversity thresholds	Minimum patch size
Class A Highest Quality		
Category A1. Little to no perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥10% AND ≥ 90% of perennial vegetation cover in the ground layer is native AND ≥ 30 native plant species per patch in the ground layer	≥ 1 ha
Category A2. A large patch with low perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥10% AND ≥70% of perennial vegetation cover in the ground layer** is native AND ≥ 30 native plant spp. per patch in the ground layer	≥ 5 ha
Class B Good Quality		
Category B. A large patch with good quality native understorey or with mature trees	The crown cover of canopy trees in the patch is ≥10% AND ≥ 50% of perennial vegetation cover in ground layer is native AND EITHER ≥ 20 perennial native plant species per patch in the ground layer OR ≥ 10 mature trees+ per ha with ≥ 30cm dbh (and/or hollows)	≥ 5 ha
Class C Moderate Quality		
Category C A large patch with low native cover but retains good native understorey diversity and habitat features of mature trees	The crown cover of canopy trees in the patch is ≥10% AND If < 50% of perennial vegetation cover in ground layer is native, then the patch must have: ≥ 20 native plant spp. per patch in the ground layer AND ≥ 10 mature trees+ per ha with ≥ 30cm dbh (and/or hollows) AND smaller trees+, saplings or seedlings suggestive of periodic recruitment	≥ 5 ha

2.3.2 Flora Species

The survey effort for threatened flora species involved traversing the Survey Area, with specific attention to habitat considered suitable for the target species. Significant flora species that were not previously encountered, or species that were unidentifiable in the field (when sampling occurred), were collected and lodged at the Queensland Herbarium for formal identification.

2.3.2.1 Conservation Significant Flora Species

The location of threatened flora species identified during on-foot surveys, were recorded via Global Positioning System (GPS) and using the ArcGIS product *Collector*. Additional detail relating to the methodology used to survey threatened plants is provided in the Field Action Plan (**Appendix A**).

Given that the date of construction for the Project is not yet known, formal flora surveys in full accordance with the *Flora Survey Guidelines - Protected Plants* (Flora Survey Guidelines), prepared by the Department of Environment and Science (DES) were not completed over the construction footprint of the Project. As these surveys are only valid for a 12-month period and clearing needs to be undertaken within two years of submitting the flora survey report to the Queensland DES, Flora surveys should be scheduled once construction timelines are known. Nonetheless, flora surveys were comprehensively undertaken in habitat known or considered likely to support the range of species expected to occur in the Survey Area.

Formal flora surveys in full accordance with the Flora Survey Guidelines have been completed over part of the Project footprint associated with the early works package of the Geotechnical Program.

2.3.2.2 Weeds

General abundance and the location of weeds listed under the *Biosecurity Act 2014* were recorded within the Project footprint and opportunistically during surveys. An average density of cover for each weed species observed was recorded every 1 km throughout the Survey Area. Averages were based on criteria listed in the Spatial Pest Attributes Standard (Calvert, 2012), further explained in **Table 2-5** and **Table 2-6**.

For grasses and herbs, vines, aquatic weeds and cacti, densities were calculated from a percentage of ground-cover, refer to **Table 2-5**.

Table 2-5 Percentage weedy ground cover criteria

Percentage Ground-cover	Density
<10	Scattered
10-20	Low
20-30	Moderate
>30	High

For woody vegetation, densities were calculated from the number of woody stems/10 m², refer to **Table 2-5** below.

Table 2-6 Average number of stems per 10 square metres (10m x 10m).

Number stems	Density
1-2	Scattered
3-4	Low
5-6	Moderate
>7	High

2.4 Field Assessment – Fauna

A total of 12 targeted terrestrial fauna survey sites were visited between 19 October and 11 November 2020 and 8 March to 27 March 2021 (see **Figure 1-1** for Site locations). Each survey site was surveyed over five days and four nights (per Survey Period), with each fauna survey team completing two full targeted trapping sites over each five day and four-night period. Each of the fauna survey sites comprised a 1 km buffer around

a mid-point centred on the alignment. Cumulatively, the proposed survey effort resulted in over 1,200-person hours of active survey. Further detail regarding the specific methodologies used to target fauna within this survey is provided in Section 4.3 and Appendix B of the Field Action Plan, provided herein as **Appendix A**

A further ten 'additional sites' were surveyed over the duration of the Spring and Post-wet Survey Periods. These locations were only surveyed over a single day each and all surveys were 'passive', consisting of habitat assessments and opportunistic observations only (i.e. did not involve trapping of fauna). The focus of these additional sites was to search for threatened fauna and their habitat, map habitat features in close proximity to the proposed alignment, and increase the overall coverage of the survey footprint.

The majority of the sites surveyed in the Spring Survey Period were also surveyed in the Post-wet Survey Period; however, alterations to the Survey Area and adjustments to the Field Action Plan were made between the Spring and Post-wet Survey Periods for the below-listed reasons:

- > Site 8, which had poor access and limited habitat, was moved to a new site closer to Bringalily State Forest (noting that a similar suite of species was expected, based on EIS modelling and field observations, at the new site);
- > Site 6 was moved slightly to the north to capture an area of habitat identified as having higher value to a range of species during the Spring Survey Period;
- > Two of the Additional Sites were relocated to areas of potential habitat for the Condamine Earless Dragon in the Condamine River Floodplain to target detection of this species; and
- > Additional sites were only surveyed once (either in Post-wet or Spring) to increase overall coverage of the Project footprint.

Each survey day (with the exception of surveys at additional sites) generally consisted of the activities listed in **Table 2-7**. Elsewhere along the alignment, fauna and habitat observations were recorded opportunistically using GIS software. For details on specific effort afforded to target species including consideration of how this meets guideline requirements, refer to Table 1-6 in Appendix B of the Field Action Plan, herein provided as **Appendix A**.

Table 2-7 Survey effort for terrestrial fauna trapping sites.

Method	Fauna group targeted by method and survey effort per Site [^]	Duration per Site
Call playback	Birds: 5 hours Mammals: 1 hour	5 days 4 nights
Spotlighting	Mammals: 2 x 200m transects Reptiles: min. 6 hours over 4 nights	4 nights
Stag watching	Mammals – 40 minutes before dusk & 40 minutes after dusk	2 nights
Dawn survey	Birds and Butterfly: minimum 4 hours	2 days
Dusk survey	Birds and Butterflies: minimum 4 hours Bats (fly-out): minimum 4 hours	2 days
Habitat assessment	All groups – 4 hours	n/a
Indirect detection (scats, tracks) / area searches / incidental flushing	All groups – 8 hours	5 days
Active diurnal searches (searches for individuals and habitat, raking leaves for reptiles)	Mammals – 2 x 100m transects Reptiles – 3 hours Birds: 4 hours	5 days
Camera traps	All: 10 traps	4 nights
Hair tube traps	Mammals: 20 traps	4 nights
Pitfall traps	Reptiles: 6 pitfalls along a 30m drift fence	4 nights
Elliot traps (a)*	Mammals: 20 traps	4 nights
Cage traps / Elliot traps (b)	Mammals: 10 traps	4 nights

Method	Fauna group targeted by method and survey effort per Site [^]	Duration per Site
Artificial burrows	Condamine earless dragon: 58 traps across 2 target sites	6 nights
Unattended bat detector	Microbats: 1 x Anabat or Songmeter	4 nights
Attended bat detector	Microbats: 4 hours	4 nights
Harp traps	Microbats: 1 x harp trap	4 nights
Funnel traps	Reptiles – minimum 2 traps (1 on either end of pitfall drift fence)	4 nights
Pest animal assessment	Methods as per above.	5 days / 4 nights
Wildlife corridors	Opportunistic assessment	5 days
Habitat features	Opportunistic assessment	5 days

[^] effort reflects total 'person hours' as each site will be assessed by two ecologists.

* were deployed where presence of Yakka skink burrows within a survey site was known or suspected.

Following initial observations regarding the availability and location of suitable habitat for the Condamine earless dragon (*Tympanocryptis condaminensis*) within the Survey Area, additional survey effort targeting this species was undertaken during the Post-wet Survey Period. The following methodology was devised following completion of the Field Action Plan, provided in **Appendix A**, and as such has been expanded upon more fully here.

Prior to the commencement of the Post-wet Survey Period potential habitat was identified and refined using:

- > Pre-clearance RE mapping for areas of grassland RE 11.3.21;
- > The location of past observations made of the species as recorded within the EIS and the Atlas of Living Australia; and
- > The observations made by the Cardno team of other areas of likely habitat within the Survey Area which was collected during the Spring Survey Period; including areas of 'converted grassland' associated with the rail line and road reserves. This included areas where the pre-clearing mapping supported woodland REs (e.g. RE 11.3.2), where woody vegetation has largely been removed from the landscape and a ground layer is present supporting both native and exotic grass, forb and herb species.

Following the desktop analysis, the suitability of these predetermined sites for the Condamine earless dragon was assessed during the Post-wet Survey Period using a qualitative ranking system of 'Best', 'Good' and 'Poor' for the known and expected habitat requirements of this species; including the presence of:

- > Suitable soils – typically cracking black soils within the Condamine River floodplain;
- > Suitable vegetation dominated by tussock grasses; and
- > Availability and proximity of sunning, foraging and refuge habitat – including that provided by cultivated land, rail ballast and presence of existing arthropod burrows and soil cracks.

Following on from this assessment, two sites were selected for the placement of species-specific traps in the form of small artificial arthropod burrows. These burrows were constructed and placed as per the methods recommended by Osborne (2018), the burrows were arranged in monitoring grids spaced 10 m apart, although the actual arrangement of rows was slightly altered to fit within the available habitat. Due to the size of the available habitat a total of 28 traps per site were installed. Traps were checked twice daily. Walking visual transects in the surrounding habitat were carried out in close proximity to the alignment for approximately three-person hours per day for six days.

The location of the Condamine earless dragon survey and trapping sites is shown by **Figure 1-1**.

2.5 Climatic Conditions

Heavy rainfall was recorded during both the Spring and Post-wet Survey Periods, in particular during the Post-wet fauna Survey Period, during which extensive flooding occurred over parts of the project extent. Climatic statistics for the Spring and Post-wet Survey Periods are presented in **Table 2-8**.

Table 2-8 Climatic conditions recorded during the Survey Period[^]

Inglewood BOM Station 041527			Millmerran BOM Station 041527	
Date	Rainfall (mm)	Temperature (°C)	Rainfall (mm)	Temperature (°C)
Spring Survey Period				
19-Oct-20	13	26.4	7.2	24.1
20-Oct-20	0	29.8	0	25.8
21-Oct-20	2	24.6	1.2	20
22-Oct-20	25	27.6	15.6	22.6
23-Oct-20	0	28.0	7	24.3
24-Oct-20	5	23.1	3.4	20.1
25-Oct-20	0	29.2	14.4	26.8
26-Oct-20	0	27.0	32.6	25.1
27-Oct-20	0	29.1	0.2	23
28-Oct-20	0	27.7	17.4	22.3
29-Oct-20	0	27.5	0.8	25.3
30-Oct-20	0	32.0	0	29.2
31-Oct-20	0	29.5	0	28.5
1-Nov-20	0	29.0	0	26.3
6-Nov-20	0	29.1	0	25.5
7-Nov-20	0	30.5	0	25.6
8-Nov-20	0	28.3	0	20.5
9-Nov-20	0	29.5	0	23
10-Nov-20	0	31	0	24
11-Nov-20	0	32.2	0	25.9
Inglewood			Millmerran BOM Station 041527	
Date	Rainfall (mm) BOM Station 041391	Temperature (°C) BOM Station 041100	Rainfall (mm)	Temperature (°C)
Post-wet Survey Period				
25-Feb-2021	0	31.2	0.6	27.7
26-Feb-2021	0	34.0	0.2	31.3
27-Feb-2021	0	32.5	0	25.9
28-Feb-2021	0	34.5	0	30.9
01-Mar-2021	0	33.5	0	26
02-Mar-2021	8	35.0	0	34.4
03-Mar-2021	0	32.5	0	26.8
04-Mar-2021	4	30.6	0.2	23.8
05-Mar-2021	0	32.5	0.2	29.9
06-Mar-2021	0	32.5	0	29.6
07-Mar-2021	0	33.0	0	28.2
08-Mar-2021	0	30.5	0	27

	Inglewood BOM Station 041527		Millmerran BOM Station 041527	
09-Mar-2021	29	31.8	23.6	29.2
10-Mar-2021	0	33.0	0.2	27.6
11-Mar-2021	0.5	30.0	0.4	23.6
12-Mar-2021	0	30.4	0.4	26.1
13-Mar-2021	0	32.5	0	27.7
14-Mar-2021	0	31.5	0	30.1
15-Mar-2021	49	24.5	13.8	19.9
16-Mar-2021	0	23.3	22.6	17.7
17-Mar-2021	0	24.1	21.8	19.6
18-Mar-2021	7	28.0	7.8	22.9
19-Mar-2021	0	30.6	0.4	26.7
20-Mar-2021	0	29.5	0	25.2
21-Mar-2021	0	30.5	0.4	25.1
22-Mar-2021	1.5	23.0	9.8	19.5
23-Mar-2021	97	26.3	55.6	23.4
24-Mar-2021	22	26.2	21.8	24.5
25-Mar-2021	No data available	26.3	0	24.8
26-Mar-2021	No data available	27.0	0	25
27-Mar-2021	No data available	27.6	0	25.6

^ data availability necessitated the use of different BOM Weather stations to derive these statistics between the two survey periods.

2.6 Survey Limitations

In general the detection of flora and fauna species during targeted surveys may be limited by a range of factors including:

- > Surveys occurring outside of the optimal timing for the detectability of flowering species; or
- > Climatic conditions or temperatures which may reduce activity levels of certain fauna groups.

As such, failure to detect a species does not necessarily equate to absence of a species within the Survey Area. The completion of the seasonal surveys for flora and fauna species within the Survey Area has helped ensure survey results are as unbiased as possible due to the broad limitations noted above.

However, the below-listed limitations may have reduced the detectability of certain species or otherwise have impacted on the intended survey effort.

- > Not all properties to which land access was granted were assessed in detail owing to:
- > These properties being 'land-locked' by an area of inaccessible land to which access was not granted; or
- > Preliminary field observations confirming general flora homogeneity of the landscape meaning that effort could be better applied to other key locations. It should be noted that this is an accepted and standard approach to appropriately conduct field surveys.
- > Detailed flora surveys targeted areas with the highest likelihood of occurrence for threatened species. Typically, detailed flora surveys excluded highly modified environments; being areas of cultivation and existing sealed and unsealed roads, although it is noted that these areas cannot be entirely disregarded.

To mitigate the reduction of survey area due to the above access limitations, alternate suitable sites were identified as surrogates wherever possible.

- > In addition to the limitations listed above, adverse weather conditions during both the Spring and Post-wet Survey periods resulted in a reduction in fauna survey effort (climatic data recorded for the duration of the fauna Survey Period is provided in **Table 2-8**) for animal welfare and safe access considerations, as detailed below:
- > For animal welfare reasons, the deployment of capture traps (i.e. Elliot traps, harp traps, pitfall traps and cage traps) was not possible during nights of heavy rain or where heavy rain was predicted. To offset this reduction in fauna survey effort, replacement effort was made in the form of additional on-foot surveys at affected sites, as well as the numerous non-capture survey methods employed by this survey (e.g. such as camera trapping, unattended bat detectors and hair tube traps);
- > Inundation by floodwater rendered the artificial burrow traps (targeting the Condamine earless dragon) ineffective for part of the time period they were deployed (**Figure 2-1**);
- > In some instances, the weather conditions or ground substrate was not conducive to pitfall trap placement (i.e. soil substrate was very rocky and could not be dug). Where this was the case, pitfall traps were not used and additional funnel traps were placed along a drift fence and extra effort was afforded to direct searches for reptiles by way of turning rocks and logs. Specific alterations to the proposed methodology are listed below;
 - A combination of pitfalls (two) and funnel traps (four) were placed alongside the drift fence at Site 10 and 6 during the Spring Survey Period; and
 - Six funnel traps were used in place of pitfalls at Sites 1, 9, 11 and 12 during the Spring Survey Period.
 - Pit-fall traps were not able to be left 'open' at survey sites 8, 11 and 12 during the Post-wet Survey Period due to high levels of seasonal rainfall.
- > Access to several sites was affected when access tracks became undrivable after rain. In particular, vehicle access to the northernmost extent of Site 8 was restricted during both the Spring and Post-wet Survey Periods for this reason. In these instances, replacement effort was made in the form of road surveys or additional survey effort in the areas that could be safely accessed;
- > During the Post-wet Survey Period, flooding of the Condamine river resulted in significantly reduced access to Site 9. Several traps were lost to floodwater, including a number of camera traps (**Figure 2-2**). It was considered unsafe to conduct on-foot surveys across the majority of the site during this time, although the highly unusual conditions did result in some opportunistic fauna sightings that may not have occurred under normal circumstances as fauna congregated in area above the flood line; and
- > During both the Spring and Post-wet Survey Periods, access to areas of potentially high-quality habitat was restricted within certain terrestrial fauna trapping sites in which landholder access was not granted. The specific locations have been detailed below. It must be noted that where access was not granted, additional effort was afforded to searches and assessment of potentially suitable habitat within accessible parts of a survey site:

Spring Survey Period

- The western extent of Additional Site 1;
- The eastern extent of Site 5;
- The eastern extent of Additional Site 3;
- Areas along the watercourse present in Additional Site 5; and
- Areas along the watercourse present in Additional Site 4.

Post-wet Survey Period

- The eastern extent of Additional Site 3;
- The eastern extent of Site 7;
- Areas along the watercourse present in Additional Site 5;
- Areas of Site 6 beyond the road reserve; and
- The north-western extent of Site 10.

Despite the limitations outlined above, the total area of potential habitat assessed and survey effort is appropriate for detecting the range of target flora and fauna species considered likely to occur within the Survey Area.



Figure 2-1 Floodwater inundating one of the artificial burrow traps targeting the Condamine earless dragon



Figure 2-2 One of several camera traps deployed at Site 9 during the Post-wet Survey that was submerged by floodwater

3 Results

3.1 Desktop Assessment

3.1.1 Threatened Communities

Of the four TECs identified in the EIS as being likely to occur within the Survey Area, it was determined that the following required seasonal identification of ground layer elements in order to confirm the presence of the community:

- > Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (grassland TEC);
- > Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC); and
- > White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands (White-box TEC).

The Brigalow (*Acacia harpophylla* dominant and codominant) ecological community (Brigalow TEC) was known to occur, based on the findings of the EIS.

3.1.2 Threatened Species

No additional species were added to the species list to be targeted in the surveys based on the review of contemporary databases (i.e. PMST and Wildlife online) as there were no additional confirmed records within the search limits. One species, the Grey snake (*Hemiaspis damelii*), was added to the list of target species for the surveys, based on a potential observation made during initial surveys completed as part of the geotechnical scope, presence of suitable habitat within the Survey Area, and confirmed records within 10 km of the Survey Area.

Table 3-1 and **Table 3-2** list the species considered in the Initial Advice Statement (IAS), EIS, and contemporary databases as possible, likely or known to occur. The likelihood of presence listings from both the IAS and EIS are tabulated along with an assessment of the level of survey effort conducted for the EIS using the following categories:

- > **Not assessed** – not assessed in the EIS;
- > **Survey unnecessary** – the EIS Likelihood of Assessment indicated that it is unlikely that the species or habitat for the species is present. This also applies to species that are Presumed Extinct;
- > **Sufficient survey effort** – targeted surveys have been conducted and no further effort is required;
- > **Limited survey effort** – while some survey effort has been conducted, the survey does not conform with guidelines and/or does not extend to the full extent of the Survey Area; and
- > **No survey effort** – no targeted surveys have been conducted for the species.

The Field Action Plan identified species requiring further assessment during the surveys through a gap analysis which has identified gaps in species data and the survey efforts to-date with respect to requisite guidelines. Species that are regarded as 'data deficient' and thus requiring targeted survey during the surveys are those in **Table 3-1** and **Table 3-2** that:

- > Had "Limited survey effort" as part of EIS surveys; or
- > Had "No survey effort" as part of EIS surveys and the contemporary PMST search indicates the species is "Known" or "Likely" Or the contemporary WildNet search indicates the species has been recorded.

Specific survey guidelines were identified for species to be targeted in the surveys (refer to Section 4.3.2 and Appendix B of the Field Action Plan).

Table 3-1 Flora species assessment

Species	Common Name	Status		IAS Likelihood	EIS Likelihood	EIS Survey	2020 PMST Search	2020 WildNet search	Target?
		NCA	EPBC Act						
Acacia lauta	Tara wattle	V	V	Likely	Possible	Limited survey effort	May occur	-	Yes
Commersonia perkinsiana	-	-	V	-	Unlikely	Survey unnecessary	Likely	-	No
Aristida forsteri	-	E	-	Potential	Not Assessed	Survey unnecessary	-	-	No
Arthraxon hispidus	Hairy-joint grass	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
Bertya opposens	-	-	V	Likely	Possible	Limited survey effort	-	-	Yes
Bothriochloa bunyensis	Satin-top grass	V	V	Likely	Unlikely	Survey unnecessary	-	-	No
Bulbophyllum globuliforme	Miniature moss-orchid	NT	V	Does not occur	Unlikely	Survey unnecessary	-	-	No
Cadellia pentastylis	Ooline	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
Calotis glabrescens	-	PE		Likely	Not Assessed	Survey unnecessary	-	-	No
Clematis fawcettii	Stream clematis	V	V	Potential	Possible	Limited survey effort	May occur	-	No
Commersonia ingewoodensis	-	E	-	Potential	Not Assessed	Survey unnecessary	-	-	No
Cymbonotus maidenii	-	E	-	Likely	Unlikely	Limited survey effort	-	-	Yes
Cyperus clarus	A sedge	V	-	-	Possible	Limited survey effort	-	✓	Yes
Dichanthium queenslandicum	King bluegrass	V	E	Likely	Likely	Limited survey effort	May occur	✓	Yes
Dichanthium setosum	-		V	Likely	Possible	Limited survey effort	Likely	-	Yes
Digitaria porrecta	Finger Panic Grass	NT	E	Likely	Known	Limited survey effort	-	✓	Yes
Eucalyptus curtisii	Plunkett Mallee	NT	-	Potential	Not Assessed	Survey unnecessary	-		No
Eucalyptus infera	Durikai mallee	V	V	Does not occur	Unlikely	Survey unnecessary	-	-	No
Eucalyptus virens	Shiny-leaved ironbark	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
Homopholis belsonii	-	E	V	Known	Likely	Limited survey effort	May occur	✓	Yes
Lepidium monoplacoides	-	-	E	Likely	Likely	Limited survey effort	-	✓	Yes
Lepidium peregrinum	-	-	E	Likely	Possible	Limited survey effort	May occur	-	Yes
Leucopogon sp. Coolmunda	Coolmunda leucopogon	E	E	Potential	Possible	Limited survey effort	-	-	Yes

Species	Common Name	Status		IAS Likelihood	EIS Likelihood	EIS Survey	2020 PMST Search	2020 WildNet search	Target?
		NCA	EPBC Act						
(D. Halford Q 1635)									
Microcarpaea agonis	-	E	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
Macrozamia conferta	-	V	V	Potential	Unlikely	Survey unnecessary	-	-	No
Macrozamia machinii	-	V	V	Known	Possible	Limited survey effort	Likely	-	Yes
Macadamia integrifolia	Macadamia nut	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
Microcarpaea agonis		-	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
Picris barbarorum	-	E		Known	Known	Limited survey effort	-	✓	Yes
Picris evae	Hawkweed	V	V	Known	Likely	Limited survey effort	Likely	✓	Yes
Phebalium distans	Mt Berryman phebalium	E	CE	Unlikely	Unlikely	Survey unnecessary	-	-	No
Philotheca sporadica	-	NT	V	Likely	Not Assessed	Survey unnecessary	-	-	No
Pomaderris coomingalensis	-	-	E	Unlikely	Not Assessed	Survey unnecessary	-	-	No
Prostanthera sp. (Dunmore D.M.Gordon 8A)	-		V	Likely	Possible	Limited survey effort	-	-	Yes
Rhaponticum australe	Austral Cornflower	V	V	Known	Likely	Limited survey effort	Likely	✓	Yes
Sarcophilus hartmannii	Waxy sarcophilus	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
Sarcophilus weinthalii	Blotched sarcophilus	E	V	Unlikely	Unlikely	Survey unnecessary	Likely	-	No
Sophora fraseri	-	V	V	Known	Possible	Limited survey effort	Known	-	Yes
Solanum papaverifolium	-	E		Likely	Unlikely	Survey unnecessary	-	-	No
Solanum stenopterum	-	V		Likely	Unlikely	Survey unnecessary	-	-	No
Thesium australe	Toadflax	V	V	Likely	Possible	Limited survey effort	Likely	-	Yes
Vincetoxicum forsteri	-	V	V	Likely	Possible	Limited survey effort	May occur	-	Yes
Westringia parvifolia	-	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
Xerothamnella herbacea	-	E	E	Likely	Possible	Limited survey effort	Likely	-	Yes
Notes: NT = Near Threatened, V= Vulnerable, E = Endangered, PE = Presumed extinct									

Table 3-2 Fauna species assessment.

Species	Common Name	Status NCA	EPBC Act	IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	Target?
Birds									
Anthochaera phrygia	Regent Honeyeater	E	CE	Likely	Possible	Limited survey effort	Likely	-	Yes
Botaurus poiciloptilus	Australasian Bittern	-	E	Unlikely	Likely	Limited survey effort	May occur	-	Yes
Calidris ferruginea	Curlew Sandpiper	E	CE, M	Potential	Possible	Limited survey effort	May occur	-	Yes
Calyptorhynchus lathamii	Glossy Black Cockatoo	V	-	Likely	Possible	Limited survey effort	-	✓	Yes
Erythrorhynchus radiatus	Red Goshawk	E	V	Likely	Possible	Limited survey effort	Likely	-	Yes
Falco hypoleucos	Grey Falcon	V	-	Potential	Not Assessed	No survey effort	Likely	-	Yes
Geophaps scripta	Squatter Pigeon (Southern Subspecies)	V	V	Likely	Possible	Limited survey effort	Known	-	Yes
Grantiella picta	Painted Honeyeater	V	V	Likely	Possible	Limited survey effort	Known	-	Yes
Hirundapus caudacutus	White-throated Needletail	-	V, M	Likely	Likely	Limited survey effort	Known	-	Yes
Lathamus discolor	Swift Parrot	E	CE	Likely	Possible	Limited survey effort	May occur	-	Yes
Lophochroa leadbeateri	Major Mitchell's cockatoo	V	-	Unlikely	Possible	Limited survey effort	-	-	Yes
Ninox strenua	Powerful Owl	V	-	Likely	Not Assessed	No survey effort	-	-	No
Poephila cincta	Southern black-throated finch	E	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
Rostratula australis	Australian Painted Snipe	V	E	Potential	Possible	Limited survey effort	Likely	-	Yes
Turnix melanogaster	Black-breasted Button-quail	V	V	Potential	Possible	Limited survey effort	Known	-	Yes
Butterflies									
Hypochrysops piceata	Bullock Jewel butterfly	E	-	Likely	Unlikely	Survey unnecessary	-	-	No
Jalmenus eubulus	Pale Imperial Hairstreak	V	-	Likely	Possible	Limited survey effort	-	✓	Yes
Mammals									
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes

Species	Common Name	Status NCA	EPBC Act	IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	Target?
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	Unlikely	Unlikely	Survey unnecessary	Likely	-	No
<i>Dasyurus maculatus</i>	Spot-tailed Quoll, Tiger Quoll (SE mainland population)	V	E	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat	V	V	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Ornithorhynchus anatinus</i>	Platypus	SLC	-	-	Possible	Limited survey effort	-	-	No
<i>Petauroides volans</i>	Greater Glider	V	V	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Petrogale penicillata</i>	Brush-tailed rock-wallaby	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Pseudomys novaehollandiae</i>	New Holland mouse	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Phascolarctos cinereus</i>	Koala	V	V	Known	Likely	Limited survey effort	Known	✓	Yes
<i>Potorous tridactylus</i>	Long-nosed potoroo	V	V	Potential	Unlikely	Survey unnecessary	-	-	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	-	V	Likely	Likely	Limited survey effort	Likely	-	Yes
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	SLC	-	-	Known	Limited survey effort	-	✓	Yes
Molluscs									
<i>Adclarkia cameroni</i>	Brigalow woodland snail	V	E	Likely	Possible	No survey effort	Likely	-	Yes
<i>Adclarkia dulacca</i>	Dulacca woodland snail	E	E	Potential	Unlikely	Survey unnecessary	May Occur	-	No
Fish									
<i>Maccullochella mariensis</i>	Mary river cod	-	E	-	Unlikely	Survey unnecessary	-	-	No
<i>Maccullochella peelii</i>	Murray cod	-	V	Likely	Likely	Sufficient survey effort – Known	Known	-	No
<i>Bidyanus</i>	Silver perch	-	CE	Likely	Unlikely	Sufficient survey effort – Unlikely	-	-	No
Reptiles									
<i>Acanthophs antarcticus</i>	Common death adder	V	-	Likely	Known	Limited survey effort	-	✓	Yes
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	Likely	Likely	Limited survey effort	Known	✓	Yes
<i>Delma torquata</i>	Collared delma	V	V	Likely	Possible	Limited survey effort	May Occur	-	Yes

Species	Common Name	Status NCA	EPBC Act	IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	Target?
Egernia rugosa	Yakka skink	V	V	Likely	Possible	Limited survey effort	May Occur	-	Yes
Furina dunmalli	Dunmall's snake	V	V	Likely	Likely	Limited survey effort	May Occur	✓	Yes
Hemiaspis damelii	Grey snake	E	-	Likely	Not Assessed	Survey unnecessary	-	-	Yes [#]
Tympanocryptis condaminensis	Condamine (Darling Downs) earless dragon	E	E	Known	Likely	Limited survey effort	Likely	-	Yes
Uvidicolus sphyrurus	Border thick-tailed gecko	-	V	Unlikely	Unlikely	Survey unnecessary	Likely	-	No
Wollumbinia belli	Bell's turtle	V	V	Unlikely	Unlikely	Sufficient survey effort – Unlikely	-	-	No

Notes: V= Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory, SLC = Special Least Concern

Notes # Whilst this species was not identified as requiring assessment in the EIS and is not identified as requiring assessment by the Terms of Reference for the EIS, a suspected identification of this species was made during the Stage 1 surveys, the Project area supports potentially suitable habitat for this species, and records are known within 10 km of the Survey Area. As such this species was included for further assessment.

3.2 Field Assessment – Flora

3.2.1 Vegetation Communities

3.2.1.1 Regional Ecosystems

During the combined Survey Periods, ground-truthing field assessments were carried out for all REs within the Survey Area. The Survey Area supported a total of eighteen Regional Ecosystems (RE), including two listed as Endangered under the *Vegetation Management Act 1999* (VM Act) and five listed as Of Concern. The REs recorded and mapped include the following:

- > Endangered REs: 11.4.3 and 11.9.5;
- > Of Concern REs: 11.3.2, 11.3.4, 11.3.21, 11.5.14, 11.8.11 and 11.9.7; and
- > Least Concern REs: 11.3.14, 11.3.18, 11.3.25, 11.3.27b, 11.5.1, 11.5.1a, 11.5.4, 11.5.20, 11.7.4, 11.7.7, 11.8.4 and 11.8.5.

Notable findings with regards to the prevalence of the above REs throughout the Survey Area have been summarised below:

- > There was a total area of 3,796.5 ha of non-remnant vegetation throughout the Survey Area;
- > The most abundant RE throughout the Survey Area was RE 11.5.4, covering an area of 198.7 ha;
- > The RE that was the least abundant was a heterogenous polygon containing 0.02 ha of 11.3.14/11.3.4, and the smallest single RE was 11.8.3 containing 0.2 ha;
- > RE 11.3.2, including examples that are consistent with the Poplar Box TEC, occur primarily as isolated patches and strips with the highest abundance occurring in association with the larger rivers in the Condamine River Catchment and the Macintyre River to the very south of the Survey Area;
- > RE 11.4.3, which in many instances was found to be consistent with the Brigalow TEC, was most commonly encountered towards the southern portion of the alignment from the area around Yelarbon to near the southern limit of the Survey Area. By contrast 11.9.5 which was also found to be regularly consistent with the Brigalow TEC was primarily encountered in the area south of Millmerran to around the Bringalily State Forest region – generally the middle portion of the alignment. Although a small area was also encountered south of Pittsworth; and

- > With the exception of two areas of RE 11.3.21, the only verified RE within the northern portion of the alignment from around Pittsworth to Gowrie are those occurring on land zone 8, specifically RE 11.8.5 and 11.8.4. This area is also the only location within the Survey Area where those two RE occur, reflecting the clear change in the underlying geology in this region.

Field work resulted in the capture of 482 quaternary points and the completion of 37 full biocondition sites to inform vegetation mapping. Mapping illustrating the location of flora survey sites is presented in **Appendix B**. **Appendix C** presents the data collected at biocondition sites. It is noted that where the Grassland TEC was assessed by way of transects a full biocondition assessment was not undertaken (data is presented in **Appendix D**). A full list of the remnant, high-value regrowth and non-remnant regrowth REs verified as occurring within the Survey Area, through either field or desktop verification is provided in **Table 3-3**. Ground-truthed REs were mapped at a ~1:10,000 scale (**Appendix E**). Of the REs identified during the field work period, two are listed as Endangered under the *Vegetation Management Act* 1999 (*VM Act*) and five are listed as Of Concern.

The boundaries of mapped RE polygons were found to be broadly accurate to the scale at which they are mapped, and in this regard the mapping presented herein has been re-mapped to exclude areas of mapped remnant vegetation that was actually found to be cleared land (e.g. existing road pavement or rail track). With regards to the accuracy of the mapped RE present, it is noted that in most instances the dominant RE in heterogeneous polygons was the only RE confirmed as actually being present, in most other respects the RE mapping of RE type was broadly accurate. The total number of REs is likely to be fewer than the number identified by the Vegetation Management Property Report as occurring within the Survey Area owing to some subdominant REs being absent from mapped polygons.

Table 3-3 REs mapped in the Survey Area That were assessed by quaternary or biocondition

RE code	VM Status	Act	Short description	Equivalent TEC
11.3.2	Of concern		<i>Eucalyptus populnea</i> woodland on alluvial plains.	Poplar Box Grassy Woodlands on Alluvial Plains
11.3.4	Of concern		<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains.	NA
11.3.14	Least concern		<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains.	NA
11.3.18	Least Concern		<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	NA
11.3.21	Of concern		<i>Dichanthium sericeum</i> and/or <i>Astrelba</i> spp. grassland on alluvial plains. Cracking clay soils.	Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland
11.3.25	Least concern		<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines.	NA
11.3.27b	Least concern		Freshwater wetlands.	NA
11.4.3	Endangered		<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains.	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant ecological community)
11.5.1	Least concern		<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces.	NA
11.5.1a	Least concern		<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces.	NA

RE code	VM Status	Act	Short description	Equivalent TEC
11.5.4	Least concern		<i>Eucalyptus chloroclada</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains and/or remnant surfaces.	NA
11.5.14	Of concern		<i>Triodia</i> sp. open hummock grassland with emergent trees on Cainozoic sand plains and/or remnant surfaces. Highly alkaline soils.	NA
11.5.20	Least concern		<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> and/or <i>E. woollsiana</i> +/- <i>E. crebra</i> woodland on Cainozoic sand plains.	NA
11.7.4	Least concern		<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust.	NA
11.7.7	Least concern		<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. woodland on Cainozoic lateritic duricrust.	NA
11.8.4	Least concern		<i>Eucalyptus melanophloia</i> woodland to open woodland on Cainozoic igneous rocks.	NA
11.8.5	Least concern		<i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks.	NA
11.9.5	Endangered		<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant ecological community)
11.9.7	Of concern		<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks.	NA

3.2.1.2 Biocondition

During the combined survey period, 37 biocondition sites were completed within ground-truthed Category B (remnant) and Category C REs in accordance with methodology outlined in Chapter 1 of the *Guide to Determining Terrestrial Habitat Quality – version 1.3 February 2020*. In addition, a further seven transects that were not full biocondition assessment were undertaken to aid in assessing the presence of the *Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland* TEC and one transect in an area ultimately determined to be non-remnant. The location of each of these sites is shown in **Appendix B** and **Table 3-4** summarises the number of transects completed for each RE.

Every attempt was made to complete the required number of transects for each RE in accordance with the *Guide to Determining Terrestrial Habitat Quality – version 1.3 February 2020*, however, as noted previously some minor access limitations meant this was not always practicable. The use of additional quaternary assessments throughout the Survey Area has provided additional data that can be used to draw comparisons between those RE for which the number of Biocondition Sites is lower than the recommended number. This is consistent with the stream lining approach as described in Box 1.3 within the *Guide to Determining Terrestrial Habitat Quality – version 1.3 February 2020*.

Table 3-4 Summary of Biocondition assessments undertaken during the Survey Period

Target RE	TEC equivalent	Spring Survey biocondition sites	Post-wet Survey biocondition sites	Total Area	Recommended number of transects [^]	Notes
11.3.2	Poplar Box Grassy Woodlands on Alluvial Plains	0	3	96	3	
11.3.4	NA	1	1	19	2	
11.3.14	NA	1	3	30	2	One biocondition assessment

Target RE	TEC equivalent	Spring Survey biocondition sites	Post-wet Survey biocondition sites	Total Area	Recommended number of transects [^]	Notes
						undertaken in Category C
11.3.21	Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	3*	4	31	2	Full biocondition assessment not completed due to non-remnant status. The primary purpose was to determine whether the TEC was present.
11.3.25	NA	1	2	30	2	
11.4.3	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant ecological community)	2	2	139	4	
11.5.1	NA	1	2	191	4	
11.5.1a	NA	0	1	10	2	
11.5.4	NA	2	2	198	4	
11.5.14	NA	0	1	54	3	
11.5.20	NA	0	1	68	3	
11.7.7	NA	2	0	3.6	2	
11.8.4	NA	0	2	66	3	
11.8.5	NA	1	3	97	3	
11.9.5	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant ecological community)	1	1	30	2	
11.9.7	NA	0	1	54	3	
Non-remnant	NA		1			

* - One of these transects was undertaken as part of the geotechnical flora survey

[^] - as per Table 1.2 within the *Guide to Determining Terrestrial Habitat Quality – version 1.3 February 2020*

The Department of Resources regional ecosystem mapping also identified the presence of additional REs for which biocondition sites were not undertaken. These are listed in **Table 3-5** along with an explanation as to why these REs were not assessed.

Table 3-5 REs for which biocondition assessments were not undertaken during the Survey Period

RE	TEC equivalent	Discussion
11.3.27b	NA	This RE was only mapped as a subdominant RE and was not observed during site investigations
11.7.4	NA	This RE was only mapped as a subdominant RE and was not observed during site investigations

Field data for individual sites is presented in **Appendix C** which is split into two sections accounting for Spring and Post-wet survey events. Calculations of biocondition scores for individual sites is presented in **Appendix F** and a summary of results is presented in **Table 3-6**. The scores below have not been 'area weighted' as this is best completed once the final impact areas for each of the RE is understood as the area being impacted will alter the area weighted score.

Table 3-6 Biocondition scores

Regional Ecosystem	Survey Event	Site ID	Site-based Condition Attributes	Landscape Context	Total Score	BioCondition Score
11.3.14	Post-wet	1BD	56/80	14/20	70/100	0.7
11.3.14	Post-wet	2BB	41/80	2/20	43/100	0.43
11.3.14	Post-wet	2BA	78/80	7/20	85/100	0.85
11.3.14	Spring	2BB	56.5/80	16/20	72.5/100	0.725
11.3.2	Post-wet	1BF	65/80	13/20	78/100	0.78
11.3.2	Post-wet	1BJ	63.5/80	11/20	74.5/100	0.745
11.3.2	Post-wet	1BK	62/80	13/20	75/100	0.75
11.3.25	Post-wet	1BR	46/80	16/20	62/100	0.62
11.3.25	Post-wet	2BD	57.5/80	14/20	71.5/100	0.715
11.3.25	Spring	2BE	64/80	20/20	84/100	0.84
11.3.4	Post-wet	1BH	56/80	8/20	64/100	0.64
11.3.4	Spring	2BC	62.5/80	20/20	82.5/100	0.825
11.4.3	Post-wet	1BS	39/80	0/20	39/100	0.39
11.4.3	Post-wet	1BC	53.5/80	18/20	71.5/100	0.715
11.4.3	Spring	1BA	46/80	11/20	57/100	0.57
11.4.3	Spring	1BB	57.5/80	11/20	68.5/100	0.685
11.5.1	Post-wet	1BB	68/80	19/20	87/100	0.87
11.5.1	Post-wet	2BC	75/80	6/20	81/100	0.81
11.5.1	Spring	1BC	52/80	20/20	72/100	0.72
11.5.14	Post-wet	1BO	80/80	20/20	100/100	1
11.5.1a	Post-wet	1BA	58/80	9/20	67/100	0.67
11.5.20	Post-wet	1BN	46/80	4/20	50/100	0.5
11.5.4	Post-wet	2BK	43/80	11/20	54/100	0.54
11.5.4	Post-wet	1BE	46/80	16/20	62/100	0.62
11.5.4	Spring	2BA	64.5/80	19/20	83.5/100	0.835
11.5.4	Spring	1BF	56.5/80	20/20	76.5/100	0.765
11.7.7	Spring	2BD	62.5/80	19/20	81.5/100	0.815
11.7.7	Spring	1BD	58.5/80	18/20	76.5/100	0.765
11.8.4	Post-wet	2BE	53.5/80	8/20	61.5/100	0.615
11.8.4	Post-wet	2BF	70.5/80	18/20	88.5/100	0.885
11.8.5	Post-wet	1BM	72/80	9/20	81/100	0.81
11.8.5	Post-wet	2BG	36.5/80	0/20	36.5/100	0.365
11.8.5	Post-wet	2BH	58.5/80	9/20	67.5/100	0.675
11.8.5	Spring	2BF	62.5/80	9/20	71.5/100	0.715
11.9.5	Post-wet	1BI	59/80	0/20	59/100	0.59
11.9.5	Spring	1BE	49/80	19/20	68/100	0.68

Regional Ecosystem	Survey Event	Site ID	Site-based Condition Attributes	Landscape Context	Total Score	BioCondition Score
11.9.7	Post-wet	1BG	64/80	18/20	82/100	0.82

It should be noted that there was only patch of remnant RE 11.5.14 that was accessible during the field surveys and there are no published benchmarks for this RE. As such, for the purposes of this assessment, the assessment site for RE 11.5.14 was also the reference site. Additionally, because there was recruitment of all species in the ecologically dominant layer and no weed cover it received a site-based condition score of 80/80.

While some biocondition metrics were collected for four sites located in RE 11.3.21 during the Post-wet Survey (2BJ and 2BI) and Spring Survey (1BG and 2BG) the level of detail was not adequate to calculate a full biocondition score. These transects have been omitted from **Table 3-6** due to lack of biocondition score. However, **Appendix C** presents the data that was obtained for these sites.

3.2.1.3 Threatened Ecological Communities

During the Spring and Post-wet Survey Periods, field assessments were carried out for all TECs identified in the EIS. In cases where a TEC was determined to be present at a scale that met the minimum area and condition thresholds outlined by Commonwealth guidelines the TEC was recorded and mapped, regardless of whether the full area fell within the Flora Study Area.

Table 3-7 presents a summary of the ground-truthed TECs identified within the Survey Area that are mapped **Appendix B**.

Table 3-7 Ground-truthed TECs identified within the Survey Area

TEC [Status]	Corresponding RE observed within Survey Area	Discussion	Total Area in Survey Area (ha)	Image
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Grassland TEC) [Critically Endangered]	11.3.21	The TEC occurs in isolated patches primarily around Brookstead and proximate to the Toowoomba Wellcamp Airport. Areas of derived grasslands (e.g. where woody cover has been lost from RE 11.3.2); where the substrate was not consistent with the TEC (e.g. where diagnostic species occur on rail ballast); and where weed cover exceeded the requisite condition thresholds were significant determinants in delineating the TEC. Assessments undertaken as part of the post-wet surveys were important in delineating the TEC owing to the presence of fertile plant material.	31.9 ha	
Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC) [Endangered]	11.3.2	The TEC was confirmed to be present in several areas within the Survey Area. All areas mapped as 11.3.2 were equated with the TEC. Where areas that were not mapped as remnant RE were assessed on ground they were found to support the requisite attributes to be regarded as the TEC.	90.3 ha	

TEC [Status]	Corresponding RE observed within Survey Area	Discussion	Total Area in Survey Area (ha)	Image
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (Vine Thicket TEC) [Endangered]	11.9.5 / 11.9.7 / 11.3.25	One occurrence of the TEC was confirmed to be present in an isolated patch accounting for ~0.2ha. While the location where the TEC was identified is shown as REs 11.9.5 / 11.9.7 / 11.3.25 (i.e. REs on sedimentary and alluvial geologies) in pre-clearing mapping, prevailing rocky outcropping was consistent with igneous material. Pre-clearing for 11.8.3 (i.e. an RE on igneous geology) is located ~130m to the east of the patch and as such the patch was considered an outlier of 11.8.3.	0.2 ha	
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (White Box TEC) [Critically Endangered]	n/a	One isolated patch of the TEC was recorded in the Flora Survey Area. Owing to landholder access constraints assessments were made at the property boundary and subsequently through GIS analysis. It was found that the area included >12 understorey species (excluding grasses) and at least two 'important species' being <i>Maireana microphylla</i> and <i>Einadia hastata</i> as viewed from the property boundary. Furthermore, subsequent GIS analysis found the patch supported in excess of the requisite 20 trees/ha to be regarded as the TEC. While White Box was recorded in one other location in the Flora Survey Area (proximate to the Vine Thicket TEC), these were scattered individuals in an area dominated by exotic species.	7.8 ha	
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community (Brigalow TEC) [Endangered]	11.4.3, 11.9.5	The TEC was found to be present in several locations. Where areas were assessed on ground as having greater than 50% weed cover they were excluded from the TEC.		

3.2.2 Flora Species

A full list of the flora species encountered during the Survey Period is provided in **Appendix G**. The list of compiled flora species have been derived from the range of flora assessments, such as biocondition assessment and quaternary data, during the Post-wet and Spring surveys.

3.2.2.1 Conservation Significant Flora Species

Over the course of the surveys, a total of ten threatened flora species listed under either the EPBC Act or NC Act were observed (**Table 3-8**). With reference to **Table 3-8** the number of individuals recorded should not be viewed as an exact number of each species with the Survey Area. While areas of suitable habitat were comprehensively surveyed, the aforementioned limitation means that there remains a likelihood that additional individuals will be encountered within the Survey Area over time. Images of selected species are presented in **Figure 3-1** to **Figure 3-9**. Seven of these species are listed under the EPBC Act, and are considered to be MNES - including:

- > *Xerothamnella herbacea*;
- > *Picris evae* (Hawkweed);
- > *Rhaponticum australe* (Austral cornflower);
- > *Lepidium monolocoides* (Winged peppergrass);
- > *Westringia parvifolia*;
- > *Homopholis belsonii* (Belson's Panic); and
- > *Dichanthium queenslandicum* (King Bluegrass).

Three species are listed solely under the NC Act, including:

- > *Picris barbarorum*;
- > *Cyperus clarus*; and
- > *Digitaria porrecta*.

Xerothamnella herbacea, *Lepidium monolocoides* and *Dichanthium queenslandicum* are listed as Endangered pursuant to the EPBC Act, whereas *Picris evae*, Austral cornflower, *Westringia parvifolia* and Belson's Panic are listed as Vulnerable. *Lepidium monolocoides* is the only EPBC Act listed species which is not also listed under the NC Act.

Of the species listed solely under the NC Act, *Picris barbarorum* and *Cyperus clarus* are listed as Vulnerable, and are therefore considered to be MSES while *Digitaria porrecta* is listed as Near Threatened and is not a MSES.

In addition to the species listed above, an observation was also made of Queensland western white gum (*Eucalyptus argophloia*), listed as Critically Endangered under the NC Act and Vulnerable under the EPBC Act. This is a commonly planted species on the Darling Downs and the record was made in a planted copse. Therefore it is 'not in the wild' pursuant to the DES *Operational policy - When a protected plant in Queensland is taken to be 'in the wild'*. As such it is not afforded specific conservation significance under the NC Act.

The mapped locations of all protected flora encountered within the Survey Area are shown in **Appendix H**.

Table 3-8 NC Act and EPBC Act listed flora species observed during the Survey Period.

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Period observed	Observations
Acanthaceae	<i>Xerothamnella herbacea</i>	-	Endangered	Endangered	Spring	75 individuals found within RE 11.4.3 and non-remnant vegetation.
Asteraceae	<i>Picris barbarorum</i>	-	Vulnerable	-	Spring and Post-wet	392 individuals were found during Spring Survey, and 1 individual was found during the Post-wet Survey in non-remnant vegetation.
Asteraceae	<i>Picris evae</i>	-	Vulnerable	Vulnerable	Spring	1 individual was found during the Spring Survey in non-remnant vegetation
Asteraceae	<i>Rhaponticum australe</i>	Austral cornflower	Vulnerable	Vulnerable	Spring and Post-wet	163 individuals were found growing on hilly sections within non-remnant vegetation in road reserves in the Post-wet Survey, and 1 individual was found in Spring.
Brassicaceae	<i>Lepidium monophloides</i>	Winged peppercre ss	Least Concern	Endangered	Spring and Post-wet	25 individuals were found during the Spring Survey and 7 individuals were found during the Post-wet Survey in RE 11.5,14 and within non-remnant vegetation
Cyperaceae	<i>Cyperus clarus</i>		Vulnerable	-	Post-wet	234 specimens found growing in dense populations in areas containing the geological formation of Cainozoic igneous rocks such as RE 11.8.4 and RE 11.8.5.
Lamiaceae	<i>Westringia parvifolia</i>		Vulnerable	Vulnerable	Spring and Post-wet	214 individuals were found in the Post-wet Survey and 22 individuals were found in Spring Surveys near Yelarbon in RE 11.4.3 and non-remnant vegetation.
Poaceae	<i>Digitaria porrecta</i>	-	Near Threatened	-	Spring and Post-wet	391 individuals were found in Post-wet and 1 individual was found during Spring Surveys typically in non-remnant vegetation and RE 11.3.2, 11.8.4 and 11.8.5.
Poaceae	<i>Homopholis belsonii</i>	Belson's Panic	Endangered	Vulnerable	Spring and Post-wet	2654 individuals were found in the Post-wet surveys while 637 were found during Spring Surveys. Tended to have a preference for shaded areas
Poaceae	<i>Dichanthium queenslandicum</i>	-	Vulnerable	Endangered	Post-wet	100 Individuals were found in the Post-wet Surveys, typically occurring as clumps of a single species.



Figure 3-1 *Xerothamnella herbacea*



Figure 3-2 *Picris barbarorum*



Figure 3-3 *Rhaponticum australe*



Figure 3-4 *Lepidium monoplacoides*



Figure 3-5 *Cyperus clarus*



Figure 3-6 *Westringia parvifolia*



Figure 3-7 *Digitaria porrecta*



Figure 3-8 *Homopholis belsonii*



Figure 3-9 *Dichanthium queenslandicum*

3.3 Field Assessment – Fauna

3.3.1 Conservation Significant Fauna Species

Over the course of the Spring Survey Period, a total of 202 species were observed, including 21 amphibian, 119 bird, 28 mammal, 28 reptile and six insect species. During the Post-wet Survey Period, an additional 79 species were observed, including two amphibian, 36 bird, three gastropod, eight mammal, 15 reptile, 14 insect and one malacostracan species (a yabby), bringing the total number of species observed during the Survey Period to 281.

Of the species observed, eight are listed under either the *EPBC Act* or *NC Act* (**Table 3-9**). Five species are considered to be both MNES and MSES, including:

- > Painted honeyeater (*Grantiella picta*);
- > White-throated needletail (*Hirundapus caudacutus*);
- > South-eastern long-eared bat (*Nyctophilus corbeni*);
- > Grey-headed Flying-fox (*Pteropus poliocephalus*); and
- > Koala (*Phascolarctos cinereus*).

All of the above-listed species are classified as Vulnerable pursuant the *EPBC Act*.

Three of the species found are listed as MSES only, including:

- > Glossy black cockatoo (eastern subspecies) (*Calyptorhynchus lathami lathami*) (*NC Act* Vulnerable);
- > Grey snake (*Hemiaspis damelii*) (*NC Act* Endangered); and
- > Short-beaked echidna (*Tachyglossus aculeatus*) (*NC Act* Special Least Concern),

which are listed as Vulnerable, Endangered and Special Least Concern under the *NC Act*, respectively.

During the post-wet field surveys, two species of native mouse were captured at Site 2 and Site 5. The initial identification made in the field was for the New Holland mouse (*Pseudomys novaehollandiae*), based on tail to head-body measurements, size of ears and fur colour. Hair samples were collected along with measurement and images of the species. The hair sample analysis returned likely House mouse (*Mus musculus*) but noted that the hairs used were not the best for identification purposes. The images and measurements were provided to Scott Burnett of the University of the Sunshine Coast and Kazz Tokek, (both of whom are recognised small mammal experts), as well as the Queensland Museum. The initial field identification of New Holland mouse was verified by Scott Burnett and Kazz Tokek, however, the Queensland Museum considers the species to be Delicate mouse (*Pseudomys delicatus*). Based on the range of identifications received, we have ultimately deferred to the Queensland Museum in this instance and have recorded the species here as Delicate mouse (**Figure 3-10**).

The mapped locations of all threatened fauna encountered within the Survey Area are shown in **Appendix I** and the following sections provide a brief summary of each species within the Survey Area.

Table 3-9 NC Act and EPBC Act listed fauna species observed during the Survey Period.

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Observations
Birds					
Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	Glossy black-cockatoo (eastern)	Vulnerable	-	7 individuals
Meliphagidae	<i>Grantiella picta</i>	Painted honeyeater	Vulnerable	Vulnerable	5 individuals
Apodidae	<i>Hirundapus caudacutus</i>	White-throated needletail	Special Concern	Least Vulnerable	2 individuals
Mammals					
Vespertilionidae	<i>Nyctophilus corbeni</i>	South-eastern long-eared bat	Vulnerable	Vulnerable	1 individual
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	Vulnerable	Vulnerable	23 individuals observed and 62 observations

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Observations
					via scat and tracks.
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-Fox	Least Concern	Vulnerable	1 individual
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked echidna	Special Concern	Least -	4 individuals
Reptiles					
Elapidae	<i>Hemiaspis damelii</i>	Grey snake	Endangered	-	2 individuals

3.3.1.2 Painted Honeyeater

During the Spring Survey Period, the species was observed utilising non-remnant vegetation dominated by *A. harpophylla* and *C. cristata* along the proposed alignment in areas that tended to be connected to nearby remnant vegetation patches that supported a similar vegetation community. The species was not observed during the Post-wet Survey Period. Refer to **Table 3-12** for a description of habitat found specific to the Painted honeyeater.

The Painted Honeyeater's distribution over summer and spring stretches from inland central Victoria through scattered parts of NSW, the ACT and southern Queensland. During winter, the Painted Honeyeater is known to migrate further to North Queensland, around Cape York Peninsula, and eastern areas of the Northern Territory. Opportunistic sightings have also been recorded in far eastern parts of South Australia (DotEE, 2018).

The species is known to use the same nest sites each season and they are generally seen in pairs or singles, rarely in small flocks of up to six birds (DES 2018; DotEE 2018). They are known to favour habitats that have a high prevalence of mistletoe, their preferred food species. This is consistent with the findings of this survey, with the dominant vegetation community of *A. harpophylla* and *C. cristata* woodland also supporting higher abundance of mistletoe in most locations.

Threatening processes affecting this species that are relevant to the Project include:

- > Destruction of habitat for agriculture and grazing and due to insect-induced eucalypt dieback (Eddy 1961; Garnett 1992); and
- > Reduced regeneration in suitable habitat due to grazing by livestock and rabbits.

3.3.1.3 Grey-headed Flying-fox

During the Post-wet Survey Period, Grey-headed flying-fox individuals were observed foraging in flowering eucalypt trees within remnant and non-remnant vegetation throughout the proposed alignment. It should be noted that no Grey-headed flying-fox camps were sighted within the proposed alignment. Refer to **Table 3-12** for a description of habitat found specific to the Grey-headed Flying-fox.

The species is known to travel great lengths (up to 50 km) to forage fruiting and flowering trees throughout the year (DES, 2013). It is likely that the area provides temporary habitat for individuals that may reside in camps located further away from the proposed alignment.

Threatening processes affecting this species that are relevant to the Project include:

- > Removing vegetation that may provide foraging resources.

3.3.1.4 White-throated needletail

Presence of the White-throated needletail was observed at Site 5 during the Spring Survey Period and at Site 8 during the Post-wet Survey Period. In both instances it was recorded overflying large areas of intact woodland. The White-throated needletail is a trans-equatorial migrant, breeding in the Northern Hemisphere and flying south for the boreal winter. It generally spends the non-breeding season in Australia, where it is widespread in the eastern and south-eastern parts of the country.

This species is almost exclusively aerial and as such, is observed over a range of habitat types. It is most commonly seen foraging at heights 'up to cloud level', although usually much lower. When flying above farmland, they are often recorded above remnant vegetation on the edge of paddocks (Tarburton 1993), as

was the case for the observations recorded during the Survey Period. Refer to **Table 3-12** for a description of habitat found specific to the White-throated needletail.

3.3.1.5 South-eastern Long-eared Bat

Presence of the South-eastern long-eared bat was observed at Site 5 during the Spring Survey Period (**Figure 3-14**). It was captured on two consecutive nights in harp traps installed along an access track located within eucalypt woodland with a very dense secondary tree layer of *Allocasuarina luehmannii*. The distribution of this slow-flying, agile microbat is scattered, falling mostly within the Murray Darling basin area. It inhabits a range of vegetation types; however, it is most commonly found in box, ironbark and cypress pine woodland vegetation on the western slopes and plains of southern Queensland and northern NSW.

The species roosts in tree hollows, crevices and under loose bark, and utilises the understory to hunt non-flying prey such as caterpillars and beetles.

Threatening processes affecting this species that are relevant to the Project include:

- > Loss of remnant semi-arid woodland;
- > Loss of hollow-bearing trees;
- > Disturbance to winter roosting and breeding sites;
- > Inappropriate fire regimes;
- > Loss or modification of habitat; and
- > Application of pesticides in or adjacent to foraging areas.

3.3.1.6 Koala

Koala (**Figure 3-11**), or evidence of Koala presence in the form of scat and scratch marks, was observed at Sites 10 and 5 during the Spring Survey Period and Sites 5, 6, 11 and to the east of Site 10 during the Post-wet Survey Period. It was also frequently recorded along many sections of the proposed alignment, with an area of apparent higher density in and around the Pittsworth region. A total of 23 Koala were directly observed while 62 observations of this species occurrence were also made within the Survey Area. Refer to **Table 3-12** for a notable habitat features specific to the Koala. Typically the Koala (or evidence of their presence) was found in habitats dominated by Eucalyptus woodland. This included the below-listed communities:

- > RE 11.9.7/11.3.4 within Site 5 which includes *E. populnea* and *Eremophila mitchellii* shrubby woodland and *E. tereticornis* woodland;
- > RE 11.5.4/11.3.18 within Site 6, consisting of *E. chloroclada*, *C. glaucophylla*, *C. endlicheri*, *A. leiocarpa* woodland and *E. populnea*, *C. glaucophylla*, *A. luehmannii* shrubby woodland; and
- > REs 11.8.4 and 11.8.5 within Site 10 including, *E. melanophloia* open woodland and *E. orgadophila* open woodland, respectively.

Key threats to this species that are relevant to the Project include:

- > Loss and modification of habitat;
- > Fragmentation and isolation of habitat patches;
- > Barrier effects posed by linear infrastructure;
- > Predation by roaming or domestic dogs; and
- > Vehicle strike.

3.3.1.7 Glossy Black-Cockatoo

Two Glossy black-cockatoos were observed at Site 5 during the Post-wet Survey Period, recorded overflying a patch of *Casuarina cristata*. Other signs of occupation in the form of chewed orts were made along the alignment in areas dominated by *C. cristata*. Refer to **Table 3-12** for a description of habitat found specific to the Glossy Black-Cockatoo. This species has a widespread distribution, from the central Queensland coast to East Gippsland, although it is uncommon within this range. It inhabits open forest and woodlands where sheoak occur. It is a highly specialised feeder, relying on sheoak cones, particularly those of Black sheoak (*Allocasuarina littoralis*), Forest sheoak (*A. torulosa*) and Belah (*C. cristata*). It depends on large, hollow-bearing *Eucalypt* trees for nest sites and lays a single egg between March and May.

Key threats to this species that are relevant to the Project include:

- > Habitat loss from vegetation clearing/removal;
- > Loss and degradation of foraging habitat and reduced regeneration of sheoak stands due to clearing, fragmentations, weed encroachment and / or grazing by domestic stock;
- > Loss of mature eucalypts for nest hollows;
- > Nest predation by feral cats; and
- > Inappropriate fire regimes, resulting in reduced habitat and food quality / availability.

3.3.1.8 Grey Snake

Presence of the Grey snake (**Figure 3-12**) was confirmed at Site 1 during the Spring Survey Period and near Additional Site 2 during preliminary surveys completed for the geotechnical works. At Site 1 it was recorded from the *Melaleuca densispicata* wetland that was recently inundated by heavy rain. It was captured from an area that had an abundance of amphibian fauna at the time of the surveys. The second observation was made at the edge of a riparian woodland associated with a predominantly ephemeral creek that had retained moderate pools of more permanent water. This species is distributed throughout south-eastern Queensland and north-central New South Wales, with a core area of habitat south of the Great Dividing Range between Dalby and Glenmorgan. It inhabits woodlands, particularly Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), usually on heavier cracking clay soils. Refer to **Table 3-12** for a description of habitat found specific to the Grey Snake

The species is known to shelter under rocks, flood debris, and within soil cracks and abandoned burrows, particularly around waterbodies or in areas with small gullies and ditches (Wilson and Swan 2010). It feeds almost exclusively on frogs.

- > Loss and modification of habitat;
- > Habitat degradation by introduced species such as cattle and rabbits; and
- > Vehicle strike.

3.3.1.9 Short-beaked Echidna

Short-beaked echidna (**Figure 3-13**) were observed at Site 12 during the Spring Survey Period and at Site 1, 3 and 8 during the Post-wet Survey Period. Evidence Short-beaked echidna presence (diggings, scat) was also observed at Site 6 and Site 4 during this period. Refer to **Table 3-12** for a description of habitat found specific to the Short-beaked Echidna.

This species is found throughout Australia in a range of habitats, including forests and woodlands, heath, grasslands, arid environments, farmland and suburban backyards. It requires a large home range and is known to shelter in hollow logs, rock crevices and vegetation. Breeding season takes place in spring, during which time this species will lay a single egg in a nursery burrow. Juveniles do not leave this nursery burrow until 6-8 months old.

Key threats to this species that are relevant to the Project include:

- > Loss and modification of habitat;
- > Fragmentation and isolation of habitat patches;
- > Barrier effects posed by linear infrastructure;
- > Predation by roaming or domestic dogs; and
- > Vehicle strike.



Figure 3-10 Delicate mouse



Figure 3-11 Koala



Figure 3-12 Grey snake



Figure 3-13 Short-beaked echidna



Figure 3-14 South-eastern Long-eared bat

3.3.1.10 Marine and Migratory Fauna

Twenty-two species listed as “Marine” under the *EPBC Act* were found throughout the Survey Area. Of these, three are also listed as “Migratory” species. These are the White-throated needletail, Satin flycatcher and Rufous fantail.

Migratory species are protected under international agreements are considered to be MNES (**Table 3-10**).

Table 3-10 *EPBC Act* listed marine/migratory fauna observed during the Survey Period

Scientific Name	Common Name	EPBC Act - Marine/Migratory	EPBC Act Status	NC Act Status	Period observed
Birds					
<i>Hirundapus caudacutus</i>	White-throated needletail	Marine/Migratory	Vulnerable	Vulnerable	Spring and Post-wet
<i>Myiagra cyanoleuca</i>	Satin flycatcher	Marine/Migratory	-	Special least concern	Post-wet
<i>Rhipidura rufifrons</i>	Rufous fantail	Marine/Migratory	-	Special least concern	Post-wet

3.3.1.11 Condamine Earless Dragon Habitat Assessments

Whilst not directly detected during these surveys, general assessments of fauna habitat have determined that much of the proposed alignment within the Condamine River Floodplain supports habitat which is considered to be important for the Condamine earless dragon (*Tympanocryptis condaminensis*), listed as Endangered under the *EPBC Act* and *NC Act*. Specifically, it was noted that areas of existing rail corridor, road reserves, and adjoining cultivated land provide the combination of ‘complicated’ habitat areas that may be used for retreat as well as exposed areas which may be used for sunning and foraging. As indicated by the the following sections of Appendix L of the Inland Rail Border to Gowrie EIS, habitat for the species within the proposal footprint can include:

- > **Section 4.3.3** - cleared habitats, particularly associated cracking clay soils on the Condamine River floodplain;
- > **Section 4.3.4.2** - The availability of soil cracks and other microhabitat refugia is greatly reduced by soil cultivation. However, cultivated field and adjacent areas are known to provide habitat for MNES species such as the Condamine earless dragon (*Tympanocryptis condaminensis*); and
- > **Section 8.3.1.8** - This dragon species appears to survive in areas that are intensely cropped and previously occupied as naturally treeless grassland. The dragon uses surface debris, including train ballast, surface rocks and rocky outcrops as shelter, while cracks in the black clays of the Condamine River floodplain provide holes to seek alternate shelter when disturbed.

While targeted surveys for this species were impacted by adverse weather events (as described in in **Section 2.6**), walking visual transects provided further confirmation of the presence of suitable habitat conditions for this species. Based on these findings and the fact that known records of this species have been identified within the project footprint, it is considered likely that the species is present with habitat also occurring in areas of ‘converted grassland’ described above and typically associated with the existing rail line easement and road reserves and the fringes of the immediately adjoining cropping land.

3.3.1.12 Other fauna species

In addition to the threatened fauna noted above, a wide range of more common species were encountered throughout the Survey Area. Dedicated searches using a range of techniques targeted toward key groups including Butterflies, Frogs, Snails, Reptiles and Birds resulted in the ‘capture’ of the species listed in **Appendix J**. Sections **Section 3.3.1.12.1– Section 3.3.1.12.6** and **Figure 3-15– Figure 3-25** provide further information regarding each group.

3.3.1.12.1 Butterflies

A total of 17 butterfly species were recorded during surveys. No threatened butterflies were recorded. Searches for butterflies in brigalow failed to record the Pale Imperial Hairstreak (*Jalmenus eubulus*) which is reliant on this species for its life-cycle. In some instances, species including the Caper white (*Belenois java*),

were observed in large numbers in relatively small areas of vegetation supporting its host plants including various species of *Capparis*. Other common species recorded included the Tailed emperor (*Charaxes sempronius*) and the Orchard butterfly (*Papilio aegeus*) illustrated in **Figure 3-15** and **Figure 3-16**.



Figure 3-15 Tailed emperor



Figure 3-16 Orchard butterfly {male & female}

3.3.1.12.2 Amphibians

Both survey periods experienced a number of significant rain events, creating ideal conditions for the detection of amphibian fauna. In total 23 amphibian species were observed. This represents over 80% of the amphibian species expected to occur within the Survey Area. The Ornate burrowing frog (*Platyplectrum ornatum*) was the most widely distributed and most frequently encountered. However, during the Spring Survey Period, within Site 1 near Yelarbon a very diverse range of burrowing frogs from the genus *Cyclorana* were observed. Two of these, the Eastern snapping frog (*Cyclorana novaehollandiae*) and Green striped frog (*Cyclorana alboguttata*) have been illustrated in **Figure 3-17** and **Figure 3-18**.



Figure 3-17 Eastern snapping frog



Figure 3-18 Green striped frog

3.3.1.12.3 Reptiles

While reptile fauna was encountered throughout the Survey Area, abundance and diversity was lower than expected, particularly for snakes and skinks. Geckos were the most frequently encountered, primarily during nocturnal spotlighting events. Of this group the terrestrial Bynoe's Gecko (*Heteronotia binoei*) and the arboreal Dubious dtella (*Gehyra dubia*) were most observed. Other notable species observed include the Bandy bandy (*Vermicella annulata*), Sand swimmer (*Eremiascincus richardsonii*), Blue tongue lizard (*Tiliqua scincoides*) and Eastern spiny-tailed gecko (*Strophurus williamsi*) that have been illustrated below in **Figure 3-19** through **Figure 3-22**.



Figure 3-19 Bandy bandy



Figure 3-20 Sand swimmer



Figure 3-21 Blue-tongued lizard

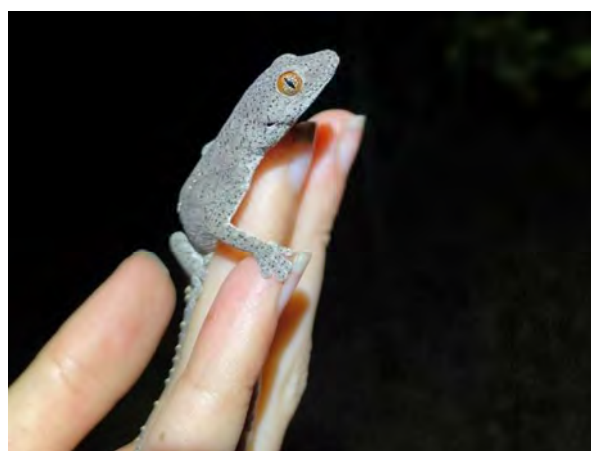


Figure 3-22 Eastern spiny-tailed gecko

3.3.1.12.4 Avifauna

Avifauna were the most abundant fauna group encountered with species ranging from the threatened Painted honeyeater, numerous birds of prey including the Little eagle (*Hieraaetus morphnoides*), nocturnal species such as the Barking owl (*Ninox connivens*) and the Owlet nightjar (*Aegotheles cristatus*) illustrated in **Figure 3-24** to common and more disturbance tolerant species such as the Torresian crow (*Corvus orru*) and the Sulphur crested cockatoo (*Cacatua galerita*) illustrated in **Figure 3-23**.



Figure 3-23 Sulphur-crested cockatoo



Figure 3-24 Owlet nightjar

3.3.1.12.5 Snails

The threatened Brigalow woodland snail (*Adclarkia cameroni*) was not recorded within the Survey Area. Snails recorded during searches for this species included the Darling Downs Woodland Snail (*Ponderconcha gilberti*) and *Pallidelix bennetti*. *P. bennetti* is a native snail species that was not specifically targeted, however was observed throughout the proposed alignment. The species is not commonly recorded is illustrated in **Figure 3-25**.



Figure 3-25 *Pallidelix bennetti*

3.3.1.12.6 Microbats

In addition to the threatened South-eastern long-eared bat, which was captured in a harp trap at Site 5 during the Spring Survey period, numerous other microbat species were detected within the Survey Area. To supplement direct capture methodology, unattended bat detectors were utilised at each Survey Site, for a total of four nights per site. Analysis of the call data recorded by these devices was carried out by external providers. A full list of microbat species identifies via call analysis is provided in **Table 3-11**.

Table 3-11 Microbat species identified via unattended bat detectors during the Spring and Post-west ecological surveys.

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat	Least concern	-
Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat	Least concern	-
Vespertilionidae	<i>Chalinolobus picatus</i>	Little pied bat	Least concern	-

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status
Vespertilionidae	Nyctophilus sp.		Least concern	-
Vespertilionidae	Scotorepens balstoni	Inland broad-nosed bat	Least concern	-
Vespertilionidae	Scotorepens sp. / Scotorepens greyii	Central-eastern broad-nosed bat/ Little broad-nosed bat	Least concern	-
Vespertilionidae	Vespadelus regulus	Southern forest bat	Least concern	-
Vespertilionidae	Vespadelus vulturnus	Little forest bat	Least concern	-
Miniopteridae	Miniopterus orianae	Eastern bent-wing bat	Least concern	-
Molossidae	Austronomus australis	White-striped freetail bat	Least concern	-
Molossidae	Ozimops lumsdenae	Northern free-tailed bat	Least concern	-
Molossidae	Ozimops ridei	Eastern free-tailed bat	Least concern	-
Emballonuridae	Saccolaimus flaviventris	Yellow-bellied sheath-tail bat	Least concern	-

3.3.2 Fauna Habitat

Fauna habitat availability and quality varied across the Survey Area, with areas of overall higher value typically linked to the proximity of areas of remnant or well-advanced regrowth vegetation. Even relatively isolated patches or trees, such as areas of roadside vegetation, provide value to native fauna in a fragmented landscape. This is evidenced by the use of these areas by the threatened Painted honeyeater, Koala and a range of other mobile native fauna.

Terrestrial fauna trapping Sites 1 through to Site 6 from the Post Wet Survey period provide particularly high-quality habitat for a number of native bird, reptile, mammal and amphibian species. These areas typically provided higher number of habitat features, hollow-bearing trees, and expanse of intact habitat, generally associated with areas of State forest. Towards the northern extent of the Survey Area, from Post Wet Survey site 10 to 12 the broader landscape is far more fragmented, consequently overall fauna habitat value is considered to be lower. However, pockets of high value do occur, most notably in and around Pittsworth where a high abundance of Koala occurs and in areas with a high density of retained hollow-bearing trees, such as on Site 12.

The middle portion of the Survey Area between Post-Wet Survey Site 6 to the Condamine River flood plain is both highly fragmented and more extensively cleared. While pockets of higher value exist along road reserves, areas of rocky relief and fence lines, this area, by and large is likely to be of lower overall value to native fauna.

Table 3-12 summarises the habitat characteristics observed at the locations where threatened fauna species were recorded within the Survey Area.

Table 3-12 Habitat summary for threatened fauna species encountered during the surveys

Species	General habitat	Notable habitat characteristics
<i>Calyptorhynchus lathami lathami</i>	<i>C. lathami lathami</i> habitat in the Survey Area generally consists of REs containing food trees such as <i>Allocasuarina</i> spp. and <i>Casuarina</i> spp. it was encountered from within and around 11.9.5, 11.9.7 and 11.4.3 within the Survey Area.	Encountered in areas with higher abundance of feed trees (<i>Allocasuarina</i> spp.) typically in narrow strips.
<i>Grantiella picta</i>	<i>G. picta</i> was found in REs 11.3.2/11.3.4/11.3.25 and 11.4.3 which are assumed to provide preferred woodland habitat for foraging.	Species encountered from narrow strips of vegetation with eucalypt and acacia species dominant. Higher abundance of Mistletoe species present throughout.
<i>Hirundapus caudacutus</i>	Observed in the airspace above woodland during surveys. This is consistent with known habitat. Likely to be wide ranging within Survey Area.	No notable features.
<i>Myiagra cyanoleuca</i>	Found in woodland habitat with RE 11.5.4 and 11.5.20	Nearby to minor drainage lines with dense vegetation.
<i>Rhipidura rufifrons</i>	Observed in woodland habitat with RE 11.5.4 and 11.5.20	Likely to be widespread. No notable features.

<i>Nyctophilus corbeni</i>	Captured in RE 11.5.20/11.5.4 in an area with reasonable density of hollow bearing trees and a mix of larger emergent eucalypt and dense understorey	Captured in area with very dense secondary tree layer. Consistent with closed guild 'clutter feeding' species.
<i>Phascolarctos cinereus</i>	<i>P. cinereus</i> was observed along much of the alignment including areas of remnant and regrowth vegetation. In particular the following Eucalypt dominated REs RE 11.9.7/11.3.4 , 11.5.4/11.3.18 , 11.8.4 and 11.8.5.	No notable features.
<i>Pteropus poliocephalus</i>	One individual was found in RE 11.3.2 within the Survey Area but is likely to be more wide ranging in response to flowering of feed trees. Potential habitat likely to broadly overlap with that of the Koala.	No notable features.
<i>Tachyglossus aculeatus</i>	<i>T. aculeatus</i> was found in REs 11.3.2, 11.5.4, and 11.7.7/11.5.1 within the Survey Area.	Typically encountered in areas with sandy soils. Dense ground layer and coarse woody debris often occurring a 'pushed piles' abundant.
<i>Hemiaspis damelii</i>	<i>H. damelii</i> was found in RE 11.3.14 and 11.5.14 within the Survey Area.	Sparse vegetative ground layer at both locations. Larger woody debris present within ground layer. Within ephemeral palustrine wetland with clay soils and typical riverine wetland community with sandy alluvial soils.

3.3.2.2 Potential Breeding Places

The combined Spring and Post-wet Survey Period resulted in the detection of 1,824 potential animal breeding places across the Survey Area (**Table 3-13**). Of these, 147 breeding places (hollow-bearing trees, stags or burrows) were observed to be actively utilised by fauna at the time of survey. The status of remaining breeding places is unknown; however, it is likely that many of these are regularly used by fauna for breeding purposes. **Appendix J** presents the locations of the fauna breeding features encountered in the Survey Area.

Hollow-bearing trees and stags within the Survey Area, particularly those located within Sites 1, 7, 11 and 12 (in which a large number of hollows and stags were observed) are likely to be used by a range of hollow dependent birds, such as parrots, arboreal mammals, and microbat species for breeding purposes. Hollow logs within the Survey Area may provide shelter and breeding habitat for a number of fauna groups including amphibians and reptiles, as well as small terrestrial mammals such as the Short-beaked echidna.

No threatened species or colonial breeding species were directly observed utilising these breeding places during the brief diurnal assessments (although one group of *Hirundo neoxena* (Welcome Swallow) nests was encountered); however, each breeding place was not individually inspected – as such, the possibility of their use by colonial breeding species cannot be discounted. The presence of several colonial breeding species, including various birds and microbats, across the Survey Area suggests that many of the breeding places observed would be used by these species from time to time and consequently should be treated as potential colonial breeding places. As such, a High-Risk Species Management Plan (High- Risk SMP) has been completed in to conserve habitat values and minimise harm to threatened fauna during construction.

Table 3-13 Hollows and habitat features recorded in the Survey Area during the Spring Survey Period

Habitat feature	Total number of features recorded throughout the Impact Area
Nest	52
Woody debris	115
Burrow	13
Hollow*	1,587
Abandoned Buildings (bat roost)	1
Cave	4
Dam	11
Ephemeral Wetland	13

Habitat feature	Total number of features recorded throughout the Impact Area
Gilgai	6
Loose Surface Rock	6
Mud Nest	1
Rock Pile	4
Rocky Outcrop	3
Termite Mound	8

* Includes hollows in hollow-bearing trees, stags and woody debris piles with hollows.

3.4 Biosecurity Matters

The specific flora and fauna species found within the Survey Area which are listed under the *Biosecurity Act 2014* are detailed below.

3.4.1 Invasive Flora

A number of exotic flora species were observed across the Survey Area (**Table 3-14**) listed as Category 3 – Restricted invasive pest plants under the *Biosecurity Act 2014*; four of which are also listed as Weeds of National Significance (WONS) (**Table 3-14**).

One species, while not listed under the *Biosecurity Act 2014* or as WONS, was noted to be present in large quantities in some parts of the Survey Area - African lovegrass (*Eragrostis curvula*). This species has the potential to spread rapidly and may negatively affect pasture and natural habitats.

Appendix L shows weed abundances of those species listed in Table 3-14.

Table 3-14 Introduced flora observed across the Survey Area.

Family	Scientific Name	Common Name	Biosecurity Act 2014 – Restricted Invasive [^]
Asparagaceae	Asparagus africanus	Climbing asparagus fern	Yes
Cactaceae	Harrisia martinii	Harrisia	Yes
Cactaceae	Harrisia pomanensis	Harrisia	Yes
Cactaceae	Harrisia tortuosa	Harrisia	Yes
Cactaceae	Opuntia aurantiaca	Tiger pear	Yes [^]
Cactaceae	Opuntia stricta	Prickly pear	Yes [^]
Cactaceae	Opuntia tomentosa	Velvety tree pear	Yes [^]
Crassulaceae	Bryophyllum delagoense	Mother of millions	Yes
Solanaceae	Lycium ferocissimum	African boxthorn	Yes [^]
Rubiaceae	Dolichandra unguis-cati	Cat's claw creeper	Yes
Ulmaceae	Celtis sinensis	Chinese elm	Yes
Verbenaceae	Lantana montevidensis	Creeping lantana	Yes
[^] = Weed of National Significance (WONS)			

3.4.2 Invasive Fauna

A number of exotic or introduced fauna species were observed during the Survey Period. A summary is presented by **Table 3-15**. Five of these species are recognised as restricted invasive animals under the *Biosecurity Act 2014*.

Table 3-15 Introduced fauna observed across the Survey Area.

Family	Scientific Name	Common Name	Biosecurity Act 2014 – Restricted Invasive [^]
Sturnidae	Acridotheres tristis	Common myna	

Family	Scientific Name	Common Name	Biosecurity Act 2014 – Restricted Invasive^
Columbidae	Columba livia	Feral pigeon	
Columbidae	Streptopelia chinensis	Spotted dove	
Nymphalidae	Pieris rapae	Cabbage white	
Bovidae	Bos taurus	European cattle	
Canidae	Canis lupus	Dingo, domestic dog	Yes^
Felidae	Felis catus	Cat	Yes^
Leporidae	Lepus europaeus	Hare	
Muridae	Mus musculus	House mouse	
Leporidae	Oryctolagus cuniculus	Rabbit	Yes
Suidae	Sus scrofa	Feral pig	Yes
Canidae	Vulpes vulpes	European fox	Yes
Muridae	Rattus rattus	Black rat	
^ = Other than domestic animals			

4 Conclusion

During the period 19 October and 13 November 2020 and 8 March to 27 March 2021 Cardno delivered a series of terrestrial ecology assessments on behalf of ARTC. The purpose of these assessments was to build upon the studies undertaken for the draft Environmental Impact Statement and are required to inform the detailed design and construction of the B2G project. More specifically, the objective of these surveys was to determine the presence or likelihood of presence, location, habitat extent/quality and significance of, any individual/population of a species and/or ecological community protected under relevant State and Commonwealth legislation and local government environmental planning requirements.

A total of eighteen REs were recorded and mapped within the project footprint, including two listed as Endangered under the VM Act and five listed as Of Concern. Biocondition sites were used to assess and score the quality of habitat within the majority of these REs. Five TECs were identified within the project footprint.

Over the course of the Surveys, a total of ten threatened flora species listed under either the EPBC Act and/or NC Act were observed. Of these species; seven are listed under the EPBC Act, and are considered to be MNES, and three are listed solely under the NC Act, and are considered to be MSES.

A total of 281 fauna species were observed during the total Survey Period, including:

- > 23 amphibians;
- > 155 birds;
- > 3 gastropods;
- > 20 insects;
- > 1 malacostracan;
- > 36 mammals; and
- > 43 reptiles.

Of the species observed, eight are listed under either the EPBC Act or NC Act. Five of these listed under both the EPBC Act and the NC Act and are considered to be both MNES and MSES, while three of the species found are listed under the NC Act only two are MSES. High quality fauna habitat was identified across the project area, within remnant, regrowth and disturbed environments. Observations included 1,824 potential animal breeding places within close proximity to the proposed alignment.

An array of exotic flora and fauna species was observed during the survey period. In terms of flora, this included 11 Category 3 – Restricted invasive pest plants listed under the *Biosecurity Act 2014*; four of which are also listed as Weeds of National Significance (WONS). Five restricted invasive fauna species listed under the *Biosecurity Act 2014* were recorded within the Survey Area.

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APPENDIX

A

FIELD ACTION PLAN

Field Action Plan - Ecological Surveys

Inland Rail - Border to Gowrie

2-0293-310-EEC-00-PL-0001_1



Prepared for
ARTC

1 March 2021

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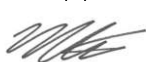
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Version	Effective Date	Description of Revision	Prepared by	Reviewed by
5	1/03/2021	Final	DW	CS

FIELD ACTION PLAN

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1 Introduction

1.1 Purpose of this report

The purpose of this Field Action Plan is two-fold:

1. Review the requirements for seasonal survey and field survey methods.
2. Detail the survey approach for the staged ecological surveys.

Given project timing, the potential need to conduct seasonal surveys, access lead times and the impending change of seasons this report specifically aims to identify the species and potential sites for which urgent survey work is required. Fundamental to understanding the need for seasonal surveys is gaining an appreciation of the field survey methods for the targeted fauna and flora survey identified in Commonwealth, State and industry guidelines.

This field action plan details the recommended approach to ecological surveys which are divided into two stages as follows:

- > **Stage 1 surveys:** recommended survey approach prior to ARTC commencing geotechnical investigation for the Inland Rail Border to Gowrie (B2G) project. The Stage 1 ecological surveys for the geotechnical investigation include:
 - confirmation of the presence/absence of threatened ecological communities (TECs) within the geotechnical investigation footprint;
 - protected plant flora surveys;
 - wildlife habitat assessments; and
 - recording declared weeds.
- > **Stage 2 surveys:** recommended detailed dry and wet season surveys intended to be completed to address gaps identified in previous field assessments to date. Stage 2 surveys include:
 - Targeted threatened fauna species surveys (Matters of National Environmental Significance (MNES), Matters of State Environmental Significance (MSES) & Matters of Local Environmental Significance (MLES)) and habitat assessments;
 - Targeted threatened flora species surveys (MNES, MSES & MLES);
 - Surveys and mapping of vegetation communities and TECs; and
 - Mapping of weed infestations.

1.1.1 Other relevant documents and management plans

This field action plan is supported by a number of additional relevant documents and plans which have been prepared for this Project. This includes:

- > The Project Services Management Plan;
- > Environment Management Plan;
- > Safety Management Plan;
- > Project-specific Safe Work Method Statement (SWMS);
- > COVID-19 Field Work Assessment; and
- > Project Risk Register.

These documents outline the approach to communication, health, safety and environment management aspects of the project, including during the field survey. The Project SWMS has been approved by ARTC and QR.

1.2 Proposed works

1.2.1 Stage 1 geotechnical investigation and access

ARTC is proposing to undertake geotechnical investigations for the B2G project. It is understood that the geotechnical investigation includes the following impact footprint:

- > Test sites will have a footprint of 10m x 10m, which will be reduced in areas of Regulated Vegetation;
- > Access tracks have a designated footprint of 10m, however, clearing will be minimised to the minimum area required for safe access. Noting the 10 m access track footprint allows for realignment should ecological constraints be identified during the survey; and
- > Seismic survey will have a maximum width of 2m, however, will be reduced to the greatest extent practicable with some capacity to alter alignments to avoid ecological constraints where identified.

The following is a summary of the geotechnical investigations based on ARTC's Geotechnical Data Collection Project (**Appendix A**) provided:

- > Access tracks:
 - Geotechnical investigation utilises various equipment from a 4WD vehicle to a truck-mounted drill rig.
 - Several access tracks are required to allow ARTC to safely access geotechnical testing sites.
- > Borehole drilling:
 - Using a truck-mounted drill rig, the drilling requires a relatively flat cleared pad around 20m x 20m.
 - Early stages of drilling will involve hammering a metal sampling tool into the ground.
 - Once complete, the boreholes will be backfilled with soil per relevant legislation and safety codes.
 - Drill pads will be rehabilitated by reinstating the disturbance area to match the surrounding surface as far as practically possible.
 - A piezometer will be installed in some of the boreholes to monitor groundwater levels before being backfilled.
- > Auger drilling
 - A drill mounted ute or small truck is used to drill a hole within a disturbance area no greater than 1m².
 - Auger holes will be backfilled using the soil and/or rock that will come out of the hole during the drilling process.
- > Ground vibration testing
 - Vibration testing utilises a sledgehammer to create sound waves (vibrations) that travel through the ground.
 - The process is non-intrusive, requiring small plates and geophones placed 10cm to 20cm apart along a string.
- > Trench Pit Soil Sampling
 - An excavator is utilised to dig a trench approximately 2-3m deep, 2m long and 30-40cm wide.
 - Once the studies are completed, backfilling of soil will take place as soon as possible.
- > Cone penetration testing (CPT)
 - Using a hydraulic rig, CPT requires pushing an instrumented cone tip vertically into the ground through several rods.
 - The methodology is very low impact, leaving only a 100mm diameter hole in the ground that is backfilled upon survey completion.

1.2.2 Stage 2 – Construction

Stage 2 works will include construction of the B2G portion of the Inland Rail Project. Generally, this will include:

- > Permanent impacts for rail infrastructure (including establishment of approximately 145 km of new rail corridor and use of approximately 71.2 km of existing rail corridor), road infrastructure earthworks, rail maintenance access roads and drainage; and
- > Temporary impacts to accommodate temporary construction-phase activities, facilities and movements.

Field assessments for the Stage 2 works will be limited to the proposed construction footprint (permanent and temporary) and a 100m buffer.

1.3 Objectives of the ecological assessment studies

Section 3 of the brief for this Project summarises the terrestrial ecological assessment objectives. An assessment of how these objectives are met by the Stage 1 and Stage 2 surveys is provided in **Table 1-1**.

Table 1-1 How the proposed assessments address the objectives of the brief

Objective from the brief	Stage assessed
Completion of winter and spring field surveys ¹ to determine the presence or likelihood of presence, location, habitat extent/quality and significance of, any individual/population of a species and/or ecological community protected under relevant State and Commonwealth legislation and local government environmental planning requirements within the B2G Project reference design disturbance footprint (temporary and permanent)	Stage 1 & 2
Verification and quantification of significant residual impacts on Matters of National, State and Local Government Environmental Significance (MNES, MSES and MLES)	Stage 2
Data to inform Inland Rail's Offset Strategy planning requirements and detail matters such as Project offset obligations for both State and Commonwealth requirements. Habitat quality assessment of impact areas is to be determined for the purpose of offset ecological equivalence.	Stage 2
Assessment of and management advice relating to Biosecurity matters within each Project area according to: <i>Biosecurity Act 2014</i> and subordinate legislation; ▪ <i>Goondiwindi Regional Council Biosecurity Management Plan</i>; ▪ <i>Toowoomba Region Pest Management Plan 2014-2018</i>; and ▪ <i>Draft Toowoomba Regional Council Biosecurity Plan for Invasive Plants and Animals 2020</i>	Stage 1 (weeds only) & Stage 2
Identify, if any, species, populations or communities where subsequent monitoring is anticipated to be required as part of a future management plan, and the appropriate means for this (including statistical analysis, where feasible and valid)	Stage 2
Sufficient field survey effort to support compliance and approvals including secondary approvals identified for geotechnical works	Stage 1 (for Geotech) & Stage 2
Preparation of a species management program and plans under the NC Act and EPBC Act	Informed by Stage 1 & Stage 2
Provision of baseline data to support site restoration, rehabilitation and landscaping practices; and	Stage 2
Mapping of approval trigger areas and ecological constraints at a suitable standard for inclusion in the ARTC GIS (ARTC /Inland Rail (IR) ArcGIS 10.7.1 and ArcGIS Server 10.7.1).	Stage 1 & Stage 2

¹ Gap analysis completed for the Project has identified that dry and post-wet season surveys are more appropriate for detection of the target species and to comply with relevant Commonwealth and State guidelines. No winter surveys are proposed in this field action plan. Stage 1 surveys are proposed in early spring (completed in September), and stage 2 surveys are proposed in the dry season (completed in October/November) and wet season (completed in February/March).

1.4 Study Area

1.4.1 Stage 1 Study area

For the purpose of this report, the Stage 1 Study area includes the following:

- > Priority 1 sites (5m buffer around infrastructure footprint, plus requirements of the Protected Plants Flora Survey which includes a 100m buffer of disturbance within 'high risk' areas);
- > Priority 2 sites (5m buffer around infrastructure footprint);
- > Access tracks (5m buffer around infrastructure footprint); and
- > Seismic survey (5m buffer around infrastructure footprint).

1.4.2 Stage 2 Study area

The Stage 2 Study area will include the following:

- > Rail footprint, and a 100m buffer; and
- > Construction compound, permanent and temporary construction impact zones, laydown, stockpile and storage areas, and a 100m buffer.

2 Matters considered

To inform this field action plan the following components of the Environmental Impact Statement (EIS) were reviewed:

- > Chapter 10 – *Flora and Fauna*;
- > Appendix J – *Terrestrial ecology report*;
- > Appendix K – *Aquatic ecology report*; and
- > Appendix L – *Matters of National Environmental Significance technical report*.

2.1 Stage 1

As the stage 1 surveys were completed to inform the impact assessment and approval requirements for geotechnical investigations, stage 1 surveys prioritised those matters likely to trigger approvals or requirement amendments to testing sites to avoid impacts to ecological matters. Specifically, the following matters were targeted during the Stage 1 Survey:

- > protected flora within areas mapped as 'high risk' by the *Nature Conservation Act 1992* (NC Act) Protected Flora Survey Trigger Map
- > protected Flora within those areas not mapped as high risk by the 'high risk' by the NC Act Protected Flora Survey Trigger Map, but for which ARTC identified adjacent 'known' records of threatened species;
- > TECs in areas which supported analogous regional ecosystems;
- > wildlife breeding habitat (e.g. nests, burrows, hollows etc.) for MNES, MSES, MLES and least concern fauna; and
- > restricted weeds listed under the *Biosecurity Act 2014*.

2.2 Stage 2

Stage 2 survey will cover MNES, MSES and MLES as documented below. All features will be assessed within the Stage 2 Study Area; being the project construction footprint and a 100 m buffer as identified in **Section 1.4.2**. The Stage 2 survey will refine the extent of impacts identified in the EIS based on ground-truthed data. It is intended this information will be used determination of significant residual impacts on MNES, MSES and MLES to guide environmental offset obligations, and to inform relevant environmental management plans and approvals for the Project.

2.2.1 MNES

The controlling provision for the Project is 'Listed threatened species and communities'. The following MNES will be targeted during the Stage 2 surveys:

- > TECs as identified in Section 4;
- > Listed threatened species (flora and fauna) as identified in Section 4 and associated habitat; and
- > Migratory species identified in the EIS Terms of reference.

The following status groups for listed threatened flora, fauna and ecological communities under the EPBC Act have been considered:

- > Vulnerable.
- > Endangered.
- > Critically Endangered.

2.2.2 MSES

The following MSES will be targeted during the Stage 2 surveys:

- > Threatened flora and fauna species listed under the NC Act and their habitat;
- > Regulated vegetation communities and essential habitat;

- > Wetlands in a wetland protection area;
- > Waterways that provide for fish passage under the *Fisheries Act 1994*.

The following status groups for flora and fauna under the *Nature Conservation Act 1992* (NCA) have been considered:

- > Special Least Concern.
- > Near Threatened.
- > Vulnerable.
- > Endangered.

2.2.3 MLES

A MLES is a matter that is prescribed under a local planning instrument as a prescribed environmental matter and cannot be the same or substantially the same as a MNES or MSES. The B2G alignment traverses two local government areas (LGAs); being, the Toowoomba Regional Council LGA and Goondiwindi Regional Council LGA.

Goondiwindi Regional Council does not identify any MLES within the Goondiwindi Regional Council Planning Scheme and as such no MLES will be subject to assessment within the portion of the Study area within the Goondiwindi LGA.

Whilst the Toowoomba Regional Planning Scheme does not refer to MLES directly, a number of environmental matters are prescribed and thus have been considered in this field action plan. The following MLES will be targeted during the Stage 2 surveys within portion of the Stage 2 Study area which falls within the Toowoomba LGA:

- > Waterways and wetlands that are not already protected as MNES or MLES;
- > Biodiversity corridors; and
- > Mapped areas of ecological significance' which are not mapped as MNES or MSES.

2.2.4 Biosecurity matters

Locations of weeds and pest animals declared under the *Biosecurity Act 2014* will be mapped.

3 Stage 1 Survey

3.1 Overview of survey requirements

A summary of the survey requirements for Priority 1, Priority 2 sites, and access tracks are shown in the decision tree in **Figure 3-1**. Sites and access tracks which do not meet the requirements for the survey will be excluded from the survey effort.

Priority 1 and Priority 2 sites were determined by ARTC. Priority 1 sites are those within a 'High Risk' area on an NC Act protected flora trigger map, or where threatened flora species were identified by ARTC as known to occur proximate to the site. Priority 1 sites are considered 'higher risk' from an ecological perspective. Priority 2 sites are those not within a high risk and not identified as having proximate records for threatened flora but might otherwise contain some ecological value.

FIELD ACTION PLAN

Decision tree for survey effort of geotechnical sites

Sites and their associated access tracks are categorised as:

- Priority 1 Within a protected flora trigger map area (* a limited number of extra sites have been added where proximate records of threatened plants occur)
- Priority 2 (a) Outside of protected flora mapping and within an area that is a pre-clear grassland Threatened Ecological Community (TEC)
- Priority 2 (b) Outside of protected flora mapping and within an area that is any other pre-clear TEC
- Priority 2 (c) Outside of protected flora mapping and supporting woody vegetation that is not a TEC

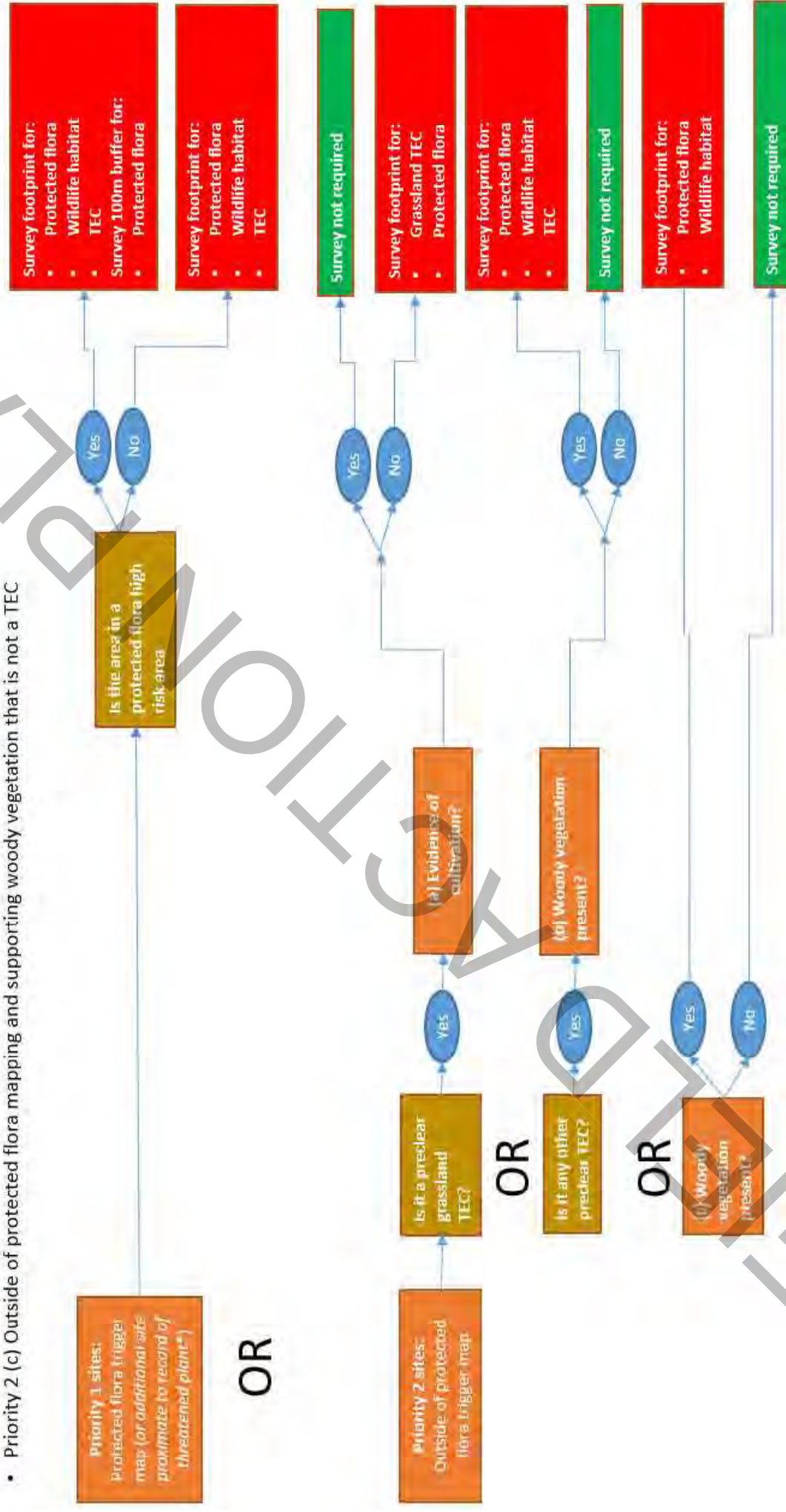


Figure 3-1 Summary of survey requirement for Priority 1, Priority 2 sites and access tracks

3.2 Priority 1 survey sites

As identified in **Figure 3-1** above, Priority 1 (P1) sites include the following:

- > Sites located within the High-Risk Area for protected plants on the Department of Environment and Science's (DES's) High Risk Area Trigger Map (P1(a) sites); and
- > Sites located outside of the High-Risk Area for protected plants but which are proximate to previous records of EVNT flora species (*information provided by ARTC*).

Table 3-1 provides a list of all Priority 1 survey sites. Geotechnical investigation sites have been grouped into survey sites as per below where they have with overlapping clearing impact areas (i.e. Priority 1 site and a 100 m buffer) and shown in **Figure 3-2** below.

Table 3-1 Priority 1 survey sites

Survey site	Geotechnical investigation		Reason for inclusion in the survey	Site category
	Geotechnical aspect	Site reference		
1	Test site	310-03-BH3300	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
2	Test site	310-03-BH3301	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
3	Test site	310-03-TP3098	Adjoins protected plant record (<i>Homopholis belsonii</i>)	P1 (a) – survey of buffer not required
4	Test site	310-03-CP3212	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
5	Test site	310-03-CP3017	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
		310-03-BH3028		
		310-03-CP3214		
		310-03-BH3027		
		310-03-CP3213		
6	Test site	310-03-TP3137	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
7	Test site	310-03-CP3020	Adjoins protected plant record (<i>Digitaria porrecta</i>)	P1 (a) – survey of buffer not required
		310-03-CP3019		
8	Test site	310-03-TP3312	Adjoins protected plant records (<i>Picris barbarorum</i>)	P1 (a) – survey of buffer not required
9	Test site	310-03-TP3346	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
10	Test site	310-03-BH3334	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
		310-03-BH3336		
		310-03-BH3333		
		310-03-TP3155		
		310-03-BH3332		
	Seismic surveys	310-03-SR3028		
		310-03-SR3032		
		310-03-SR3031		
		310-03-SR3030		
11	Test site	310-03-BH3343	Within high risk trigger area for protected plants	P1 (a) – 100 m buffer
		310-03-BH3342		
		310-03-BH3340		
		310-03-BH3339		
	Seismic surveys	310-03-SR3037		

Survey site	Geotechnical investigation		Reason for inclusion in the survey	Site category
	Geotechnical aspect	Site reference		
		310-03-SR3038		
		310-03-SR3035^		
		310-03-SR3036		
12	Test site	310-03-BH3084	Adjoins protected plant record (<i>Digitaria porrecta</i>)	P1 (a) – survey of buffer not required
		310-03-TP3209		
	Access track	AT-310-03-BH3084		
13	Test site	310-03-TP3217	Adjoins protected plant record (<i>Rhaponticum australe</i>)	P1 (a) – survey of buffer not required
	Access track	AT-310-03-TP3209		

^NOTE: Survey of this site not required as test site located wholly on 'highly modified' existing road.

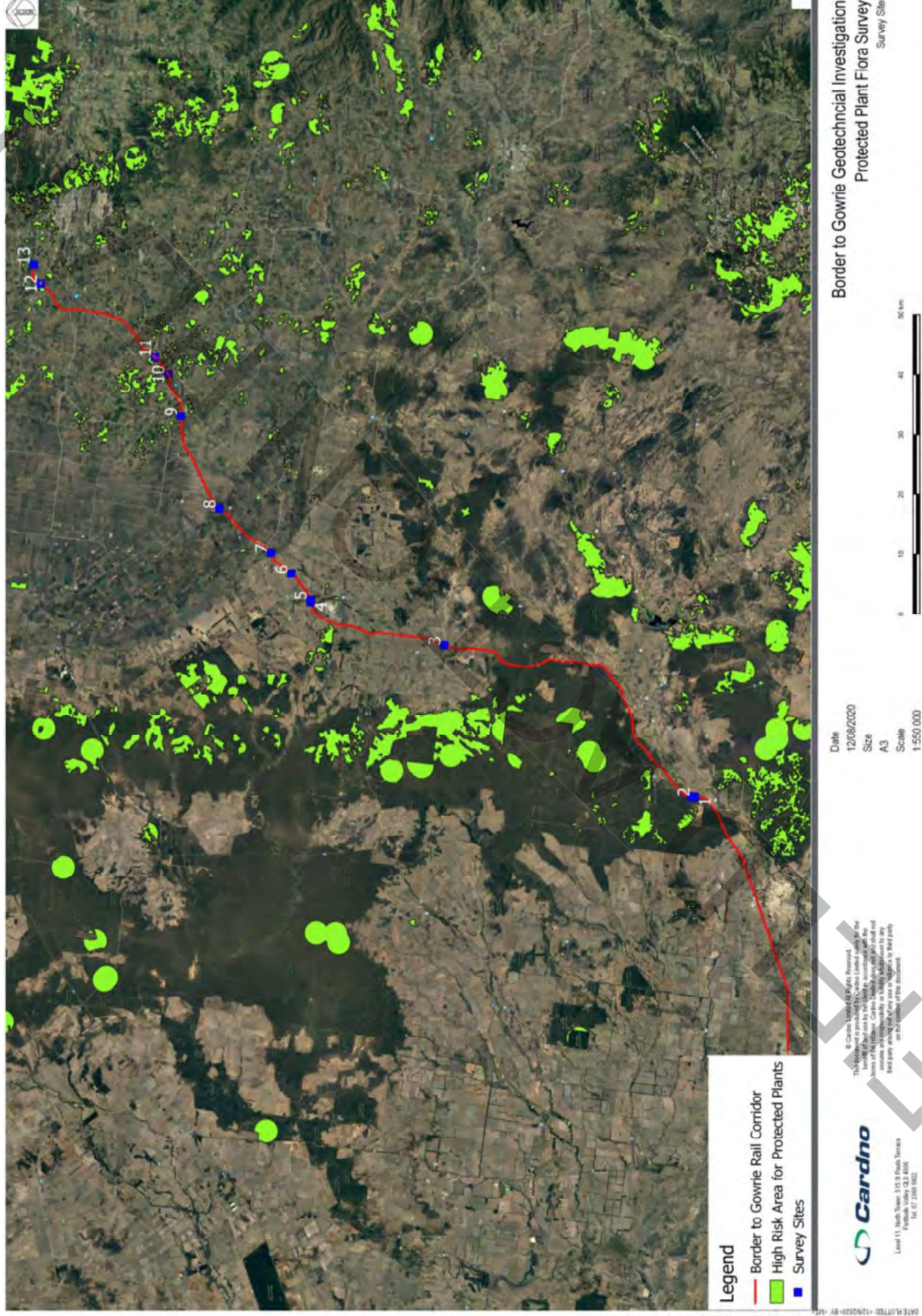


Figure 3-2 Priority 1 Survey Sites

3.3 Priority 2 survey sites and access tracks

As detailed in **Figure 3-2**, Priority 2 (P2) sites and access tracks included in the survey effort meet the following requirements:

- > Sites located outside of the High-Risk Area for protected plants (and / or no proximate known records for protected plants as identified by ARTC);
- > Sites located in a preclear grassland TEC with no evidence of cultivation;
- > Sites located in any other preclear TEC and woody vegetation is present; or
- > Sites with woody vegetation present (being defined as the presence of one or more tree within the proposed construction footprint as identified by aerial imagery).

The “preclear grassland TEC” refers to, the Critically Endangered *Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland* which equates with two REs:

- > 11.3.21 *Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains. Cracking clay soils; and
- > 11.3.24 *Themeda avenacea* grassland on alluvial plains. Basalt derived soils.

“Any other preclearing TEC” refers to the seven additional TECs which have the potential to occur within the Study area (refer to **Section 3.4.1** below) based on corresponding REs. The review of woody vegetation utilised current and historical areas from multiple sources including (Good Earth Pro. and Nearmap).

A total of 113 test sites are included in the P2 site categorisation. A summary of the categorised Priority 2 sites and access tracks is detailed in **Table 3-2** below. The detail of the categorisation of the Priority 2 sites and access tracks are enclosed in **Appendix C**. The location of the P2 Sites is shown on **Figure 3-3**.

Table 3-2 Summary of Priority 2 sites survey requirements

Priority 2 site and access tracks	Survey required
P2 (a) sites	14
P2 (b) sites	32
P2 (c) sites	24
Survey not required	43
Total P2 surveys	113



Figure 3-3 Priority 2 Sites

3.4 Stage 1 survey effort

3.4.1 Threatened Ecological Communities

The Stage 1 survey effort includes an assessment of the presence/absence of TECs within sites categorised as the following:

- > Priority 1 sites;
- > Priority 2 (a) sites; and
- > Priority 2 (b) sites.

TECs identified in the EIS (Section 4 of the MNES Technical Report) as occurring within 1km of the proposed rail corridor are based on desktop mapping and include five TECs shown in **Table 3-3** below.

Table 3-3 Threatened ecological communities identified within the EIS

TEC	EPBC Act Status
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered
Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered
Weeping Myall Woodlands	Endangered
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Endangered
Poplar Box Grassy Woodland on Alluvial Plains	Endangered

TEC were assessed against key diagnostic criteria and conditions thresholds within the conservation and listing advice for TECs including:

- > Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (DEWHA, 2013);
- > Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSSC, 2006);
- > Commonwealth Listing Advice on Weeping Myall Woodlands (TSSC, 2009);
- > Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSSC, 2006); and
- > Conservation Advice (including listing advice) for the Poplar box grassy Woodland on Alluvial Plains (DEWHA, 2019).

While TECs can be correlated with Regional Ecosystems, a direct correlation can rarely be made owing to the specific descriptions provided by the Commonwealth. The steps used to assess the presence/absence of the five TECs potentially present in the Study area are outlined in **Table 3-4**, **Table 3-5** and **Table 3-6** below.

Table 3-4 Key diagnostic criteria and condition thresholds

TEC	Key diagnostic characteristics	Condition thresholds
Brigalow (<i>Acacia harpophylla</i> dominant and codominant)	▪ The presence of <i>Acacia harpophylla</i> as one of the most abundant tree species in the patch. <i>A. harpophylla</i> is either dominant in the tree layer, or co-dominant with other species (Notably <i>Casuarina cristata</i>, other species of <i>Acacia</i> or <i>Eucalyptus</i>; <u>and</u>	▪ The patch is 0.5 ha or more in size; <u>and</u>
	▪ In Qld Brigalow Belt Bioregion and meets the description of one of the following REs: – 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21. <u>and/or</u>	▪ 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 ha (100 m by 50 m), that is representative of the patch.
	▪ The vegetation in the patch is brigalow regrowth with species composition and structural elements broadly typical of one of the identified Qld REs (although species density may be reduced). This can be assumed to be the case	

TEC	Key diagnostic characteristics	Condition thresholds
	where it has been at least 15 years since it was last comprehensively cleared (not just thinned); unless direct evidence proves otherwise.	
Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	▪ 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. ▪ Occurrence on landforms that are typically flat to very low slopes (less than 5 percent/1 degree). ▪ Tree canopy usually absent to sparse, comprising less than 10% projective crown cover. ▪ The ground layer is typically dominated by perennial native grasses and contains 3 or more of the indicator native species listed below: – <i>Aristida leptopoda</i> – <i>Astrelba elymoides</i> – <i>Astrelba lappacea</i> – <i>Austrodanthonia bipartita</i> – <i>Austrostipa aristiglumis</i> – <i>Bothriochloa biloba</i> – <i>Bothriochloa erianthoides</i> – <i>Dichanthium sericeum</i> – <i>Digitaria divaricatissima</i> – <i>Elymus plurinervis</i> – <i>Eriochloa crebra</i> – <i>Eulalia aurea</i> Silky – <i>Panicum decompositum</i> – <i>Panicum queenslandicum</i> – <i>Thellungia advena</i> – <i>Themeda avenacea</i> – <i>Themeda triandra</i> (synonym. <i>T. australis</i>) – <i>Walwhalleya proluta</i>	Refer to condition thresholds detailed in Table 3-6 below.
Weeping Myall Woodlands	▪ The dominant overstory species, Weeping Myall, goes through regular cycles of senescence and regeneration. As such, percentage canopy cover will fluctuate from very sparse to 30 percent. The death of canopy trees is not considered to be an indicator of poor condition. ▪ Consequently, a patch must fit the following criteria in order to be included in the listed ecological community: – the tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated Weeping Myall trees; and – the overstory must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha; and – the area is at least 0.5 ha in size; and – the 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 m tall and of the vegetative cover present, 50% is comprised of native species.	
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	▪ The White Box – Yellow Box – Blakely's Red Gum grassy woodlands that existed prior to European settlement now exists as remnants in three different states. The three states are: – An overstory of eucalypt trees exists, but there is no substantial native understorey. – A native understorey exists, but the trees have been cleared. – Both a native understorey and an overstory of eucalypts exist in conjunction. ▪ In order for an area to be included in the listed ecological community, a patch must have a predominantly native understorey.	
	Occurs in the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar	

TEC	Key diagnostic characteristics	Condition thresholds
Poplar Box Grassy Woodland on Alluvial Plains	Penplains, Darling Riverine Plains, NSW South Western Slopes, Riverina and Murray Darling Depression IBRA bioregions - Associated with ancient and recent depositional alluvial plains with clay, clay-loam, loam and sandy loam, typically duplex soils or sodosols. This includes areas that may not be part of currently defined floodplains. - A grassy woodland to grassy open woodland with a tree crown cover of 10% or more at patch scale. - A tree canopy must be present that shows these features: - Canopy tree species are capable of reaching 10 m or more in height; - Poplar Box (<i>Eucalyptus populnea</i>) must be present in the canopy and is the dominant tree species; - Where hybrids of Poplar Box with other <i>Eucalyptus</i> spp. are present, they should be counted as part of the <i>Eucalyptus populnea</i> component of the tree canopy when assessing the previous criterion. - Mid layer (1-10 m) crown cover of shrubs to small trees is low, about 30% or less. - A ground layer (<1 m) mostly dominated across a patch by native grasses, other herbs and occasionally chenopods (during extended dry periods), ranging from sparse to thick (in response to canopy development, soil moisture, disturbance and/or management history). - A list of diagnostic native plant species and some of the key native fauna that make up the ecological community is provided as an appendix to the Conservation Advice (DEWHA, 2019).	The minimum condition thresholds (Moderate and High condition categories A, B, or C) are provided in Table 3-6 below.

Table 3-5 Condition thresholds for the Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Queensland ecological community (extract from TEC Listing Advice (TSSC, 2009))

	Best quality	Good quality
Patch size	Patch size Minimum patch size at least 0.5 ha AND	Minimum patch size at least 2 ha AND
Grasses	At least 4 native perennial grass species from the indicator species list AND	At least 3 native perennial grass species from the indicator species list AND
Tussock cover	At least 200 native perennial grass tussocks AND	At least 200 native perennial grass tussocks AND
Woody shrub cover ¹	Total projected canopy cover of shrubs is less than 30% AND	Total projected canopy cover of shrubs is less than 50% AND
Introduced species	Perennial non-woody introduced weed species are less than 5% of the total projected crown cover	Perennial non-woody introduced weed species are less than 30% of the total projected crown cover
¹ Shrubs are typically absent. When present, they are defined as woody plants more than 0.5 m tall that occupy the mid vegetation layer. The upper, tree canopy layer also is typically absent but may comprise scattered trees to less than 10% projective crown cover.		
Sampling should be based upon a quadrat size of 0.1 ha (e.g. 50 m x 20 m) selected in an area with the most apparent native perennial grass species. Unless exceptional circumstances apply, to maximise the assessment of condition, a site must be assessed during a good season, two months after cessation of disturbance (fire, grazing, mowing or slashing) and within two months of effective rain.		

Table 3-6 Condition categories and thresholds for the Poplar Box Grassy Woodland on Alluvial Plains ecological community (extract from the TEC Conservation Advice (DEWHA, 2019))

Category and rationale	Native cover and diversity thresholds	Minimum patch size
Class A Highest Quality		
Category A1. Little to no perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is $\geq 10\%$ AND $\geq 90\%$ of perennial vegetation cover in the ground layer** is native AND ≥ 30 native plant species per patch in the ground layer	≥ 1 ha
Category A2. A large patch with low perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is $\geq 10\%$ AND $\geq 70\%$ of perennial vegetation cover in the ground layer** is native AND ≥ 30 native plant spp. per patch in the ground layer	≥ 5 ha
Class B Good Quality		
Category B. A large patch with good quality native understorey or with mature trees	The crown cover of canopy trees in the patch is $\geq 10\%$ AND $\geq 50\%$ of perennial vegetation cover in ground layer** is native AND EITHER ≥ 20 perennial native plant species per patch in the ground layer OR ≥ 10 mature trees+ per ha with ≥ 30 cm dbh*** (and/or hollows)	≥ 5 ha
Class C Moderate Quality		
Category C A large patch with low native cover but retains good native understorey diversity and habitat features of mature trees	The crown cover of canopy trees in the patch is $\geq 10\%$ AND If $< 50\%$ of perennial vegetation cover in ground layer** is native, then the patch must have: ≥ 20 native plant spp. per patch in the ground layer AND ≥ 10 mature trees+ per ha with ≥ 30 cm dbh*** (and/or hollows) AND smaller trees+, saplings or seedlings suggestive of periodic recruitment	≥ 5 ha

3.4.2 Protected plants flora survey

3.4.2.1 Survey timing and personnel

The Stage 1 geotechnical investigation ecological surveys were completed between 7 September and 18 September 2020. The survey was completed in spring and coincides with the preferred seasonal survey for threatened fauna and flora species and TECs targeted in the survey (**Appendix B**). In accordance with the *Protected Plants Flora Survey Guidelines – August 2020* (the Guidelines) the survey will be completed by Suitably Qualified Persons. Cardno's Suitably Qualified Persons who will lead the two field teams are:

- > David Francis (Senior Principal – Ecology); and
- > David Wassman (Principal Ecologist)

A self-assessment of the suitability of survey personnel has been provided below in **Table 3-7** and **Table 3-8**, demonstrating both exceed the minimum score of 100 to be regarded as a suitably qualified person. Detailed CVs of the two Suitably Qualified Persons are provided in **Appendix D**.

Table 3-7 Suitably Qualified Person Self-Assessment Grading: David Francis

COMPONENT 1: QUALIFICATION KNOWLEDGE AND ABILITY	Conditions	Points allocated	Comment	Score
A relevant qualification from a recognised institution (e.g. University, TAFE) that results in a thorough knowledge of plant identification and flora surveys.	General training (not Aust. or QLD focused); OR	30		
	Australian focused training; OR	40		
	Queensland focused training	50	David has a BSc from the University of Queensland majoring in Botany, Zoology and Ecology with Honours conducted in botanical taxonomy of a Queensland species.	50
Regional ecosystem training by a recognized and qualified institution, such as the Queensland Herbarium		5	David completed a training course called identifying Regional Ecosystem through NRM in 2003	5
Member of a recognised group / certificate program relevant to ecology/botany, where skills/knowledge are demonstrated to be granted membership. E.g. Certified Environmental Practitioner (CEnvP) Program		5	CEnvP	5
Lead author of articles/papers published in peer reviewed journals in relation to Qld flora surveys, Qld plant identification, or Qld EVNT plants.	10 points per paper to a maximum of 50 points	10	-	
COMPONENT 2: FIELD EXPERIENCE				
Experience within the last 2 years and a total of at least 5 years at leading flora surveys in a field-based environment at a rate of no less than 5 comprehensive botanical surveys that focus on locating and identifying EVNT plants, per year.	General (not Aust. based); OR	40		
	Australian based survey experience; OR	50		
	Qld based field flora surveys experience	60	Dave has over 23 years of experience in flora surveys, the past 17 of which have been in environmental consultancy in Qld. During which time he conducted >5 comprehensive botanical surveys per year that focus on EVNT plants. Dave, therefore, exceed the requisite experience.	60
Number of plant specimens you have collected that have been retained/incorporated into the Queensland Herbarium collection:	5 points per 5 plant specimens retained/incorporated, to a maximum of 40 points	5	David has 35 specimens in the Queensland Herbarium that identify me as the collector	40
TOTAL SCORE				160

Table 3-8 Suitably Qualified Person Self-Assessment Grading: David Wassman

COMPONENT 1: QUALIFICATION KNOWLEDGE AND ABILITY	Conditions	Points allocated	Comment	Score
A relevant qualification from a recognised institution (e.g. University, TAFE) that results in a thorough knowledge of plant identification and flora surveys.	General training (not Aust. or QLD focused); OR	30		

COMPONENT 1: QUALIFICATION KNOWLEDGE AND ABILITY	Conditions	Points allocated	Comment	Score
	Australian focused training; OR	40		
	Queensland focused training	50	David has a BSc. from the University of the Sunshine Coast majoring in Environmental Science with course in Australian Vegetation with a Queensland focus.	50
Regional ecosystem training by a recognized and qualified institution, such as the Queensland Herbarium		5	David has attended Queensland Herbarium regional ecosystem training including "BioCondition v2.1 Application, Assessment and Scoring" (2011), "Vegetation Structure and Remnant Status under the VMA 1999" (2005) and "Identifying Regional Ecosystems Training Course" (2003)	5
Member of a recognised group / certificate program relevant to ecology/botany, where skills/knowledge are demonstrated to be granted membership. E.g. Certified Environmental Practitioner (CEnvP) Program		5	CEnvP (registration number 1174)	5
Lead author of articles/papers published in peer reviewed journals in relation to Qld flora surveys, Qld plant identification, or Qld EVNT plants.	10 points per paper to a maximum of 50 points	10	-	
COMPONENT 2: FIELD EXPERIENCE				
Experience within the last 2 years and a total of at least 5 years at leading flora surveys in a field-based environment at a rate of no less than 5 comprehensive botanical surveys that focus on locating and identifying EVNT plants, per year.	General (not Aust. based); OR	40		
	Australian based survey experience; OR	50		
	Qld based field flora surveys experience	60	Dave has over 7 years of experience in flora surveys of which have been in environmental consultancy in Qld. During which time I conduct >5 comprehensive botanical surveys per year that focus on EVNT plants. David, therefore, exceeds the requisite experience.	60
Number of plant specimens you have collected that have been retained/incorporated into the Queensland Herbarium collection:	5 points per 5 plant specimens retained/incorporated, to a maximum of 40 points	5		
TOTAL SCORE				120

3.4.2.2 Areas excluded from the protected plants survey

In accordance with Section 5.2 of the Guidelines, the extent of the Survey Area incorporates the proposed clearing area (impact area) and a 100m buffer (clearing impact area) to same.

Several areas were excluded from the Survey Area under Section 5.2 of the Guidelines, specifically:

- > it is not reasonably practicable for a flora survey to be undertaken in an area of the buffer zone because landholder consent to access the area cannot be obtained despite all reasonable attempts (s 249(2)(a)); or
- > there is very low likelihood of EVNT plants being present in an area of the buffer zone because it is within a property of less than 1,000m² that has a permanent dwelling or building (s 249(2)(b)); or
- > an area of the buffer zone is a highly modified environment (s 249(2)(b)); or

- > an area of the buffer zone is highly unlikely to be impacted as it is separated from the area to be cleared by an area of highly modified environment that is at least 30 meters wide (s 249(2)(b)).

The guideline defines a highly modified environment as:

- a gravel or bitumen road;
- an impervious surface;
- land that is regularly being mowed, slashed or ploughed; or
- any combination of (a), (b) and (c) in this list.

In accordance with the Guidelines the following areas are excluded from the Survey Area:

- > Priority 1 geotechnical sites with no current land access as listed in **Table 3-9**.
- > Areas of the buffer zone within a highly modified environment, including gravel and bitumen roads and land that is regularly mowed, slashed and ploughed.

Additionally, areas of water that do not support vegetation (e.g. water within the middle of a creek) were similarly excluded given no survey by boat is proposed and survey participants will not physically traverse completely inundated areas due to associated safety risks. Riparian vegetation on the banks of these areas will be assessed.

Areas excluded from the Survey Area are detailed in **Table 3-9**.

Table 3-9 Areas excluded from the Stage 1 Survey area for the protected plants flora survey

Survey Site	Geotechnical test site reference	Excluded Area (ha)	Lot and Plan	Rationale
1	310-03-BH3300	0.4	2MH461	Highly modified unsealed road.
2	310-03-BH3301	0.2	58SP169187	Highly modified unsealed road.
3	310-03-TP3098	NA	NA	Site not in 'high risk area'. Only project footprint (and nominal buffer as per Section 1.4) will be assessed.
4	310-03-CP3212	0	NA	No excluded areas. Site and 100m buffer will be assessed.
5	310-03-TP3017 310-03-BH3028 310-03-CP3214 310-03-BH3027 310-03-CP3213	0.4	140DER34129 2SP260880	Area of water – no vegetation present in permanently inundated area.
6	310-03-TP3137	0.4	RD01RP124356	Highly modified bitumen road.
7	310-03-CP3020 310-03-CP3019	NA	NA	Site not in 'high risk area'. Only project footprint (and nominal buffer as per Section 1.4) will be assessed.
8	310-03-TP3312	NA	NA	Site not in 'high risk area'. Only project footprint (and nominal buffer as per Section 1.4) will be assessed.
9	310-03-TP3346	3.2	1RP7470	No access granted
10	310-03-BH3334 310-03-BH3336 310-03-BH3333 310-03-TP3155 310-03-BH3332 310-03-SR3028 310-03-SR3032 310-03-SR3031 310-03-SR3030	27.7	2RP205146	No access granted
11	310-03-BH3343 310-03-BH3342 310-03-BH3340 310-03-BH3339	0.3	RD01A341307	Highly modified gravel road.
	310-03-SR3037	7.0	2718A341307	No access granted

Survey Site	Geotechnical test site reference	Excluded Area (ha)	Lot and Plan	Rationale
	310-03-SR3038 310-03-SP3035^ 310-03-SR3036			
12	310-03-BH3084 310-03-TP3209 AT-310-03-BH3084	NA	NA	Site not in 'high risk area'. Only project footprint (and nominal buffer as per Section 1.4) will be assessed.
13	310-03-TP3217 AT-310-03-TP3209	NA	NA	Site not in 'high risk area'. Only project footprint (and nominal buffer as per Section 1.4) will be assessed.

^NOTE: Survey of this site not required as test site located wholly on 'highly modified' existing road

Habitat stratification

With respect to determining the number of habitat types within an overarching site, it is relevant to note that the term "habitat type" is not defined in the Flora Survey Guidelines. Habitat types can be stratified by multiple approaches, for example, vegetation condition or regional ecosystem type. Some specific examples of stratification and the advantages and disadvantages of same have been presented in **Table 3-10**.

Table 3-10 Summary of stratification methods for habitat types

Stratification Method	Advantages	Disadvantages
Regional ecosystem mapping	- Readily available mapping product. - Allows for landzone differences and similarities. - Refined vegetation community descriptions available.	- Sometimes too coarse to capture subtle differences in habitat types (e.g. large rocky outcrops or deeply incised gullies). - Sometimes too fine to justify stratification (e.g. there is sometimes little difference between the floristics of the same Eucalypt growing on two different land zones).
Broad Vegetation Group Mapping	- Readily available mapping product. - Allows for broad grouping based on vegetation structure.	- Can have very broad distribution – therefore may be too coarse to capture site specific differences. - A single BVG can occur across a wide variety of land forms and landzones.
Vegetation Condition	Can sometimes be readily distinguished by aerial imagery.	- In the absence of site reconnaissance is not likely to provide fine enough resolution. - Generally, need to be considered in combination with other methods.
Site reconnaissance	Can account for site specific variability not detectable at desktop level.	Not always practicable depending on size of site.

For the Stage 1 protected plant flora survey, the method of stratification is based on the Pre-clear Broad Vegetation Group (BVG) mapping at a scale of 1:2,000,000 (i.e. state level). This method is considered suitable as it allows for a broad grouping of vegetation based on structure.

Table 3-11 identifies the different habitat types within the Survey Area.

Table 3-11 Habitat Type Stratification

BVG1:2M	Structural Description	Typical Landform	Typical Soil	Habitat type
11	Moist to dry eucalypt open forests to woodlands mainly on basalt areas (land zone 8)	Predominantly low basaltic ranges and rolling hills	Red Ferrosols and Black Vertosols	HT1
12	Dry eucalypt woodlands to open woodlands, mostly on shallow soils in hilly terrain (mainly on sandstone and weathered rocks, land zones 7 and 10)	Mainly on sandstone scarps, tablelands and ranges, and lateritic duricrusts	Shallow Rudosols and Tenosols	HT2

BVG1:2M	Structural Description	Typical Landform	Typical Soil	Habitat type
16	<i>Eucalyptus</i> spp. dominated open forest and woodlands drainage lines and alluvial plains.	Fringing drainage lines on alluvial plains	Rudosols and Tenosols	HT3
17	<i>Eucalyptus populnea</i> (poplar box) or <i>E. melanophloia</i> (silver-leaved ironbark) (or <i>E. whitei</i> (White's ironbark)) dry woodlands to open woodlands on sandplains or depositional plains.	Flat to gently undulating plains	Red Sodosols and Chromosols	HT4
25	<i>Acacia harpophylla</i> (brigalow) sometimes with <i>Casuarina cristata</i> (belah) open forests to woodlands on heavy clay soils.	Predominantly gently undulating to rolling plains	Grey and Black Vertosols	HT5
30	<i>Astrebla</i> spp. (mitchell grass), <i>Dichanthium</i> spp. (bluegrass) tussock grasslands.	Flat alluvial plains	Grey to Brown Vertosols	HT6

3.4.2.3 Timed meander

The guidelines detail flora survey includes the timed meander survey method. The timed meander survey requires sampling of each habitat type as per the following steps:

- > Choose a starting point within a habitat type and record the time. The choice of starting point is determined by the suitably qualified person based on their experience.
- > Traverse the habitat type in a random manner so as to maximise the coverage of habitat and the encounter rate of different species.
- > Record the identities of any EVNT plants observed and collect specimens and locational data. Also collect specimens and locational data for any possible EVNT plants.
- > Record the time every two to five minutes. If the survey needs to be interrupted, do not include this time in the results.
- > Continue searching a habitat type until no new plant species has been recorded for 30 minutes or when the entire area of habitat type is surveyed, whichever happens sooner.
- > Meanders must be undertaken (at a minimum) at the following rate per area of habitat type:
 - o <2ha, one meander;
 - o between 2ha and 10ha, two meanders;
 - o between 10ha and 100ha, four meanders; and
 - o >100ha, six meanders.

Table 3-12 details the habitat types and number of timed meanders required for each protected plant flora survey site.

Table 3-12 Survey sites and timed meanders

Survey Site	Geotechnical investigation site reference	Habitat Type	Total survey area	Excluded area	Residual survey area (Ha)	Timed Meanders Required
1	310-03-BH3300	HT2	5.6	0.4	5.2	2
2	310-03-BH3301	HT2	5.7	0.2	5.5	2
3	310-03-TP3098	HT5	NA^	NA^	NA^	NA^
4	310-03-CP3212	HT4	5.7	0	5.7	2
	310-03-TP3017					
	310-03-BH3028					
5	310-03-CP3214	HT4	11.4	0.4	11	4
	310-03-BH3027					
	310-03-CP3213					

Survey Site	Geotechnical investigation site reference	Habitat Type	Total survey area	Excluded area	Residual survey area (Ha)	Timed Meanders Required
6	310-03-TP3137	HT4	5.7	0.4	5.3	2
7	310-03-CP3020 310-03-CP3019	HT3	NA^	NA^	NA^	NA^
8	310-03-TP3312	HT6	NA^	NA^	NA^	NA^
9	310-03-TP3346	HT1	5.7	3.2	2.5	2
10	310-03-BH3332 310-03-BH3333 310-03-BH3334 310-03-BH3336 310-03-TP3155 310-03-SR3028 310-03-SR3030 310-03-SR3031 310-03-SR3032	HT1	27.4	27.1	0.3	1
	310-03-SR3030 310-03-SR3032	HT6	0.7	0.6	0.1	1
	310-03-BH3343 310-03-BH3342 310-03-BH3340 310-03-BH3339 310-03-SR3037 310-03-SR3038 310-03-SR3035^ 310-03-SR3036	HT1	25.8	7.3	18.5	4
	310-03-BH3084 310-03-TP3209 AT-310-03-BH3084	HT1	NA^	NA^	NA^	NA^
	310-03-TP3217 AT-310-03-TP3209	HT6	NA^	NA^	NA^	NA^
	Total					
	62.4					20

NOTE: Site not within high risk area but proximate threatened flora records. Survey will be limited to footprint and 5m buffer. NO requirement for 'meanders' in accordance with NC Act Flora Survey guidelines

3.4.3 Wildlife habitat assessment

Section 4.2 provides the methodology for species-specific fauna survey techniques that will be utilised in the Stage 2 surveys. This level of survey effort proposed for the Stage 2 surveys is disproportionate for the geotechnical sites given the scale and low impact nature of the proposed works. However, the works may still have an impact on the habitat for those species outlined in **Table 4-8** and as such the ecological assessment must consider the likely presence of habitat and identify the areas where this occurs. The proposed approach to survey of wildlife habitat for the Stage 1 surveys will focus on identifying notable habitat features which may constitute breeding places to ensure these features are, where possible, avoided by the geotechnical works.

An animal breeding place is a bower, burrow, cave, hollow, nest or other thing that is commonly used by the animal to incubate or rear the animal's offspring'. As per Section 335 of the *Nature Conservation (Animal) Regulation 2020*, an animal breeding includes any place where:

- > the animal is preparing, or has prepared, the place for incubating or rearing the animal's offspring; or

- > the animal is breeding, or is about to breed, and is physically occupying the place; or
- > the animal and the animal's offspring are physically occupying the place, even if the occupation is only periodical; or
- > the animal has used the place to incubate or rear the animal's offspring and is of a species generally known to return to the same place to incubate or rear offspring in each breeding season for the animal.

The DES Information sheet: *Species Management Program Requirements for tampering with a protected animal breeding place in Queensland* provides additional guidance relating to SMPs, and makes note that an SMP is required for any proposed activity that will impact on breeding places of protected animals that are classified as extinct in the wild, endangered, vulnerable, near threatened (EVNT), special least concern, colonial breeder or least concern under the NC Act. That is, if a breeding place that is permanently or intermittently used by any native fauna species is being cleared then a SMP is required. Where it is determined that an SMP is required, a breeding place survey must be undertaken by a 'suitably qualified' person and an application must be made in writing to DES for the approval of the SMP to tamper with an animal breeding place.

Breeding places identified within the Priority 1 and 2 survey sites will be mapped using a hand-held GPS and the following details will be collected:

- > Lot and plan details.
- > Breeding place description:
 - Hollow-bearing limb:
 - Tree species; and
 - Hollow size.
 - Nest;
 - Timber stockpile;
 - Burrow; or
 - Other (as determined in the field)
- > Status (active/inactive).
- > Conservation status of species utilising breeding habitat.

Koala are not included in DES's Species Management Program (SMP) documentation, as Koalas do not habitually use a breeding place. Notwithstanding, potential koala habitat will be identified in the field survey through identification of scats and scratches, and recording of koala food trees. Any recommended avoidance and mitigation measures will be detailed following the field survey.

The disturbance of a flying-fox roosts is also managed separately under the NC Act. The EIS did not indicate roosts located within the corridor, however, if roosts are identified which will likely be disturbed the works, the restrictions relating to flying-foxes and roosts under the NC Act will apply to the works. Should flying fox roosts be detected during the field assessment the location of these will be recorded.

3.4.4 Land access

The land access for the Stage 1 geotechnical investigation survey includes the Priority 1 sites, Priority 2 sites and access tracks and associated buffers. At the date of this report, ARTC has negotiated access arrangements for the majority of sites, however additional land access parcels have been identified due to the addition of protected plant survey buffers and access tracks. The status of the existing land access includes the following:

- > Land Access Agreement (LAA Received) (i.e. access granted);
- > Open access (i.e. road and water parcels);
- > Potential negotiation unlikely (i.e. no current access);
- > Hard no (i.e. no current access); and
- > Queensland Rail (QR) access required (i.e. rail corridor).

The land access status for Priority 1, Priority 2 sites and access tracks is enclosed in **Appendix E**.

3.4.5 Survey schedule

Based on the proposed survey effort for the Stage 1 Geotechnical investigation the survey schedule is detailed in **Table 3-13**. The schedule assumes two teams of two and allows for the surveys to be completed within the proposed two-week timeframe.

Table 3-13 Proposed survey schedule

Survey sites	Total sites	Sites/day
Priority 1 survey sites	20 timed meanders	2 -3 meanders per day.
Priority 2 (a) sites	14 sites	4-5 site per day over 3 days
Priority 2 (b) sites	32 sites	Approx. 6 sites per day over 10 days
Priority 2 (c) sites	24 sites	

3.4.6 Limitations

Additional ecological surveys will be completed as part of Stage 2 ecological assessment including detailed terrestrial and aquatic fauna and flora surveys. Environmental impacts associated with the geotechnical investigation are to be managed in accordance with the Geotechnical Construction Environmental Management Plan (CEMP), excluding aquatic fauna. The CEMP will incorporate the results of Stage 1 ecological surveys and associated permits and SMPs.

The protected plant flora survey requires a survey of the impact area and a 100 m buffer area, however, land access restrictions for several Priority 1 sites do not allow survey of several areas and are excluded from the survey effort under the Guidelines. The timed meander survey method advocated in the Flora Survey Guidelines is a risk-based survey method that does not require every part of the corridor to be traversed. As such it is possible, that a threatened species may occur on the Survey Area in an area not physically traversed or otherwise visible.

Hazards and/or risks identified during the Health, Safety and Environment (HSE) Risk Management Process and incidents, have the potential to delay the survey or extend the survey.

Notwithstanding the above, the survey effort, methodology and proposed timing are deemed appropriate for detecting TECs, protected plants and wildlife habitat within the Survey Area.

4 Stage 2 survey

4.1 Gap analysis

Following a review of the NSW/Qld Border to Gowrie Environmental Impact Statement (EIS) (ARTC, 2019), Cardno propose additional flora and fauna survey efforts targeting threatened species that are known, likely or have the potential, to occur within the Stage 2 Study area.

The process of identifying species that are known, or have the potential, to occur within the Stage 2 Study area involved:

- > Identifying those species listed in the Initial Advice Statement (IAS) Inland Rail – Border to Gowrie as potential, likely, or known to occur (ARTC, 2018).
- > Comparing those listed in the IAS with those presented in the EIS to identify whether all species have been considered in the EIS and / or whether the likelihood of presence was adjusted between the IAS and EIS. Specifically, the following sections of the EIS were considered:
 - Appendix J of the EIS (Terrestrial Ecology Technical Report) in Table 4.2, Table 4.5 and Appendix A (Tables 2.1 & 2.2) ('possible', 'likely' and 'known' species only); and
 - Appendix L of the EIS (Matters of National Environmental Significance Technical Report) in Appendix A (Table 2.1)
- > A review of contemporary information (i.e. Commonwealth's Protected Matters Search Tool (PSMT) and the Department of Environment and Science's WildNet database) consistent with the impact assessment area (i.e. 1 km radius from Project footprint) as defined in the EIS (Chapter 10 – Flora and Fauna) to determine whether additional species require assessment. Noting the searches were expanded to include 1 km buffer from laydown areas and the construction footprint to ensure species captured include those impacted by additional infrastructure not previously addressed in the EIS.

No additional species were added to the species list to be targeted in the Stage 2 surveys based on the review of contemporary databases (i.e. PMST and Wildlife online) as no additional confirmed records occurred within the search limits.

One species, the Grey snake (*Hemiaspis damelii*), has been added to the list of target species for the Stage 2 surveys, based on a potential observation made during the Stage 1 surveys, presence of suitable habitat within the Stage 2 Survey area and confirmed records within 10 km of the Study Area.

Table 4-1 and **Table 4-2** list the species considered in the Initial Advice Statement (IAS), EIS, and contemporary databases as possible, likely or known to occur. The likelihood of presence listings from both the IAS and EIS are tabulated along with an assessment of the level of survey effort conducted for the EIS using the following categories:

- > **Not assessed** – not assessed in the EIS.
- > **Survey unnecessary** – the EIS Likelihood of Assessment indicated that it is unlikely that the species or habitat for the species is present. This also applies to species that are Presumed Extinct.
- > **Sufficient survey effort** – targeted surveys have been conducted and no further effort is required.
- > **Limited survey effort** – while some survey effort has been conducted, the survey does not conform with guidelines and/or does not extend to the full extent of the Study area.
- > **No survey effort** – no targeted surveys have been conducted for the species.

This report has identified species requiring further assessment during the Stage 2 surveys through a gap analysis which has identified gaps in species data and the survey efforts to-date with respect to requisite guidelines. Species that are regarded as 'data deficient' and thus requiring targeted survey during the Stage 2 surveys are those in **Table 4-1** and **Table 4-2** that:

- > Had "Limited survey effort" as part of EIS surveys; or
- > Had "No survey effort" as part of EIS surveys and the contemporary PMST search indicates the species is "Known" or "Likely" Or the contemporary WildNet search indicates the species has been recorded.

Specific survey guidelines have been identified for species which will be targeted in the Stage 2 surveys (refer to **Section 4.3.2** and **Appendix B**).

Table 4-1 Fauna species assessment

Species	Common Name	Status		IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	To be Targeted in Stage 2?
		NCA	EPBC Act						
Birds									
<i>Anthochaera phrygia</i>	Regent Honeyeater	E	CE	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Botaurus poiciloptilus</i>	Australasian bittern	-	E	Unlikely	Likely	Limited survey effort	May occur	-	Yes
<i>Calidris ferruginea</i>	Curlew sandpiper	E	CE, M	Potential	Possible	Limited survey effort	May occur	-	Yes
<i>Calyptrorhynchus lathamii</i>	Glossy Black Cockatoo	V	-	Likely	Possible	Limited survey effort	-	✓	Yes
<i>Erythroriorchis radiatus</i>	Red Goshawk	E	V	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Falco hypoleucos</i>	Grey Falcon	V	-	Potential	Not Assessed	No survey effort	Likely	-	Yes
<i>Geophaps scripta</i>	Squatter Pigeon (Southern Subspecies)	V	V	Likely	Possible	Limited survey effort	Known	-	Yes
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Likely	Possible	Limited survey effort	Known	-	Yes
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	V, M	Likely	Likely	Limited survey effort	Known	-	Yes
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Lophochroa leadbeateri</i>	Major Mitchell's cockatoo	V	-	Unlikely	Possible	Limited survey effort	-	-	Yes
<i>Ninox strenua</i>	Powerful Owl	V	-	Likely	Not Assessed	No survey effort	-	-	No
<i>Poephila cincta</i>	Southern black-throated finch	E	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Rostratula australis</i>	Australian painted snipe	V	E	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Turnix melanogaster</i>	Black-breasted button-quail	V	V	Potential	Possible	Limited survey effort	Known	-	Yes
Butterflies									
<i>Hypochrysops piceata</i>	Bullock Jewel butterfly	E	-	Likely	Unlikely	Survey unnecessary	-	-	No
<i>Jalmenus eubulus</i>	Pale Imperial Hairstreak	V	-	Likely	Possible	Limited survey effort	-	✓	Yes
Mammals									
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Dasyurus hallucatus</i>	Northern quoll	-	E	Unlikely	Unlikely	Survey unnecessary	Likely	-	No
<i>Dasyurus maculatus</i>	Spot-tailed Quoll, Tiger Quoll (SE mainland population)	V	E	Likely	Possible	Limited survey effort	May occur	-	Yes

Species	Common Name	Status		IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	To be Targeted in Stage 2?
		NCA	EPBC Act						
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat	V	V	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Ornithorhynchus anatinus</i>	Platypus	SLC	-	-	Possible	Limited survey effort	-	-	No
<i>Petauroides volans</i>	Greater Glider	V	V	Likely	Possible	Limited survey effort	May occur		Yes
<i>Petrogale penicillata</i>	Brush-tailed rock-wallaby	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Pseudomys novaehollandiae</i>	New Holland mouse	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Phascolarctos cinereus</i>	Koala	V	V	Known	Likely	Limited survey effort	Known	✓	Yes
<i>Potorous tridactylus</i>	Long-nosed potoroo	V	V	Potential	Unlikely	Survey unnecessary	-	-	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	-	V	Likely	Likely	Limited survey effort	Likely	-	Yes
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	SLC	-	-	Known	Limited survey effort	-	✓	Yes
Molluscs									
<i>Adclarkia cameroni</i>	Brigalow Woodland Snail	V	E	Likely	Possible	No survey effort	Likely	-	Yes
<i>Adclarkia dulacca</i>	Dulacca woodland snail	E	E	Potential	Unlikely	Survey unnecessary	May Occur	-	No
Fish									
<i>Maccullochella mariensis</i>	Mary river cod	-	E	-	Unlikely	Survey unnecessary	-	-	No
<i>Maccullochella peelii</i>	Murray Cod	-	V	Likely	Likely	Sufficient survey effort – Known	Known	-	No
<i>Bidyanus</i>	Silver perch	-	CE	Likely	Unlikely	Sufficient survey effort - Unlikely	-	-	No
Reptiles									
<i>Acanthophis antarcticus</i>	Common Death Adder	V	-	Likely	Known	Limited survey effort	-	✓	Yes
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	Likely	Likely	Limited survey effort	Known	✓	Yes
<i>Delma torquata</i>	Collared Delma	V	V	Likely	Possible	Limited survey effort	May Occur	-	Yes
<i>Egernia rugosa</i>	Yakka Skink	V	V	Likely	Possible	Limited survey effort	May Occur	-	Yes
<i>Furina dunmali</i>	Dunmall's Snake	V	V	Likely	Likely	Limited survey effort	May Occur	✓	Yes
<i>Hemiaspis damelii</i>	Grey Snake	E	-	Likely	Not Assessed	Survey unnecessary	-	-	Yes [#]
<i>Tympanocryptis condaminensis</i>	Condamine (Darling Downs) earless dragon	E	E	Known	Likely	Limited survey effort	Likely	-	Yes
<i>Uvidicolus sphyrurus</i>	Border thick-tailed gecko	-	V	Unlikely	Unlikely	Survey unnecessary	Likely	-	No

Species	Common Name	Status		IAS likelihood	EIS likelihood	EIS Survey	2020 PMST Search	2020 WildNet Search	To be Targeted in Stage 2?
		NCA	EPBC Act						
<i>Wollumbinia belli</i>	Bell's turtle	V	V	Unlikely	Unlikely	Sufficient survey effort - Unlikely	-	-	No

Notes: V= Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory, SLC = Special Least Concern

Notes # Whilst this species was not identified as requiring assessment in the EIS and is not identified as requiring assessment by the Terms of Reference for the EIS, a suspected identification of this species was made during the Stage 1 surveys, the Project area supports potentially suitable habitat for this species, and records are known within 10km of the Study area. As such this species has been included for further assessment.

Table 4-2 Flora species assessment

Species	Common Name	Status		IAS Likelihood	EIS Likelihood	EIS Survey	2020 PMST Search	2020 WildNet search	Target?
		NCA	EPBC Act						
<i>Acacia lauta</i>	Tara Wattle	V	V	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Androcalva procumbens</i>	-	-	V	-	Unlikely	Survey unnecessary	Likely	-	No
<i>Aristida forsteri</i>	-	E	-	Potential	Not Assessed	Survey unnecessary	-	-	No
<i>Arthraxon hispidus</i>	Hairy-joint grass	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Bertya opposens</i>	-	-	V	Likely	Possible	Limited survey effort	-	-	Yes
<i>Bothriochloa bunyensis</i>	Satin-top Grass	V	V	Likely	Unlikely	Survey unnecessary	-	-	No
<i>Bulbophyllum globuliforme</i>	Miniature moss-orchid	NT	V	Does not occur	Unlikely	Survey unnecessary	-	-	No
<i>Cadellia pentastylis</i>	Ooline	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Calotis glabrescens</i>	-	PE	-	Likely	Not Assessed	Survey unnecessary	-	-	No
<i>Clematis fawcettii</i>	Stream clematis	V	V	Potential	Possible	Limited survey effort	May occur	-	No
<i>Commersonia ingleswoodensis</i>	-	E	-	Potential	Not Assessed	Survey unnecessary	-	-	No
<i>Cymbonotus maidenii</i>	-	E	-	Likely	Unlikely	Limited survey effort	-	-	Yes
<i>Cyperus clarus</i>	A sedge	V	-	-	Possible	Limited survey effort	-	✓	Yes
<i>Dichanthium queenslandicum</i>	King Bluegrass	V	E	Likely	Likely	Limited survey effort	May occur	✓	Yes
<i>Dichanthium setosum</i>	-	-	V	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Digitaria porrecta</i>	Finger Panic Grass	NT	E	Likely	Known	Limited survey effort	-	✓	Yes
<i>Eucalyptus curtisii</i>	Plunkett Mallee	NT	-	Potential	Not Assessed	Survey unnecessary	-	-	No
<i>Eucalyptus infera</i>	Durikai mallee	V	V	Does not occur	Unlikely	Survey unnecessary	-	-	No
<i>Eucalyptus virens</i>	Shiny-leaved ironbark	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Homopholis belsonii</i>	-	E	V	Known	Likely	Limited survey effort	May occur	✓	Yes

Species	Common Name	Status		IAS Likelihood	EIS Likelihood	EIS Survey	2020 PMST Search	2020 WildNet search	Target?
		NCA	EPBC Act						
<i>Lepidium monoplacoides</i>	-	-	E	Likely	Likely	Limited survey effort	-	✓	Yes
<i>Lepidium peregrium</i>	-	-	E	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Leucopogon sp. Coolmunda</i> (D. Halford Q 1635)	Coolmunda leucopogon	E	E	Potential	Possible	Limited survey effort	-	-	Yes
<i>Microcarpaea agonis</i>	-	E	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Macrozamia conferta</i>	-	V	V	Potential	Unlikely	Survey unnecessary	-	-	No
<i>Macrozamia machinii</i>	-	V	V	Known	Possible	Limited survey effort	Likely	-	Yes
<i>Macadamia integrifolia</i>	Macadamia nut	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Microcarpaea agonis</i>	-	-	E	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Picris barbarorum</i>	-	E		Known	Known	Limited survey effort	-	✓	Yes
<i>Picris evae</i>	Hawkweed	V	V	Known	Likely	Limited survey effort	Likely	✓	Yes
<i>Phebalium distans</i>	Mt Berryman phebalium	E	CE	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Philotheca sporadica</i>	-	NT	V	Likely	Not Assessed	Survey unnecessary	-	-	No
<i>Pomaderris coomingalensis</i>	-	-	E	Unlikely	Not Assessed	Survey unnecessary	-	-	No
<i>Prostanthera sp. (Dunmore D.M. Gordon 8A)</i>	-		V	Likely	Possible	Limited survey effort	-	-	Yes
<i>Rhaponticum australe</i>	Austral Cornflower	V	V	Known	Likely	Limited survey effort	Likely	✓	Yes
<i>Sarcophilus hartmannii</i>	Waxy sarcophilus	V	V	Unlikely	Unlikely	Survey unnecessary	-	-	No
<i>Sarcophilus weinthalii</i>	Blotched sarcophilus	E	V	Unlikely	Unlikely	Survey unnecessary	Likely	-	No
<i>Sophora fraseri</i>	-	V	V	Known	Possible	Limited survey effort	Known	-	Yes
<i>Solanum papaverifolium</i>	-	E		Likely	Unlikely	Survey unnecessary	-	-	No
<i>Solanum stenopterum</i>	-	V		Likely	Unlikely	Survey unnecessary	-	-	No
<i>Thesium australe</i>	Toadflax	V	V	Likely	Possible	Limited survey effort	Likely	-	Yes
<i>Tylophora linearis</i>	-	V	V	Likely	Possible	Limited survey effort	May occur	-	Yes
<i>Westringia parvifolia</i>	-	V	V	Potential	Possible	Limited survey effort	Likely	-	Yes
<i>Xerothamnella herbacea</i>	-	E	E	Likely	Possible	Limited survey effort	Likely	-	Yes

Notes: NT = Near Threatened, V= Vulnerable, E = Endangered, PE = Presumed extinct

4.2 Vegetation and flora surveys

4.2.1 Optimal timing

4.2.1.1 Target flora species

The optimal survey timing for the flora survey is based on the seasonal presence of reproductive plant material for the identification of targeted flora species. Optimal flora survey timing is following summer rainfall which is usually late March to late May, however, this is dependent on local seasonal conditions (Eyre *et al.*, 2015). Further, the Queensland Herbarium details flora surveys located south of the Tropic of Capricorn, should generally occur in May or June following the wetter summer months with exception of spring surveys which may follow an unseasonably wet winter when many plant species are flowering. A review of the Bureau of Meteorology rainfall data for Inglewood (located centrally within the alignment) indicates low to average rainfall at Inglewood during June 2020, noting monthly data for July and August were not available at the date of this advice. A review of flora species that require additional survey is enclosed in **Appendix B**. The optimal survey season and/or timing has been detailed based on Commonwealth, State guidelines, industry standards and journal articles. Species which require reproductive material for identification include:

- > Hairy-joint Grass (*Arthraxon hispidus*)
- > King Bluegrass (*Dichanthium queenslandicum*)
- > Bluegrass (*Dichanthium setosum*)
- > Finger panic grass (*Digitaria porrecta*)
- > Belson's Panic (*Homopholis belsonii*)
- > Winged Pepper-cress (*Lepidium monoplacoides*)
- > Wandering Pepper-cress (*Lepidium peregrinum*)
- > Coolmunda leucopogon (*Leucopogon* sp. *Coolmunda* (D. Halford Q 1635))
- > Hawkweed (*Picris evae*)
- > *Prostanthera* sp. *Dunmore* (D.M.Gordon 8A)
- > Austral Cornflower (*Rhaponticum australe*)
- > *Xerothamnella herbacea*

The review of survey effort for threatened flora species broadly indicates spring and summer as the optimal flora survey season.

4.2.1.2 Targeted Threatened Ecological Communities

The EIS indicates five threatened ecological communities (TECs) are likely to occur within the Study area. Of these, the following require identification of ground layer elements in order to confirm the presence of the community:

- > Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland.
- > Poplar Box Grassy Woodland on Alluvial Plains.
- > White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands.

Optimal survey timing for these TECs are described shown in **Table 4-3**.

Table 4-3 Recommended survey timing for TECs

TEC	Season/survey timing	Notes	Source
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Within two months of effective rain.	> Unless exceptional circumstances apply, to maximise the assessment of condition, a site must be assessed during a good season, two months after cessation of disturbance (fire, grazing, mowing or slashing) and within two months of effective rain .	> A guide to the identification, assessment and management of nationally threatened ecological communities, Natural Grasslands on Basalt and Fine-textured Alluvial Plains of Northern New South Wales and Southern Queensland, (DEWHA, 2012).

TEC	Season/survey timing	Notes	Source
			> Commonwealth Listing Advice on Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Threatened Species Scientific Committee, 2009).
Poplar Box Grassy Woodland on Alluvial Plains	Spring to early summer within two months of effective rain.	> The Conservation Advice recommends surveys spanning multiple years, but acknowledges that there may be instances where this is not possible and, in these instances, surveys should be conducted in spring to early summer . > Ideally, to maximise the assessment of understory condition, sites should be assessed during a good season, six months after cessation of disturbance fire/flood/grazing /mowing/slashing) and within two months of effective rain .	> Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains. (DEE, 2019).
White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands TEC	Late autumn (see note)	> The best time of year to determine if 50% of the ground layer is made of perennial native species is late autumn. However, this can also be determined at other times of year.	> White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands TEC Policy Statement (DEH, 2006)

4.2.2 Flora and vegetation survey methods

The survey methods for vegetation communities and protected flora is shown in **Table 1-1** below and are in accordance with Commonwealth and State guidelines and are considered sufficient to identify many cryptic threatened communities and species.

The flora survey will be completed across the entire Stage 2 Study area divided by two seasons (i.e. dry season and post-wet season survey). The post-wet season survey will target those species and communities which can only be confidently detected following effective rain (e.g. grassland communities and grass species). The flora species to be targeted in the survey are shown in **Table 4-5** and reflect those species regarded as 'data deficient' as per gap analysis results in **Section 4.1**. **Appendix B** identifies those flora species which will be targeted in each of the survey periods.

The survey will exclude highly modified environments; being, areas of cultivation and existing sealed and unsealed roads but will aim to survey all other areas.

Other portions of the Stage 2 Study area are not able to be surveyed due to landholder access not being secured prior to commencement of the surveys.

The portions of the alignment and wet season flora proposed for dry and wet season survey are illustrated in **Figure 4-1**.

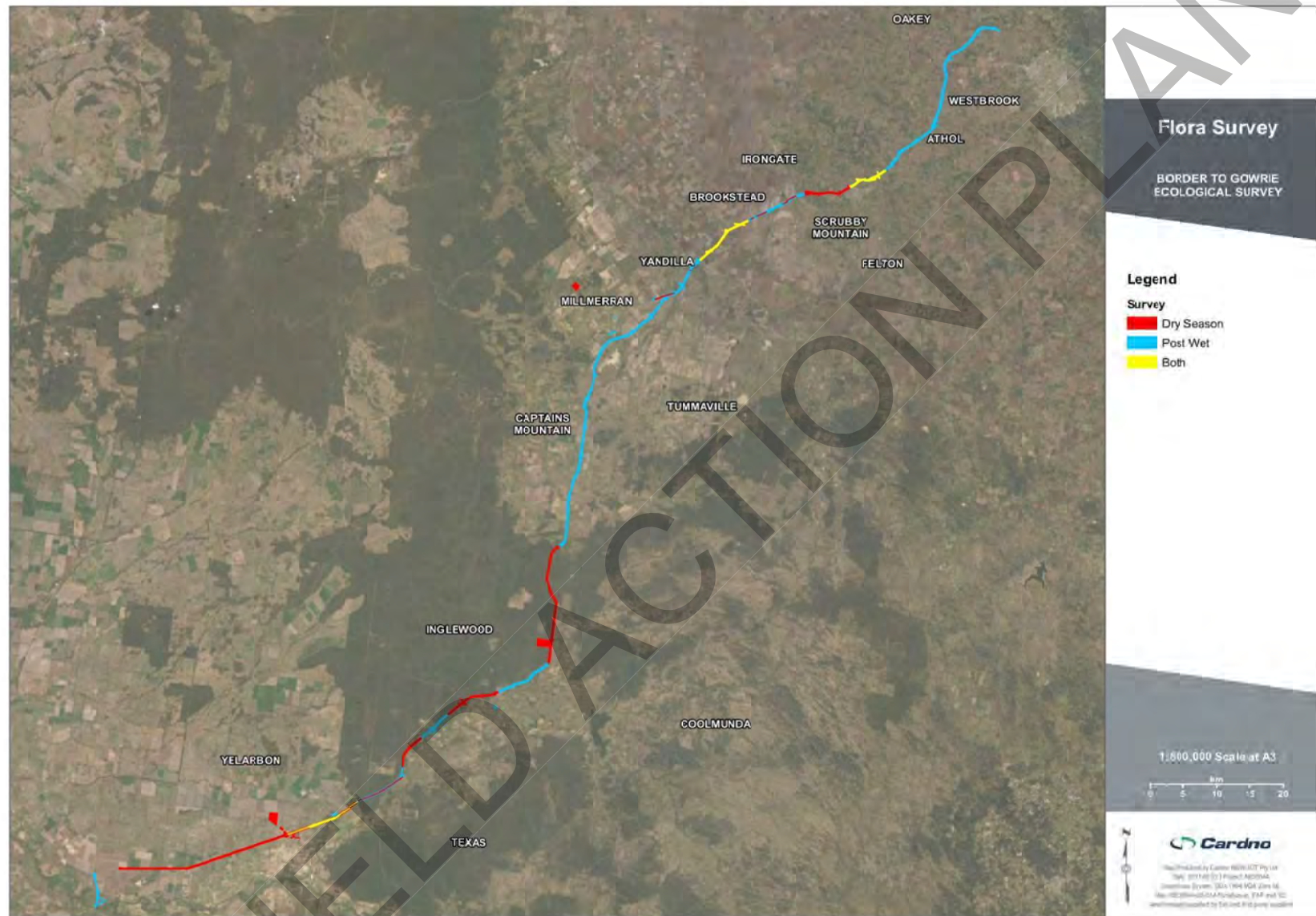


Figure 4-1 Flora survey locations

Table 4-4 Vegetation communities and protected flora survey

Value	Equivalent REs	Survey method	Reference
TECs	- Brigalow (Acacia harpophylla dominant and codominant (11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21.); - Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (11.3.21 and 11.3.24); - Weeping Myall Woodlands (11.3.2, 11.3.28, 11.3.2a, 11.3.2b, 11.3.2c); - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (11.8.2a, 11.8.8, 11.9.9a and 11.3.23); and - Poplar Box Grassy Woodland on Alluvial Plains (11.3.2, 11.3.2a, 11.3.2b, 11.3.2c, 11.3.17, 11.4.7, 11.4.12)	Diagnostic criteria and condition threshold assessment. There is not a 1:1 relationship between the TECs that are predicted to be present and REs. In particular TECs can constitute regrowth, be more disturbed and/or can occupy much smaller patch sizes than mapped remnant REs. As such pre-clearing RE mapping will be used as a flag to identify potential locations of TECs.	> As described by the Commonwealth for each TEC > Pre-clearing RE mapping
REs		Quaternary and / or tertiary plots to confirm vegetation community	Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (Version 5.1)
Habitat Quality	All REs, but primarily Endangered (11.3.21, 11.4.3 & 11.9.5) and Of Concern (11.3.2, 11.3.4 & 11.9.7)	Habitat will be assessed and scored in accordance with required number of plots and methodology contained within the 'Guide to determining terrestrial habitat quality'. Habitat plots will primarily be positioned within the construction footprint, with some extending into the 100m buffer. A total of 36 plots will be assessed within the Stage Survey area. No assessments will be made of potential 'receiving sites' in the broader area.	Guide to determining terrestrial habitat Quality - A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy, Version 1.2 April 2017
Protected flora	Not applicable	Flora surveys are only valid for 12 months after the flora survey was completed, and clearing needs to be undertaken within two years of submitting the flora survey report to the Queensland Department of Environment and Science. Given the date of construction is not yet known, flora surveys will be completed generally in accordance with the <i>Flora Survey Guidelines - Protected Plants</i> (i.e. surveys but not involve targeted meanders separated by habitat type. Instead, surveys for threatened species will target habitat for threatened species, and involve mapping threatened species where identified within the construction footprint and 100m. Tracklogs of meanders, or separation of the Study area by habitat type will not be completed.	Flora Survey Guidelines - Protected Plants - Nature Conservation Act 1992 (version 2.01)
Declared weeds	Not applicable	Restricted weeds will be mapped within the construction footprint only. General abundance of weeds will be noted within the 100m buffer.	Abundance will be mapped in accordance with Appendix 1 of the Spatial Pest Attributes Standard Queensland (July 2012, V7)

Value	Equivalent REs	Survey method	Reference
Habitat features / Breeding Places	Not applicable	Habitat features which may constitute animal breeding places (e.g. hollow-bearing trees, nests, burrows, roosts etc.) will be mapped within the construction footprint only. General notes on habitat will be made for areas within the 100m buffer.	Information sheet - Species Management Program, Requirements for tampering with a protected animal breeding place in Queensland
Wetlands and waterways	Not applicable	Wetlands and waterways mapped within the Study Area will be ground-truthed and general comments will be made on extent, condition etc.	NA
MLES	Not applicable	Areas mapped as MLES within the Toowoomba Regional Council LGA will be ground-truthed and general comments will be made on the condition of these areas.	NA

Table 4-5 Threatened flora species targeted in survey

Species	Common Name	Status	
		NCA	EPBC Act
<i>Acacia lauta</i>	Tara Wattle	V	V
<i>Arthraxon hispidus</i>	Hairy-joint grass	V	V
<i>Bertya oppositifolia</i>	-		V
<i>Cadellia pentastylis</i>	Ooline	V	V
<i>Clematis fawcettii</i>	Stream clematis	V	V
<i>Cymbonotus maidenii</i>	-	E	
<i>Cyperus clarus</i>	A sedge	V	
<i>Dichanthium queenslandicum</i>	King Bluegrass	V	E
<i>Dichanthium setosum</i>	-		V
<i>Digitaria porrecta</i>	Finger Panic Grass	NT	E
<i>Eucalyptus virens</i>	Shiny-leaved ironbark	NT	
<i>Homopholis belsonii</i>	-	E	V
<i>Lepidium monophloeoides</i>	-	-	E
<i>Lepidium peregrinum</i>	-	-	E
<i>Leucopogon</i> sp. Coolmunda (D. Halford Q 1635)	Coolmunda leucopogon	E	E
<i>Macrozamia machinii</i>	-	V	V
<i>Picris barbarorum</i>	-	E	
<i>Picris euae</i>	Hawkweed	V	V
<i>Prostanthera</i> sp. (Dunmore D.M. Gordon 8A)	-		V
<i>Rhaponticum australe</i>	Austral Cornflower	V	V
<i>Sophora fraseri</i>	-	V	V
<i>Thesium australe</i>	Toadflax	V	V
<i>Tylophora linearis</i>	-	V	V
<i>Westringia parvifolia</i>	-	V	V
<i>Xerothamnella herbacea</i>	-	E	E

4.3 Fauna surveys

4.3.1 Optimal survey timing

Optimal survey timing has been reviewed for the fauna survey with consideration of the peak times of detection. **Table 4-6** below describes the recommended survey timing for field surveys in the Brigalow Belt Bioregion as described in Eyre *et al.* (2018). A full list of species-specific fauna and flora survey timings requirements as detailed in the Commonwealth, state and industry-standard survey guidelines for threatened species is enclosed in **Appendix B**.

Table 4-6 Recommended Survey Timing for Terrestrial Vertebrate Fauna Surveys within the Brigalow Belt Bioregion (Eyre *et al.*, 2018)

Recommended survey timing	Rationale
Spring to early summer (September - mid November)	As temperatures begin to warm up after winter there is a peak in vertebrate activity with the commencement of breeding activity in many species. Exact timing is dependent on the timing of the onset of spring when temperatures begin to warm but before summer temperatures become too high as many species, especially reptiles, become less active. Rainfall is also a major trigger for increased activity in many species. This period can be very dry so conducting a second survey during moist periods is critical.
Autumn (March - mid May)	A second survey should be undertaken after summer as the temperatures decrease but before the onset of cold winter nights. This coincides with another active period including dispersal and migration of many species. It is also more likely to be moist than during the spring-early summer period, and also coincides with grass seeding and growing season (important for granivores).

4.3.2 General fauna survey methods

A total of 12 targeted terrestrial trapping sites will be visited in the dry season surveys. While some of these will be revisited in the post-wet season survey some of the sites will be relocated to target other fauna species and provide broader coverage of the alignment. Each of the fauna survey sites comprise a 1 km buffer around a mid-point centred on the alignment. Surveys will be completed by two fauna survey teams each comprised of two Cardno ecologists. Each trapping site will be surveyed over five days and four nights, and each fauna survey team (i.e. fauna survey team 1 and fauna survey team 2) will each complete two full targeted trapping sites over each five day and four-night period. Days to pack-up and set-up will occur in-between. Cumulatively, the proposed survey effort will result in over 1,200-person hours of active survey across project area. The locations of proposed fauna trapping sites are provided in **Figure 4-2**.

A further five 'Additional Sites' will be targeted over the duration of the survey period. These locations will only be surveyed over a single day each and all surveys will be 'passive' (i.e. will not involve trapping of fauna). The focus of these Additional Sites will be to:

- > conduct rapid searches for threatened fauna and their habitat;
- > map habitat features and weeds in close proximity to the proposed alignment; and
- > increase the overall coverage of the survey footprint.

Table 4-7 identifies the general survey techniques that will be utilised at each site, noting that a number of techniques can be completed concurrently. The general survey techniques have been drawn from the relevant Commonwealth Fauna Survey Guidelines for various fauna groups and aim to maximise detection across the broadest number of species. Additionally, targeted fauna survey techniques will be completed within areas of suitable habitat for those species for which additional effort or techniques are required. **Table 4-8** identifies where this is the case.

A full assessment of required techniques and effort for each of the threatened fauna species to be targeted during the fauna surveys, and justification for any alternatives proposed is provided as **Appendix B**.

A fauna survey day will generally consist of the following schedule:

- Dawn chorus at first light to sunrise and active searches (alternating sites such that each site has a min. 2 dawn surveys);
- Check traps and ID any captured fauna;
- Complete active searches;
- Break in middle of day

- Set traps
- Dusk chorus at sunset to last light and active searches (alternating sites such that each site has a min. 2 dusk surveys)
- Spotlighting (min 45mins each site / night).

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Figure 4-2 Proposed fauna trapping sites

Table 4-7 Survey effort for generic fauna survey methods

Method	Fauna group targeted by method and proposed survey effort per site [^]	Proposed duration per site
Call playback	Birds: 5 hours Mammals: 1 hour	5 days 4 nights
Spotlighting	Mammals: 2 x 200m transects Reptiles: min. 6 hours over 4 nights	4 nights
Stag watching	Mammals - 40mins before dusk & 40 mins after dusk	2 nights
Dawn survey	Birds and Butterfly: min 4 hours	2 days
Dusk survey	Birds and Butterflies: min 4 hours Bats (fly-out): min 4 hours	2 days
Habitat assessment	All groups - 4 hours	n/a
Indirect detection (scats, tracks) / area searches / incidental flushing	All groups - 8 hours	5 days
Active diurnal searches (searches for individuals and habitat, raking leaves for reptiles)	Mammals - 2 x 100m transects Reptiles - 3 hours Birds: 4 hours	5 days
Camera traps	All: 10 traps	4 nights
Hair tube traps	Mammals: 20 traps	4 nights
Pitfall traps	Reptiles: 6 pitfalls along a 30m drift fence	4 nights
Elliot traps (a)*	Mammals: 20 traps	4 nights
Cage traps / elliot traps (b)	Mammals: 10 traps	4 nights
Unattended bat detector	Microbats: 1 x Anabat or Songmeter	4 nights
Attended bat detector	Microbats: 4 hours	4 nights
Harp traps	Microbats: 1 x harp trap	4 nights
Funnel traps	Reptiles – min. 2 traps (1 on either end of pitfall drift fence)	4 nights
Pest animal assessment	Methods as per above.	5 days / 4 nights
Wildlife corridors	Opportunistic assessment	5 days

NOTE: [^] effort reflects total 'person hours' as each site will be assessed by two Cardno ecologists. * will be deployed where presence of Yakka skink burrows within a site is known or suspected.

4.3.3 Species-specific fauna survey methods

The general survey methods identified above are collectively suitable for maximising detection across the largest number of fauna species and groups. **Table 4-8** identifies the fauna survey techniques that will be used to maximise detection of target species listed under the EPBC Act and NC Act. A full assessment of possible techniques and effort for each of the threatened fauna species to be targeted during the fauna surveys, and justification for any alternatives proposed is provided as **Appendix B**.

The fauna species identified in **Table 4-8** are those to be targeted for Stage 2 Surveys as they regarded as data deficient as per **Section 4.1**, being those species which had "Limited survey effort" as part of EIS surveys, or had "No survey effort" as part of EIS surveys and the contemporary database record searches indicate the species is known or likely to occur and reflect those identified in **Table 4-1**.

Table 4-8 Threatened species targeted in the terrestrial and aquatic fauna survey

Faunal group	Scientific Name	Proposed Survey Techniques	Proposed survey intensity / duration [^]
Mammals	Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	Unattended bat detectors, attended bat detectors and harp traps as per Table 4-7 .	As per Table 4-7 .
	South-eastern Long-eared Bat <i>Nyctophilus corbeni</i>	Harp traps as per Table 4-7 . Also attended and unattended bat detectors (noting species can only be identified to genus level using these techniques)	As per Table 4-7 .

Faunal group	Scientific Name	Proposed Survey Techniques	Proposed survey intensity / duration [^]
	Spot-tailed Quoll <i>Dasyurus maculatus maculatus</i>	Indirect detection (latrines, scats, tracks), hair tubes, cage traps, and camera traps as per Table 4-7 .	As per Table 4-7 .
	Koala <i>Phascolarctos cinereus</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Indirect detection (scats, scratches) - Area searches for individuals - Spotlighting - Call playback - Camera trapping. Additionally, the Koala Rapid Assessment Methodology (KRAMs) and / or Spot Assessment Technique (SAT) will be completed in larger tracts of suitable habitat.	As per Table 4-7 . A minimum of 20 KRAMs and / or SATs will be completed within the Project footprint (10 in the dry season and 10 in the wet season).
	Greater glider <i>Petauroides Volans volans</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Spotlighting; - Indirect detection (scats); - Camera trapping.	As per Table 4-7 .
	Grey-headed flying-fox <i>Pteropus poliocephalus</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Spotlighting; - Dusk survey; - Diurnal area searches (for camps); - Habitat assessments. Additionally, the known flying-fox camp at Inglewood (3km from the Project footprint) will be visited during the survey period.	As per Table 4-7 .
	Brush-tailed rock-wallaby <i>Petrogale penicillata</i>	The following techniques as per Table 4-7 are suitable for detection of this species: Diurnal searches; Camera trapping.	As per Table 4-7 .
	Echidna <i>Tachyglossus aculeatus</i>	Active searches / area searches and searches for diggings and scats as per Table 4-7.	As per Table 4-7 .
	Brigalow Woodland Snail <i>Adclarkia cameroni</i>	Active searches will be completed in targeted trapping sites that occur within suitable habitat in brigalow woodland. Active searches will include turning logs and raking accumulated leaves and searches for dead shells.	The survey includes five sites mapped by the EIS as habitat for Brigalow Woodland snail (being Sites 7-11), and one site within a mapped Brigalow TEC (being Site 5). Targeted searches for this species will be completed within these sites.
Molluscs	Common Death Adder <i>Acanthophis antarcticus</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Nocturnal spotlighting (vehicle transects); and - Pitfall and funnel trapping. Spotlighting vehicle transects will also be completed opportunistically within the Project footprint when moving between sites.	As per Table 4-7 .
Reptiles	Five-clawed Worm-skink <i>Anomalopus mackayi</i>	The following techniques as per Table 4-7 are suitable for detection of this species: Active diurnal searches Pitfall/funnel traps	As per Table 4-7 .
	Collared delma <i>Delma torquata</i>	The following techniques as per Table 4-7 are suitable for detection of this species:	As per Table 4-7 .

Faunal group	Scientific Name	Proposed Survey Techniques	Proposed survey intensity / duration [^]
		- Diurnal searches - Pitfall trapping - Funnel trapping	
	Yakka skink <i>Egernia rugosa</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches (searching for burrows/latrines sites), and distance observation with binoculars - Spotlighting (in burrows) - Elliot trapping around burrows	As per Table 4-7 .
	Dunmall's snake <i>Furina dunmali</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches - Spotlighting (and nocturnal vehicle searches) - Pitfall trapping - Funnel trapping	As per Table 4-7 .
	Grey snake <i>Hemiaspis damelii</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches - Spotlighting (and nocturnal vehicle searches) - Pitfall trapping - Funnel trapping	As per Table 4-7 .
	Condamine earless dragon <i>Tympanocryptis condaminensis</i>	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches - Spotlighting (and nocturnal vehicle searches) - Pitfall trapping - Funnel trapping Pitfall trapping and funnel trapping as per Table 4-7. - Post-wet season surveys will also incorporate specific pitfall trapping using species specific traps as per national guidelines for earless dragon species.	As per Table 4-7 .
	Regent honeyeater <i>Anthochaera phrygia</i>	Targeted searches in areas of suitable habitat, targeting areas of heavily flowering trees and flocks of other blossom feeders.	Total 20hrs completed over each seasonal survey period.
Birds	Australasian bittern <i>Botaurus poiciloptilus</i>	Areas searches in suitable habitat.	One dawn targeted survey in morning, and area search for feathers, footprint, nests etc. will be completed in suitable habitat.
	Swift parrot <i>Lathamus discolor</i>	Targeted surveys in areas of heavily flowering eucalypts.	Areas searches within targeted trapping sites as per Table 4-7 .
	Major Mitchell's cockatoo <i>Lophochroa leadbeateri</i>	Diurnal bird survey, areas searches, incidental detection within targeted trapping sites as per Table 4-7 .	Areas searches within targeted trapping sites as per Table 4-7 .
	Red goshawk <i>Erythrorhynchus radiatus</i>	Area searches for nests and individuals will be completed by vehicle and foot in areas of suitable habitat at targeted trapping sites.	Min. 4hr over 5 days per site (128hrs total over 40 days). Significant watercourses will also be searches for nests and individuals.
	Curlew sandpiper <i>Calidris ferruginea</i>	Spotlighting and areas searches in suitable habitat.	As per Table 4-7 , searches will be completed in suitable habitat.
	Australian painted snipe <i>Rostratula australis</i>	Targeted stationary searches at suitable wetlands and watercourses during wet season survey	Total of min. 10 hours across 5 days.
	Painted honeyeater <i>Grantia picta</i>	Area searches as per Table 4-7 .	As per Table 4-7 .
	White-throated Needle-tail <i>Hirundapus caudacutus</i>	Area searches as per Table 4-7 .	As per Table 4-7 .

Faunal group	Scientific Name	Proposed Survey Techniques	Proposed survey intensity / duration [^]
	Glossy black-cockatoo <i>Calyptrorhynchus lathamii</i>	Searches for individuals and ort searches will be completed within suitable habitat within each of the targeted trapping sites. Habitat assessment will be used to refine habitat mapping for this species.	Min. 4hr over 5 days per site (128hrs total over 40 days)
	Squatter pigeon <i>Geophaps scripta scripta</i>	Area searches and flushing surveys as per Table 4-7 at targeted trapping sites.	8hrs over 5 days per site.
	Black-breasted button-quail <i>Turnix melanogaster</i>	Area searches and flushing surveys as per Table 4-7 at targeted trapping sites.	8hrs over 5 days per site.
	Grey falcon <i>Falco hypoleucos</i>	No species-specific guidelines. Refer Table 4-7 . Relevant techniques include: - Dusk and dawn survey - Habitat assessment - Area searches Active diurnal searches	Refer Table 4-7 .
	Pale Imperial Hairstreak <i>Jalmenus eubulus</i>	No species-specific guidelines. Refer Table 4-7 . Relevant techniques include: - Dusk and dawn survey - Habitat assessment - Area searches - Active diurnal searches	Refer Table 4-7 .
Butterflys			

NOTE: [^] effort reflects total 'person hours' as each site will be assessed by two Cardno ecologists.

5 Workplace Health and Safety

5.1 Health and safety management plan

A Safety Management Plan for the project has been provided which outlines the risk management process for fieldwork including project inductions and includes the approved Safe Work Method Statement (SWMS). A SWMS has been developed for the project to manage identified hazards to an acceptable level, and has been approved by ARTC and QR. The SWMS will be updated regularly based on:

- > Feedback from field team members;
- > Outcomes of 'Take 5s' or 'Every Minute Risk Assessments' undertaken in the field;
- > Any new identified hazards (recorded in Shield, Cardno's hazard reporting app); and
- > Cardno's Project Self Assessments and Audits.

Sub-contractors will be inducted in accordance with the project SWMS or the contractor's policies, procedures and operational manuals.

The project team is familiar with working in the rail corridor. All field staff members that will work within an active rail corridor have completed Safely Access the Rail Corridor (SARC) training and have a valid Rail Industry Worker Card. Additionally, our team members have experience working in remote areas, having done so on numerous projects. The project team will be trained and familiar with the Health and Safety Management Plan and will be familiar with the project-specific protocols associated with this project. This will include travel, communication and work plans. Staff will be equipped with personal and vehicle safety equipment. Field staff have all been trained in first aid.

In accordance with the Safety Management Plan, hazards and/or risks identified during the Health, Safety and Environment (HSE) Risk Management Process, will be reported in the HSE Action Register and discussed with ARTC.

5.2 Covid-19 field work plan

Cardno has developed a COVID-19 Field Work Assessment and COVID-19 specific measures are incorporated into our SWMS. All team members will be required to operate under the COVID-19 Field Work Assessment and SWMS, which includes the requirement to complete a COVID-19 fitness for work assessments before travelling for fieldwork, measures for social distancing, protocols for safe travel, and requirements for disinfection of equipment and surfaces. All field members will be equipped with masks, gloves, antibacterial wipes and hand sanitiser.

5.3 Risk management

As part of Cardno's internal risk management Cardno will develop supporting documentation and processes around the field survey that would detail the process for:

- > Daily field team check-in designed as an opportunity to review prior days' work, issues, concerns and goals/targets for the next day, and expediently elevate any emerging project risks or unexpected finds. Any notable items will be shared with the ARTC B2G Project officer.
- > Detailed 'step by step' field methodologies – including identification of any critical aspects of the methodology and updated with lessons learnt or any agreed variations to methodology or effort.
- > Daily WHS procedures including Take 5 requirements and review / sign-off of SWMS.
- > Quick reference guide to GIS management and data capture.

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APPENDIX

A

OVERVIEW OF GEOTECHNICAL
INVESTIGATIONS

Attachment 1 – Overview of investigations

Access Tracks

We need to undertake a range of tests requiring a variety of different equipment. The equipment varies from a 4WD ute to a truck mounted drill rig. In some cases, to allow us to safely get to and from the test sites we may need to clear and level tracks and pads. ARTC will consult with you about the best route and obtain all the necessary permits and approvals for this work. Upon completion of the testing program the disturbed areas will be rehabilitated.

Reasonable precautions will be taken to limit disturbance to vegetation and existing tracks during access, setup and drilling, however, the ground surface may become rutted and some grasses or small saplings/bushes may be disturbed at the drilling sites and along the access routes.

About Borehole Drilling

Drilling is undertaken using a truck mounted drill rig. The drilling rigs require a relatively flat cleared pad around 20 by 20 metres to ensure a safe working area.

Along with the truck mounted drill rig, we expect up to three support vehicles will be required. The support vehicles may come and go but the rig will stay in place for the duration of drilling.

We will use water during the drilling process for cooling and lubrication. We will bring the water to the drilling site. During drilling the water will be contained in a purpose-built tank and recirculated until the hole is completed. If additional water is required, water will be drawn from an approved location. We will not source water from your property unless specific arrangements have been approved prior to drilling.



Borehole Drilling - Temporary Disturbance

The ground surface may become rutted and grasses or small saplings may be disturbed due to vehicle movements.

The early stages of the drilling process will involve a hammering noise as the soil and/or rock samples are recovered by hammering a metal sampling tool in to the ground. This will generally occur during the first two days of drilling. After the hammering, the most consistent noise disturbance in the area will be the sound of an idling diesel engine which may be slightly louder during sample retrieval and towards the completion of the borehole.

Borehole Drilling - Rehabilitation

When the borehole is completed, the drilling supervisor will determine the most appropriate backfill method for the location to comply with the relevant legislation, codes and safety protocols. Some boreholes will be used for ongoing groundwater monitoring (see below). Generally, boreholes will be backfilled with the soil removed during drilling. The borehole site will be left with a slightly raised or mounded surface as it will compact over time. No open holes will be left unfenced while unattended. All holes will be fully backfilled or covered if the hole will be used for ongoing ground water monitoring before leaving the work site.

Drill pads will be rehabilitated as soon as possible and reinstated to match the existing surrounding surface as close as practicable. The soil will be distributed and contoured evenly over the surface. The soil surface will be left rough and covered with surface litter, where possible to minimise the potential for erosion.



Pre Drilling – truck in position before drilling



Post Drilling – small cleared area and mounded soil at hole location

Borehole Drilling – Ongoing groundwater monitoring

In some boreholes we will install a device (called a piezometers) to monitor groundwater levels within the borehole. Once the device is installed, the borehole will be backfilled with a permeable cement grout and covered with a locking cover approximately 30cm in diameter. This cover will be flush with the ground surface.

An engineer will return to the site several times after installation to obtain data and maintain the data loggers - usually around 2 weeks, 6 weeks, then annually. The piezometer will be left in the location for at least 12 months, so we can understand seasonal groundwater changes.



At the end of the monitoring program the piezometer would be removed, and the borehole backfilled. The surface will be covered with topsoil to match the existing surrounding surface as far as practicable.

About Auger Hole Drilling

Auger holes will be drilled using a drill rig mounted on a four-wheel ute or small truck. Shallow auger holes are completed in an hour with deeper holes taking up to one day.

Auger Hole Drilling Temporary Disturbance

The area of disturbance is limited to the auger hole and does not exceed 1m².

Auger Hole Drilling Rehabilitation

Upon completion, the auger holes will be backfilled using the soil and/or rock that will come out of the hole during the drilling process. Not all the material removed from the hole will fit back down the hole. The remaining material will be spread out around the borehole location and mounded (approx. 10 to 20 cm) directly over the backfilled hole.



About Ground Vibration Testing

Ground vibration testing is non-intrusive. It involves hitting a metal plate on the ground with a sledgehammer to create sound waves (vibrations) which travel through the ground. The sound waves are bent at different angles when they meet different types of soil or rock. A string of receivers (called geophones) 'listen' to the waves when they return to the surface and send information about the wave length and speed to the recording device. This provides information about the soil and rock layers and how deep they are.



The geophysical survey team will usually drive a 4WD ute to the start of the testing line then walk along the line to space the geophones out 10cm to 20cm apart. There can be up to 100 geophones in a string. The geophones are around the size of a small solar garden light. The metal plate is around the size of a dinner plate.

Ground Vibration Testing - Temporary Disturbance

The primary noise disturbance associated with ground vibration testing is the hammer blows on the metal plate. The testing may involve up to 10 blows.

About Geological Mapping Survey (Geological Field Survey)

Geological surveys are non-intrusive. They are usually conducted by field geologists. The geologist will walk over the selected site and record observations and measurements of surface rocks and outcrops. Rock chip samples may be gathered for analysis.

About Trench Pit Soil Sampling

Trench pits will be excavated by machine (e.g. rubber tyred back hoe or small tracked excavator) to the required depth to allow the geologist to examine, record and/or sample the soil in its natural profile. Trench pits are usually around 2-3m deep, 2m long and 30-40cm wide.



We will backfill the trench pits as soon as possible after the studies are completed. Trench pits will be backfilled in the general order the material was removed and be compacted in layers of 300 mm to 500 mm (maximum) using the machine bucket. The soil will be distributed and contoured evenly to match the existing surrounding surface as close as practicable. The trench pit site will be left with a slightly raised or mounded surface as the soil will compact over time.

About Cone Penetration Testing (CPT)

The CPT (Cone Penetration Testing) consists of using a hydraulic rig to push an instrumented cone tip vertically into the ground through several rods. The cone continuously measures the resistance needed to penetrate the soil at a constant rate. Geotechnical Engineers use this information to understand the soils conditions under the proposed structure (embankments and /or bridges).

These test are generally undertaken along areas where soft soils are encountered, such as floodplains, marshlands, coastal plains, etc. The test is undertaken from a purposed build truck or tracked rig, with many different shapes and colours. The cone is pushed into the ground from the centre of the rig. This technique is of very low impact as it only leaves a 100 mm diameter hole in the ground that is backfilled at the end of the test. Each test is typically carried out to 15 m to 30m below the surface or until the cone encounter enough resistance to stop the progress. Each test takes approximately a couple of hours per site.



Types of CPT drill rigs in position for testing

Safety of people and livestock

While the borehole or auger hole is open (not yet complete), the rig will generally remain in place over the hole. This includes overnight if the hole is not completed in one day. This will prevent the feet and legs of livestock and people from going into the open hole. If an open hole needs to be left unattended, and the drill rig will not remain in place, safety fencing and all necessary lighting and signage determined by a specific risk assessment for that site, will be installed.

Typically, a trench pit will be completed within a day. If a trench pit needs to be left open when the crew is not at the site, safety fencing and all necessary lighting and signage determined by a specific risk assessment for that site, will be installed. Precautions will be taken to protect the trenches from the adverse effects of weather during this period. We will also create an egress ramp to allow small animals to escape the trench if they do get in there.

Once the hole is completed, the crew will fully backfill the hole or cover it with a locking cover approximately 30cm in diameter if it will be used for ongoing ground water monitoring. This cover will be flush with the ground surface, so it does not create a hazard. Landowners will be advised of the location of the groundwater monitoring device to ensure they are aware.

Drill pads and trench pits will be rehabilitated as soon as possible and reinstated to match the existing surrounding surface as close as practicable. The soil will be distributed and contoured evenly over the surface to reduce the risk of trips, slips and falls. The soil surface will be left rough and covered with surface litter, where possible to minimise the potential for erosion.

Spill Management

The drill rig and support vehicles are equipped with spill kits appropriate to the fuels, oils and chemicals used in the drilling process and carried on the drilling and support equipment. Spills will be promptly cleaned up and contaminated materials hauled to the appropriate disposal site in a manner consistent with regulatory requirements.

Waste Control

Bins will be provided at the work site for all waste types. The site will be maintained in a clean and orderly state daily. All waste produced will be collected and recycled where practical or disposed of at an approved disposal facility.

Fire

ARTC will take all reasonable precautions to minimise any fire hazard at the site including:

- No smoking on site.
- Fire extinguishers will be readily available.
- No hot works will be undertaken onsite
- All chemicals and dangerous goods will be stored correctly.
- No ignition sources will be exposed to potential fuel areas.

In the case of fire, the fire brigade shall be notified immediately. An attempt may be made to extinguish the fire if it is safe to do so, otherwise the area shall be evacuated immediately.

Erosion Sediment Control

As the disturbed area will be less than 2m² no physical erosion and sediment controls will be put in place. All water used during the drilling will be contained in a purpose-built tank and recirculated until the hole is completed to ensure drilling fluids will not enter any surrounding waterways. The work areas will be backfilled with excavated material as soon as practicable following completion of work in each location. No sediment laden run-off will be discharged directly or indirectly into drains or waterways.

Weed and Seed

At the start of the drilling project, independent of the property specific cleaning requirements, all vehicles that will access private property, outside of road and rail corridors will have a weed and seed wash-down to prevent the introduction of noxious weeds from outside of the study area into the study areas. Weed and seed categories and associated cleaning procedures are provided in the following sections.

Category 1 - Cleaning Level

As minimum the following procedures will be carried out on all field vehicles to help prevent the spread of weeds from one site to another:

- Prior to leaving a public corridor and entering private property, the operator will complete a visual assessment of their vehicle for loose soil and vegetation. Where present the loose soil and vegetation will be removed from exposed areas with a broom or brush;
- The same procedure of removing loose soil and vegetation from the vehicle will be completed before re-entering the public corridor;
- If a particularly pervasive type of noxious weed is identified by the environmental reconnaissance, the areas should be flagged and the investigation teams notified so the areas can be avoided where possible. It is best to avoid contaminated areas wherever practical; and
- A weed and seed inspection log book will be completed for each vehicle and retained in the vehicle to document that the vehicle was cleaned and inspected to the Category 1 level.

Category 2 - Cleaning Level

The Category 2 cleaning will include the use of a dedicated wash-down vehicle that will travel to the site and complete an on-site wash-down of all the site vehicles that entered the property. The Category 2 Cleaning level procedures and considerations will include the following:

- The same procedures described in the Category 1 Cleaning Level will be undertaken. The best preventative measure will again be to avoid contaminated areas wherever practical;
- Once the Category 1 cleaning is completed, the vehicles will drive to a location within the property that is outside of the contaminated area
- When selecting the wash-down location it will be important to select a location where runoff will not enter a water course or water body, a buffer of 50 m or more is preferred;
- Complete the wash-down at a position just outside of the area where weeds are to be contained so the runoff flows back toward the infested area;
- Avoid sensitive vegetation and habitat features;
- A well grassed area which slopes gently away from the wash-down area is preferred;
- Once the wash-down is complete, the vehicles will be inspected on site by a team member who has completed the Greening Australia (or similar course) and record the inspection in log book for each vehicle and retained in the vehicle to document that the vehicle was cleaned and inspected to the Category 2 level;
- For the procedure described, all weeds and debris will remain on site.

APPENDIX

B

SURVEY EFFORT FOR THREATENED FLORA
AND FAUNA SPECIES

Table 6-1 Survey effort for threatened fauna species know or likely to occur within the impact assessment area

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
BIRDS												
<i>Anthochaera phrygia</i>	Regent honeyeater	Preferably spring	D	Preferably mornings within breeding season May to March and mostly September to November	a) Area searches b) Targeted searches	a) 20 hrs. b) 20 hrs.	a) 10 days b) 5 days	a) for areas <50ha b) Targeting areas of heavily flowering trees and flocks of other blossom feeders.	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	NA	Targeted searches in areas of suitable habitat, targeting areas of heavily flowering trees and flocks of other blossom feeders. Total 20hrs completed over each seasonal survey period.	Complies with guideline.
<i>Botaurus poiciloptilus</i>	Australasian bittern	No season specified	D / PW	Early morning or early evening.	a) Habitat observation b) Area searches	Not specified	Not specified	a) Observation of targeted foraging habitat within wetlands in the early morning or early evening. Detection by sightings and unsolicited calls. b) Area searches in suitable habitat for sightings, nests, indicative footprints and feathers.	Recommended survey methods for wetland birds: bitterns in Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	-	One dawn targeted survey in morning, and area search for feathers, footprint, nests etc. will be completed in suitable habitat.	Complies with guidelines.
<i>Calidris ferruginea</i>	Curlew sandpiper	Early August - March	D	a) Nocturnal b) Diurnal	a) Nocturnal survey b) Aerial surveys of foraging habitat	Not specified	Not specified	a) Nocturnal area or transect spotlight surveys in suitable habitat either on foot or from a slow-moving vehicle. b) Aerial surveys of foraging habitat in large or remote study areas.	Recommended survey methods for shorebirds in Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010) Conservation Advice Calidris ferruginea (DEWHA, 2015)	-	Spotlighting and areas searches in suitable habitat as per Table 4-7.	Complies with guidelines.
<i>Calyptorhynchus lathami</i>	Glossy black-cockatoo	Anytime of year (breeding March to August)	D / PW	Not specified	a) Land based searches b) Search for foraging and nesting signs	a) 5 hrs. b) 20 hrs	a) 1 day. b) 4 days.	a) For each area of 50 ha or less (one day's search and morning/evening watch for breeding birds sufficient to check for feeding sign or breeding in a 50-ha patch, b) Search for signs of feeding or nests(4hr/day over 4 days).	Glossy black-cockatoo, Calyptorhynchus lathami. Targeted species survey guidelines (Hourigan, 2012)	The EIS identifies that the Project footprint supports 480.56ha of suitable habitat for this species which would require 48hrs of area searches and 192hrs of foraging surveys searches to comply with the State Guidelines.	Searches for birds and ors will be limited to suitable habitat within and proximate to targeted trapping site, and will include active diurnal, dusk and dawn survey. Min. 4hr over 5 days per site (128hrs total over 40 days). Habitat assessment will be used to refine habitat mapping for this species.	Techniques comply with guideline. Due to the large project area total survey effort may not be fully met, however coverage across the Project and habitat assessments are considered sufficient to detect this species. The precautionary principal will be applied as necessary in refining resulting habitat mapping.
<i>Erythroriorchis radiatus</i>	Red goshawk	Not specified	D / PW	Not specified	a) Area searches	a) 80 hrs.*	a) 10 days*	Area searches for individuals and/or distinctive nests. *effort for 50 ha area is 50 hrs. over 8 days	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	The EIS identifies the project footprint supports 339.34ha of habitat for this species, records for this species are concentrated in the north of the project area. Require 339hrs of searches to	Area searches for nests and individuals will be completed by vehicle and foot in areas of suitable habitat at targeted trapping sites. Min. 4hr over 5 days per site (128hrs total over 40 days). Significant watercourses will also be searches for	Survey effort will not fully comply with guideline owing to the large size of the project area. Given spread of sites across project area, and targeted assessment along watercourses, survey effort considered sufficient. The

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
										fully comply with guideline.	nests and individuals.	precautionary principal will be applied as necessary in refining resulting habitat mapping.
<i>Falco hypoleucos</i>	Grey falcon	Not specified	D / PW	Not specified	Not specified	Not specified	Not specified	Note specified	Consultation Document on Listing Eligibility and Conservation Actions <i>Falco hypoleucos</i> (DEWHA, 2019)	No species-specific guidelines for this species.	Refer Table 4-7. Relevant techniques include: - Dusk and dawn survey - Habitat assessment - Area searches - Active diurnal searches	NA
<i>Geophaps scripta</i>	Squatter pigeon	Not specified	D / PW	Not specified	a) Areas searches or transect surveys b) Flushing surveys	a) 15 hrs. b) 10 hrs.	a) 3days b) 3 days	for areas <50ha	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	The EIS identified 339.34ha of suitable habitat for this species in the project footprint, which will require at least 102hrs of survey.	Area searches and flushing surveys as per Table 4-7. Min 8hrs over 5 days per site., resulting in mon. 256hrs of total survey across dry and wet season surveys.	Complies with guidelines.
<i>Grantiella picta</i>	Painted honeyeater	Early spring to late summer	D	During daylight hours and preferably in the early morning (< 2 hrs after sunrise) and late afternoon (<2 hrs before sunset) and avoid inclement weather (i.e. rain and wind)	a) Area searches	a) 4 hrs (per 50ha of suitable habitat)	a) 4 days	For example, at least 1 hour of surveying per day for a minimum of 4 days.	Painted honeyeater, <i>Grantiella picta</i> . Targeted species survey guidelines (Rowland, 2012)	The EIS identifies 432.99ha of habitat for this species in the Project footprint.	Area searches within habitat at each targeted trapping site will result in Min 8hrs over 5 days per site., resulting in mon. 256hrs of total survey across dry and wet season surveys.	Complies with guidelines.
<i>Hirundapus caudacutus</i>	White-throated Needletail	Summer	D	Observations should be made as late as possible in the evening of birds coming into roost in tall trees along ridge tops.	NA - No species-specific guidelines.	NA - No species-specific guidelines.	NA - No species-specific guidelines.	NA - No species-specific guidelines.	Referral guideline for 14 birds listed as migratory species under the EPBC Act, (DoE, 2015)	The EIS identifies 3,203.8 of habitat for this species in the Project footprint.	Area searches as per Table 4-7., searching for roost sites.	NA – no species-specific guidelines.
<i>Lathamus discolor</i>	Swift parrot	Autumn to early winter (March-July) In mainland Australia for non-breeding season (arriving between February and March), returns to Tasmania September – October.	PW	Not specified	a) Areas searches or transect surveys* b) Targeted surveys**	a) 20 hrs. b) 20 hrs.	a) 8 days b) 8 days	* In areas of less than 50 ha. ** Targeting areas of heavily flowering eucalypts.	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	The EIS identifies 286.39ha of habitat for this species in the Project footprint.	Targeted surveys in areas of heavily flowering eucalypts during area searches as per Table 4-7. Min 8hrs over 5 days per site., resulting in mon. 128hrs of total survey during wet season surveys.	Complies with guidelines.
<i>Lophochroa leadbeateri</i>	Major Mitchell's cockatoo	NA – No species-specific guidelines	D / PW	NA – No species-specific guidelines	NA – No species-specific guidelines	NA – No species-specific guidelines	NA – No species-specific guidelines	NA – No species-specific guidelines	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Queensland Herbarium, 2018)	The EIS identifies 387.77 ha of habitat for this species in the Project footprint.	Diurnal bird survey, areas searches, incidental detection.	Complies with guidelines.
<i>Rostratula australis</i>	Australian painted snipe	Not specified	PW	Not specified	a) Targeted stationary observations b) Land-based areas searches or line transects for sites of less than	a) 10 hrs. b) 10 hrs.	a) 5 days b) 3 days	Difficult to detect even when present. Thought to be mainly crepuscular but can be detected during the day. Secretive but	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	Suitable habitat for this species within the project area comprises wetlands and watercourses.	Targeted searches will be completed within area of suitable habitat in the wet season surveys. Total of	Complies with guidelines.

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
					50 ha when wetland holds water but is not flooded.			conspicuous when in the open.			min. 10 hours across 5 days.	
<i>Turnix melanogaster</i>	Black-breasted button-quail	Not specified	D / PW	Not specified	a) Land-based areas searches or line transects	a) 15 hrs.	a) 3 days	Shy and inconspicuous. Highly cryptic. Usually detected by observation of birds that flush or walk away after being disturbed. May also be detected by their scratching when foraging in the leaf litter. Platelets may indicate presence of this taxon but is not conclusive as these are also made by other button quail. Call playback has been used to survey for black-breasted button quail, but the effectiveness of this method is uncertain.	Survey Guidelines for Australia's Threatened Birds (DEWHA, 2010)	The EIS does not identify any habitat for this species within the Project footprint.	Area searches and flushing surveys as per Table 4-5 at targeted trapping sites.	Complies with guideline.
MAMMALS												
<i>Chalinolobus dwyeri</i>	.Large-eared Pied Bat	Mid spring through to early autumn (October through to March)	D / PW	Not specified	a) Unattended bat detectors b) Attended bat detectors c) Harp traps	a) 16 detector nights b) 6 detector hrs. c) 16 trap nights	a) 4 nights b) 3 nights c) 4 nights	a), b), c) for project area <50ha	Survey Guidelines for Australia's Threatened Bats (DEWHA, 2010)	The EIS identified 54,95ha of potential habitat for this species within the Project footprint.	Unattended bat detectors, attended bat detectors and harp traps as per Table 4-7 .	Whilst only 4 nights of trapping are proposed at each targeted trapping site, all survey techniques will be utilised at each of the proposed 32 trapping sites resulting in a total of 128 trap nights per technique. Survey effort considered to comply with guidelines given area of habitat within Project area.
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll, Tiger Quoll (SE mainland population)	Ecologically no reason for seasonal surveys, however cage trapping should not be conducted between August – mid November. Surveys conducted between April and September may detect males in areas of unsuitable habitat.	PW	Not specified	a) Habitat Transects b) Indirect detection (latrines, scats, tracks) c) Hair tubes d) Remote camera traps	a) Cover entire area, spaced at 50-100 m intervals b) Cover entire area, spaced at 50-100 m intervals c) 20 d) 10 traps/ha	a) 2hr /ha (for a 5ha area) b) 2hr /ha (for a 5ha area) c) 4 nights d) 14 nights	Spotted-tailed quolls have home ranges that span hundreds of hectares, surveys conducted at a small scale (5ha) are not considered appropriate. Sampling units of 100 hectares are recommended.	Survey Guidelines for Australia's Threatened Mammals (DEWHAa, 2011a)	The EIS identified 81,42ha of potential habitat for this species within the Project footprint.	Indirect detection (latrines, scats, tracks), hair tubes, and camera traps as per Table 4-7 . 20 hair tubes will be deployed at each of the 32 targeted trapping sites for 4 nights, 10 camera traps will be deployed at each site for 4 nights. Habitat and indirect detection methods will be completed within each survey site for a total of 8hrs each site (256hrs total).	Generally complies with guidelines. Effort associated with hair tubes compliant with guideline. Camera traps will only be deployed at each targeted trapping site for 4 nights which is below survey effort guidelines. However, given all survey techniques will be utilised across all sites within the Project area, coverage and overall effort considered

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
												adequate. Targeted trapping will be supplemented by habitat assessments.
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat	Not specified	D / PW	Not specified	a) Harp traps b) Mist nets	a) 20 trap nights b) 20 net nights	a) 5 nights b) 5 nights	a), b) for project area <50ha	Survey Guidelines for Australia's Threatened Bats (DEWHA, 2010)	The EIS identified 344.10 of potential habitat for this species within the Project footprint, a total of 138 trap nights required.	Harp trapping as per Table 4-7 . One harp trap will be deployed in each of the 32 proposed targeted trapping sites for a period of 4 nights resulting in a total 128 trap nights.	Does not comply with survey guidelines. Owing to the large survey area and logistics associated with trapping multiple appropriate flyways, the total survey effort is slightly less than recommended in the survey guidelines given the availability of potential habitat for this species. However, sites will be well-spaced across the project area to give greater coverage, and surveys completed over two seasons. Additionally, whilst only able to detect to the level of genus, attended and unattended bat detectors will be used and all survey results will be supplemented by a habitat assessment. Collective survey effort is considered sufficient for detection of species and mapping of habitat.
<i>Petauroides volans volans</i>	Greater Glider	Not specified	D / PW	Nectar availability and monthly lunar phases (i.e. bright moon can reduce detectability).	a) Spotlight survey b) Scat and Sign search c) Incidental	a) 1 per generic survey site b) & c) not specified	a) 30 minutes b & c) not specified	Not specified	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2018)	The EIS identified a total of 198.42ha of potential habitat for this species within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Spotlighting; - Indirect detection (scats); - Camera trapping.	Complies with guidelines.
<i>Petrogale penicillata</i>	Brush-tailed rock-wallaby	Not specified	D / PW	Not specified	a) Diurnal searches b) Scat plots c) Camera traps	Not specified	Not specified	Ensure desktop is completed to understand records and survey habitat (i.e. rocky outcrops)	Survey Guidelines for Australia's Threatened Mammals (DEWHAa, 2011a)	No habitat for this species is identified by the EIS as potentially present within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: Diurnal searches;	Complies with guidelines.

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
											Camera trapping.	
<i>Phascolarctos cinereus</i>	Koala	Not specified	D / PW	In the inland context, there may be seasonal variation in koalas' use of different habitat types. Presence/absence surveys in the inland context, conducted during dry periods, should be centred on riparian areas, upper/mid-slope areas and other dry-period refugia in order to maximise detectability.	a) Strip transects b) Nocturnal spotlighting c) Call playback d) Camera trap e) Mark resight/mark recapture f) Detection dogs g) Radio/satellite collars h) Indirect methods i) Scratches j) Scats (SAT) k) Scats regulated grid l) Scats (KRAM) m) Faecal standing	Not explicitly stated	Not explicitly stated	None specified	EPBC Act referral guidelines for the vulnerable koala (DoE, 2014)	The EIS identifies 493.06ha of potential habitat for this species within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Indirect detection (scats, scratches) - Area searches for individuals - Spotlighting - Call playback - Camera trapping. Additionally, a total of 20 Koala Rapid Assessment Methodology (KRAMs) and / or Spot Assessment Technique (SAT) plots will be completed in larger tracts of suitable habitat.	Complies with guideline for chosen techniques.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Spring, summer and early autumn	D / PW	Flowering and fruiting season	a.) Active diurnal searches (for day roosts, and to detect droppings, odour) b.) dusk surveys for flying individuals c.) comprehensive surveys of vegetation communities and food plants d.) Night surveys - walking transects (100m apart)	Refer notes	None specified	Survey effort guide "Consultants should demonstrate that they have sought information about the location of historic camps from the appropriate authoritative sources as outlined above. It should also be demonstrated that a comprehensive vegetation survey has been completed for the survey area, and a clear assessment of the contribution of the project area in terms of food plants, especially in relation to the broader region, is provided." DEWHA, 2010. The National Flying-fox Monitoring Viewer indicates a Grey-headed flying-fox (GHFF) camp is located in Toowoomba. The camp has a population of GHFF estimated to be between 500-2,500.	Survey Guidelines for Australia's Threatened Bats (DEWHA, 2010)	A known flying-fox roost is present in Inglewood (approximately 3 km south of the Project footprint).	The following techniques as per Table 4-7 are suitable for detection of this species: - Spotlighting; - Dusk survey; - Diurnal area searches (for camps); - Habitat assessments. Additionally, the known flying-fox camp at Inglewood (3km from the Project footprint) will be visited during the survey period.	Complies with guidelines
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	NA- no species-specific guidelines	D / PW	NA- no species-specific guidelines	a) Active searches b) Searches for diggings and scats	NA- no species-specific guidelines	NA- no species-specific guidelines	NA	No species-specific guidelines. https://keyserver.lucidcentral.org/key-server/data/080e0e0d-0b01-4405-8e0c-0805000f0308/media/Html/Tachyglossus_aculeatus.htm	-	Active searches / area searches and searches for diggings and scats as per Table 4-7	NA- no species-specific guidelines

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
Molluscs												
<i>Adclarkia cameroni</i>	Brigalow Woodland Snail	Mid spring to early autumn (October to March)	D / PW	Not specified	a) Turning logs and raking accumulated leaves b) Searches for dead shells	a) & b) 2 persons	a) & b) 2 hours	Survey to target areas of preferred snail microhabitat.	Conservation Advice Adclarkia cameroni brigalow woodland snail (TSSC, 2016)	The EIS identifies 131.46ha of potential habitat for this species in the Project footprint.	Active searches will be completed in targeted trapping sites that occur within suitable habitat in brigalow woodland. The survey includes five sites mapped by the EIS as habitat for Brigalow Woodland snail (being Sites 7-11), and one site within a mapped Brigalow TEC (being Site 5). Targeted searches for this species will be completed within these sites. Active searches will include turning logs and raking accumulated leaves and searches for dead shells.	Complies with guidelines.
REPTILES												
<i>Acanthophs antarcticus</i>	Common Death Adder	Spring to early autumn (September to March)	D / PW	Not specified	a) Nocturnal vehicle transect b) Pitfall and funnel trapping	a) 2 surveys b) > 100 pitfall and 100 funnel trap nights per ha	a) 2 nights b) extended period required	~500 km (or all suitable roads surveyed multiple times) Pitfall and funnel trapping could be used in addition to nocturnal vehicle transects. The survey effort is considerable given the highly cryptic nature of the species and possible genuine rarity over much of their distribution. Therefore, based on the precautionary principle, if it is not feasible to invest this quantity of survey effort, with suitable habitat present in the survey area, then A. antarcticus should be assumed to be present.	Common death adder, Acanthophs antarcticus. Targeted species survey guidelines (DES, 2012)	The EIS identified 540.87ha of potential habitat for this species in the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Nocturnal spotlighting (vehicle transects); and - Pitfall and funnel trapping	Generally complies with guidelines. Whilst required survey effort for pitfall and funnel trapping will not be met given the large size of the project area, spotlighting will be completed via nocturnal vehicle transects and on foot extensively within the Project area to supplement trapping effort.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	Spring to early autumn (September to March)	D / PW	Coolest part of the day > 25°C	a) Diurnal searches b) Pitfall/funnel traps c) Artificial shelter sites	a) 1.5-person hours per hectare b) 6 20L buckets along 30m drift fencing c) Hay bales- 4X4m fenced plots Tiles-50 tiles placed at 5m intervals in suitable habitat-1 grid per 2 ha for sites up to	a) 3 days b) 2 replicates per habitat type	Diurnal searched are not suitable within floodplain habitat as species hides deep in clay cracks Pitfall traps have marginal effectiveness for this species Artificial shelter sites- only possible over a longer survey timeframe.	Survey guidelines for Australia's threatened reptiles (DEWHA, 2011b) / Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DEWHA, 2011c)	The EIS identifies 178.26ha of habitat for this species in the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Active diurnal searches - Pitfall/funnel traps	Generally complies with guidelines. Owing to the large size of the project area and total amount of potentially suitable habitat for these species, the proposed survey will not strictly comply with the survey guidelines. Notwithstanding active diurnal searches and

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
						40ha. 2 grids if site less than 2 ha. 20 grids for sites > 40ha						pitfall / funnel trapping will occur at the 32 trapping sites accounting for a total survey effort of 96hrs of active searching, and 128 trap nights per pitfall line (x 6 buckets = 768 total trap nights). Targeted survey techniques will be supplemented by habitat assessments and the precautionary principal applied to mapping habitat.
<i>Delma torquata</i>	Collared Delma	Spring to early autumn (September to March)	D / PW	Coollest part of the day/>25°C	a) Diurnal searches b) Pitfall lines c) Artificial shelter (tiles grids)	a) 1.5-person hours per hectare b) 6 x 4—10L buckets and funnel traps spread along a 15 metre fence c) Tiles-50 tiles placed at 5m intervals in suitable habitat-1 grid per 2 ha for sites up to 40ha. 2 grids if site less than 2 ha. 20 grids for sites > 40ha	a) 3 days	Artificial shelter-tile grids are supplementary for this species	Survey guidelines for Australia's threatened reptiles(DEWHA, 2011b) / Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DEWHA, 2011c)	The EIS identifies a total of 295,76ha of habitat for this species within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches; - Pitfall trapping; - Funnel trapping.	Complies with guidelines.
<i>Egernia rugosa</i>	Yakka Skink	Spring to early autumn (September to March)	D / PW	Coollest part of the day/>25°C	a) One-off diurnal searches b) Transects c) Spotlighting d) Elliot and cage traps	a) 1.5-person hours per hectare c) 1.5-person hours per ha d) 1 Elliot and 1 cage trap placed as close as possible to burrow network-check every morning and evening.	a) 3 days c) 3 nights d) 4 days/nights	Diurnal searches- searches for burrows or latrine sites. Yakka skinks can be watched using binoculars or a telescope, focusing on burrow systems or latrine sites. Transects should be strategically designed/positioned in large habitat patches (>10ha) Spotlighting-targeting water inundated gilgais, wetlands, riparian habitat. More effective on warm and humid nights.	Survey guidelines for Australia's threatened reptiles(DEWHA, 2011b) /Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DEWHA, 2011c)	The EIS identifies a total of 364.47ha of habitat for this species within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches (searching for burrows/latrine sites), and distance observation with binoculars - Spotlighting (in burrows) - Elliot trapping around burrows	Generally complies with guidelines. Owing to the large size of the project area and total amount of potentially suitable habitat for these species, the proposed survey will not strictly comply with the survey guidelines with respect to total effort. Notwithstanding active diurnal searches for suitable habitat and burrows, latrine sites etc, spotlighting and Elliott trapping will occur at the 32 trapping sites. Targeted survey techniques will be supplemented by habitat assessments and the precautionary

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
												principal applied to mapping habitat.
<i>Furina dunmalli</i>	Dunmall's Snake	Spring to early autumn (September to March)	D / PW	Cooler part of the day/>25°C	a) Diurnal searches b) Transects c) Spotlighting d) Opportunistic road surveys e) Pitfall/funnel traps	a) 1.5-person hours per hectare c) 1.5-person hours per hectare e) 6 20 L buckets over 30 of drift fencing-funnel traps placed at either end	a) 3 days b) 3 nights e) 2 replicates per habitat type over 4 days	Opportunistic road surveys are most effective following heavy rain and during warm evenings. Transects should be strategically designed/positioned in large habitat patches (>10ha)	Survey guidelines for Australia's threatened reptiles (DEWHA, 2011b) Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DEWHA, 2011c)	The EIS identifies a total of 295.76ha of habitat for this species within the Project footprint.	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches - Spotlighting - Pitfall trapping - Funnel trapping	Generally complies with guidelines. Owing to the large size of the project area and total amount of potentially suitable habitat for these species, the proposed survey will not strictly comply with the survey guidelines with respect to total effort. Notwithstanding active diurnal searches, spotlighting, and pitfall/funnel trapping will occur at the 32 trapping sites. Targeted survey techniques will be supplemented by habitat assessments and the precautionary principal applied to mapping habitat.
<i>Hemiaspis damelii</i>	Grey Snake	Spring/summer months and also targeted during breeding season (January to March)	D / PW	Not specified	a) Passive nocturnal search b) Nocturnal vehicle transect c) Active diurnal search d) Pitfall and funnel trapping	a) 60 min per 100 x 100 m plot, 2 plots per 5 ha b) ~250 km (or all suitable roads surveyed multiple times) c) 60 minutes per plot, 2 plots per 5 ha	a) 2 x 30min search across 2 surveys b) 2 surveys across 2 nights c) 2 x 30min search across 2 surveys	Active searches of 30 minutes (1 person) or 15 minutes (2 people) per survey site within the survey period.	Hemiaspis damelii. Targeted species survey guidelines (DES, 2012)	Whilst no habitat for this species is identified in the EIS, a suspected identification of this species was made during field assessments, and there is record of this species within Kurumbul, within 8km of the Study Area.	The following techniques as per Table 4-7 are suitable for detection of this species: - Diurnal searches - Spotlighting (and nocturnal vehicle searches) - Pitfall trapping - Funnel trapping	Generally complies with guidelines. Owing to the large size of the project area and total amount of potentially suitable habitat for these species, the proposed survey will not strictly comply with the survey guidelines with respect to total effort. Notwithstanding active diurnal searches, spotlighting, and pitfall/funnel trapping will occur at the 32 trapping sites. Targeted survey techniques will be supplemented by habitat assessments and the precautionary principal applied to mapping habitat.

Scientific name	Common name	Season (Month)	^Survey Targeted	Time of day / Temperature	Technique	Intensity	Duration	Notes on Survey Techniques	Source	Comments	Proposed Technique	Justification
<i>Tympanocryptis condaminensis</i>	Condamine (Darling Downs) earless dragon	Late spring to early autumn	D / PW	Diurnal - active during the warmer parts of the day, from mid-morning to late afternoon.	a) Pitfall trapping b) Arthropod traps	a) Six 10 litre buckets spread along a 15 metre drift fence b) grids of 56 (i.e. 7 x 8) traps placed at 10 metre intervals.	a) 20 weeks b) 5 weeks	Little difference in detection rate between pitfall traps and arthropod traps.	Grassland earless dragon (<i>Tympanocryptis pinguicollis</i> ²) in Survey guidelines for Australia's threatened reptiles (DEWHA, 2011)		The following techniques as per Table 4-7 are suitable for detection of this species: ▪ Pitfall trapping ▪ Funnel trapping Post-wet surveys will also incorporate the use of Arthropod traps set in a grid pattern across two areas of suitable habitat.	
FISH												
<i>Maccullochella peelii</i>	Murray Cod	a) March to May (<i>no direct physical disturbance to occur June-Dec</i>) b) As above c) Any time of year d) As above e) As above f) As above g) As above h) Early Sept – early Jan i) As above	N/A	Most active at dawn and dusk, sight-based assessments best during the day	a) Habitat Assessment b) Electrofishing c) Catch & release d) Daytime snorkelling e) Spot lighting at night f) Underwater camera g) Doppler imaging h) Fyke nets i) Larval drift net	NA	NA	NA	Survey guidelines for Australia's threatened fish (DSEWPaC, 2011) Draft Referral Guidelines for the vulnerable Murray cod (<i>Maccullochella peelii</i>), (DoE, 2016.)		Not targeted by these surveys. Aquatic surveys completed for EIS deemed appropriate	Complies with guidelines.
INVERTEBRATES												
<i>Jalmenus eubulus</i>	Pale imperial hairstreak	Not specified	D / PW	Not specified	NA – No species-specific guidelines	NA – No species-specific guidelines	NA – No species-specific guidelines	Only known to breed in old-growth brigalow forest or woodland and does not appear to colonise regrowth habitats following clearing or other major disturbance.	NSW Office of Environment and Heritage (2020)	EIS identifies habitat for this species within the Project footprint.	Active searches / area searches. Habitat searches	Complies with guidelines

²NOTE: D = dry season; PW = post-wet season survey

Table 6-2 Survey effort for threatened flora species known or likely to occur within the impact assessment area

Scientific name	Common name	Month / Season	^Survey Targeted	Notes	Source
<i>Acacia lauta</i>	Tara wattle	Flowers during August-September	D / PW	Sets fruit in December	Queensland Government (2020), Species profile— <i>Acacia lauta</i> s266B EPBC Act 1999, Approved Conservation Advice for <i>Acacia lauta</i>
<i>Arthraxon hispidus</i>	Hairy-joint Grass	Flowering March to July and summer to autumn	PW	<i>A. hispidus</i> was once considered an annual, but is now thought to be a perennial that tends to die down in winter	Conservation advice <i>Arthraxon hispidus</i> (DEWHA, 2008b) Queensland Government (2020), Species profile— <i>Arthraxon hispidus</i>
<i>Bertya opposens</i>		Flowering has been recorded from June to November, January and March and fruits between June, August and November	D / PW	The inflorescences occur as a single flower or umbelliform with 2 or 3 flowers on 2 mm long peduncles.	Queensland Government (2020), Species profile— <i>Bertya opposens</i>
<i>Cadellia pentastylis</i>	Ooline	Flowers mainly from October to December in Queensland (October to November in New South Wales), but occasionally flowering extends through to early April	D / PW	Ooline occurs in a range of vegetation types including semi-evergreen vine thicket, brigalow-belah, poplar box and bendee communities Fruiting records are from November to December	Queensland Government (2020), Species profile— <i>Cadellia pentastylis</i> Pollock, A.B. (1999). <i>Cadellia pentastylis</i> , in Species Management Manual. Department of Natural Resources, Brisbane

² "At the time when the grassland earless dragon (*T. pinguicollis*) was included in the EPBC Act list of threatened species, on 16 July 2000, the species was believed to occur in the Darling Downs in Queensland. This part of the species range is now described as a new species, the Condamine earless dragon (*T. condaminensis*). As provided by section 184(d) of the EPBC Act, the Delegate of the Minister of the Environment amended the EPBC Act list of threatened species by updating the name of *T. pinguicollis* to *T. pinguicollis* and *T. condaminensis*, effective from 5 May 2016" (DAWE, 2020).

Scientific name	Common name	Month / Season	Survey Targeted	Notes	Source
<i>Clematis fawcettii</i>	Clematis	Flowers from October to December.	D	Recorded in Queensland forest SF 151, Lamington National Park, Mount Barney National Park, 4,8,9 Bunya Mountains National Park, Main Range National Park and Mount Dumaesq Conservation Park in Queensland	Queensland Government (2020), Species profile— <i>Cadellia Clematis</i> Wang J (1997). <i>Clematis fawcettii</i> . Botanical Research. Queensland Department of Natural Resources.
<i>Cymbonotus maidenii</i>		Flowers throughout the year, but most commonly is spring.	D / PW	Probably germinates, grows and flowers in response to rain Grows in isolated patches, mainly north of the Darling and Barwon Rivers, and in inland Queensland	Queensland Government (2020), Species profile— <i>Cymbonotus maidenii</i>
<i>Cyperus clarus</i>		Flowers from spring to summer	D / PW	It is Tufted perennial. It is found from near Emerald in central Queensland to near Delungra on the New South Wales north-west slopes.	Queensland Government (2020), Species profile— <i>Cyperus clarus</i>
<i>Dichanthium queenslandicum</i>	King Bluegrass	Flowers have been recorded throughout the year, particularly from March	PW	None specified	Queensland Government (2020), Species profile— <i>Dichanthium queenslandicum</i>
<i>Dichanthium setosum</i>	Bluegrass	Flowers appear mostly during summer	PW	None specified	Listing Advice <i>Dichanthium setosum</i> (TSSC, 2010)
<i>Digitaria porrecta</i>	Finger panic grass	Flowers appear in late summer	PW	None specified	Conservation Advice <i>Digitaria porrecta</i> (finger panic grass) (TSSC, 2013)
<i>Eucalyptus virens</i>	Shiny-leaved ironbark	Flowering has been recorded November - February	D / PW	The inflorescences are axillary and simple, or terminal and compound. The peduncles are slender, growing to 1.4 cm long and bearing 7 white flowers. It has a very limited distribution in southern Queensland and is currently known from 5 locations include near Inglewood, Tara, north-east of Eidsvold and the scarp on approach to the Maranoa River near Mt Moffatt, 10 km East South East of Brovinia, north of Binjour and North West of Injun scattered over a distance of approximately 500 km	Queensland Government (2020), Species profile— <i>Eucalyptus virens</i>
<i>Homopholis belsonii</i>	Belson's Panic	Flowering February – May and possibly November – December as fruiting has been recorded in February.	PW	None specified	Ausgrass (Sharp, D. & Simon (2001); The MacMillan Company of Australia PTY Ltd and World Wildlife Fund (Leigh <i>et al</i> , 1984)
<i>Lepidium monoplacoides</i>	Winged Pepper-cress	August to October	D	None specified	Specifies Profile <i>Lepidium monoplacoides</i> (DEWHA, 2020)
<i>Lepidium peregrinum</i>	Wandering Pepper-cress	Flowers from January to April	PW	Knowledge of the species' lifecycle and ecology is incomplete, and the species may naturally experience boom and bust cycles. Known to occur along watercourses in riparian open forest.	Listing advice <i>Lepidium peregrinum</i> (TSSC, 2003); PlantNET Flora Online Species Profile - <i>Lepidium peregrinum</i>
<i>Leucopogon sp. Coolmunda</i> (D. Halford Q 1635)	Coolmunda leucopogon	Flowering in <i>Leucopogon sp. Coolmunda</i> is known to occur in the latter half of the year between June and January.	D / PW	None specified.	Conservation Advice <i>Leucopogon sp. Coolmunda</i> (DEWHA, 2008a)
<i>Macrozamia machinii</i>		Mature cones have been recorded from September to December. Ripe seeds are present between February and April. Cones may not be annual when conditions are unfavourable	D / PW	It is distinguished by the strongly spirally twisted leaves with dark green leaflets with flat margins and more or less glaucous undersides, and cones that are held above the soil surface.	Queensland Government (2020), Species profile— <i>Macrozamia machinii</i> ; PlantNET Flora Online Species Profile - <i>Macrozamia machinii</i>
<i>Picris barbarorum</i>		Flowering from July to November	D	Erect annual herb 5–60 high, much-branched, with sparse simple to bifid hooked hairs Occurs on riverbanks and floodplains	PlantNET Flora Online Species Profile - <i>Picris barbarorum</i>
<i>Picris evae</i>	Hawkweed	Flowering spring to summer	D / PW	None specified	PlantNET Flora Online Species Profile - <i>Picris evae</i>
<i>Prostanthera sp. Dunmore</i> (D.M. Gordon 8A)		Spring	D	None specified	Conservation Advice <i>Prostanthera sp. Dunmore</i> (DEWHA, 2008c); Stanley, TD & Ross, EM 1986, Flora of south-eastern Queensland, vol. 2, p. 396. Reprinted with updates 2002, Department of Primary Industries, Queensland
<i>Rhaphonticum australe</i>	Austral Cornflower	Flowers between spring and late summer to autumn	D / PW	The dead flowering stems can remain on the plant for several months after the seeds have dispersed.	SPRAT, <i>Rhaphonticum australe</i> - Austral Cornflower (DEWHA, 2020)
<i>Sophora fraseri</i>	Brush sophora	Flowering has been recorded in April and from late August to mid-November	D	Fruiting has been recorded in January, April, July-August and November Most collections are from the Conondale, D'Aguilar and Taylor Ranges, and the Great Dividing Range south of Toowoomba in southeast Queensland	Queensland Government (2020), Species profile— <i>Sophora fraseri</i>
<i>Thesium australe</i>	Toadflax	Flowers from October through to April	D / PW	It is a short-lived erect herb with wiry stems up to 40 cm high. It is parasitic on the roots of other plants, particularly kangaroo Grass (<i>Themeda australis</i>).	Queensland Government (2020), Species profile— <i>Thesium australe</i>
<i>Tylophora linearis</i>		Flowers in spring, with flowers recorded in November or May with fruiting probably 2 to 3 months later	D	Vegetatively this species is difficult to distinguish from <i>Rhyncharrhena linearis</i> and <i>Marsdenia viridiflora</i> .	Office of Environment and Heritage (2020) <i>Tylophora linearis</i> – profile PlantNET Flora Online Species Profile - <i>Tylophora linearis</i>
<i>Westringia parvifolia</i>		Flowers in November and February	D / PW	Has been confused with <i>Westringia cheelli</i> , but has smaller elliptic-obovate leaves (to 2 mm long and to 1 mm wide)	PlantNET Flora Online Species Profile - <i>Westringia parvifolia</i>
<i>Xerothamnella herbacea</i>		Flowers January, February, April, July, September and October. Fruits in April and October	D / PW	None specified	State Herbarium of South Australia (Barker, R.M, 1986)

^NOTE: D = dry season; PW = post-wet season survey

APPENDIX

C

STAGE 1 SURVEY SITE
CATEGORISATION

Priority 2 site categories

Item	Test Site ID	Grassland TEC	Pre-Clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
1	310-03-TP3053	Absent	11.5.1/11.5.4/11.7.4	No	Absent	Present	Yes	P2 (c)	No
2	310-03-GM3001	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
3	310-03-BH3307	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
4	310-03-TP3500	Absent	11.3.2/11.3.4	No	PBGWAP	Present	Yes	P2 (b)	Yes
5	310-03-BH3602	Absent	11.3.2/11.3.4	No	PBGWAP	Present	Yes	P2 (b)	Yes
6	310-03-GM3002	Absent	11.3.2/11.3.4	No	PBGWAP	Present	Yes	P2 (b)	Yes
7	310-03-BH3308	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	Yes
8	310-03-GM3003	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
9	310-03-TP3501	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
10	310-03-BH3603	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
11	310-03-BH3309	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
12	310-03-TP3054	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Present	Yes	P2 (c)	No
13	310-03-GM3004	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (a)	Yes
14	310-03-BH3604	Absent	11.3.2/11.3.4/11.3.25	Yes	PBGWAP	Absent	No	N/A	Yes
15	310-03-TP3056	Absent	11.5.4/11.5.1/11.7.7	No	Absent	Absent	No	N/A	Yes
16	310-03-BH3004	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (a)	Yes
17	310-03-CP3202	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (a)	Yes
18	310-03-BH3005	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (a)	Yes
19	310-03-CP3002	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Absent	Yes	P2 (a)	Yes
20	310-03-BH3006	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Absent	Yes	P2 (a)	Yes
21	310-03-TP3057	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Absent	No	N/A	Yes
22	310-03-TP3058	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes
23	310-03-TP3059	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes
24	310-03-TP3060	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes
25	310-03-TP3061	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes

Item	Test Site ID	Grassland TEC	Pre-Clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
26	310-03-TP3062	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes
27	310-03-TP3063	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	Yes
28	310-03-TP3084	Absent	11.5.4/11.3.18/11.9.5	No	PBGWAP	Present	Yes	P2 (b)	Yes
29	310-03-GM3005	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
30	310-03-TP3085	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
31	310-03-TP3086	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
32	310-03-BH3009	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
33	310-03-CP3004	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
34	310-03-GM3008	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
35	310-03-CP3203	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
36	310-03-BH3010	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
37	310-03-TP3087	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
38	310-03-TP3710	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
39	310-03-TP3714	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
40	310-03-TP3711	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
41	310-03-TP3713	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	Yes
42	310-03-TP3712	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
43	310-03-TP3088	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
44	310-03-TP3131	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
45	310-03-CP3014	Absent	11.3.2/11.3.25	No	PBGWAP	Absent	No	N/A	Yes
46	310-03-BH3023	Absent	11.3.2/11.3.25	No	PBGWAP	Absent	No	N/A	Yes
47	310-03-CP3210	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
48	310-03-BH3025	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
49	310-03-CP3015	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
50	310-03-BH3605	Absent	11.3.2/11.3.25	Yes	PBGWAP	Present	Yes	P2 (b)	Yes
51	310-03-CP3212	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P1 (duplicate)	Yes

Item	Test Site ID	Grassland TEC	Pre-Clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
52	310-03-CP3016	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
53	310-03-BH3026	Absent	11.3.2/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	Yes
54	310-03-CP3213	Absent	11.8.5	No	Absent	Present	Yes	P1 (duplicate)	Yes
55	310-03-BH3027	Absent	11.8.5	No	Absent	Present	Yes	P1 (duplicate)	Yes
56	310-03-CP3214	Absent	11.8.5	No	Absent	Present	Yes	P1 (duplicate)	Yes
57	310-03-BH3028	Absent	11.8.5	No	Absent	Present	Yes	P1 (duplicate)	Yes
58	310-03-CP3017	Absent	11.8.5	No	Absent	Present	Yes	P1 (duplicate)	Yes
59	310-03-BH3320	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
60	310-03-TP3338	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
61	310-03-BH3321	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
62	310-03-BH3322	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
63	310-03-BH3323	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
64	310-03-TP3340	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
65	310-03-BH3324	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
66	310-03-BH3325	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
67	310-03-TP3342	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
68	310-03-TP3343	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
69	310-03-BH3326	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
70	310-03-TP3344	Absent	11.8.5	Yes	Absent	Present	Yes	P2 (c)	Yes
71	310-03-TP3147	Absent (Adjoining RE)	11.8.5 (11.3.21 on the cusp)	No	Absent	Absent	No, however recommended.	P2 (c)	No
72	310-03-BH3063	Absent	11.8.5	Yes	Absent	Absent	No	N/A	No
73	310-03-BH3064	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes

Item	Test Site ID	Grassland TEC	Pre-Clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
74	310-03-BH3337	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
75	310-03-TP3158	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
76	310-03-BH3342	Absent	11.8.5	No	Absent	Absent	No	P1 (duplicate)	Yes
77	310-03-BH3343	Absent	11.8.5	No	Absent	Absent	No	P1 (duplicate)	Yes
78	310-03-BH3348	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
79	310-03-BH3349	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
80	310-03-BH3350	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
81	310-03-BH3351	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
82	310-03-TP3179	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
83	310-03-TP3180	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
84	310-03-TP3181	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
85	310-03-BH3352	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
86	310-03-BH3353	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
87	310-03-TP3182	Absent	11.8.5	No	Absent	Absent	No	N/A	Yes
88	310-03-TP3183	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
89	310-03-BH3354	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
90	310-03-TP3184	Absent	11.8.5	Yes	Absent	Absent	No	N/A	Yes
91	310-03-BH3355	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
92	310-03-TP3185	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	Yes
93	310-03-TP3186	Absent	11.8.11	No	Absent	Absent	No	N/A	Yes
94	310-03-BH3606	Present	11.3.21/11.3.24	No	-	Absent	No	N/A	Yes
95	310-03-TP3187	Present	11.3.21/11.3.24	No	-	Absent	No	N/A	Yes
96	310-03-BH3607	Present	11.3.21/11.3.24	No	-	Absent	No	N/A	Yes
97	310-03-BH3071	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
98	310-03-BH3608	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes

Item	Test Site ID	Grassland TEC	Pre-Clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
99	310-03-TP3188	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes
100	310-03-TP3189	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes
101	310-03-BH3072	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes
102	310-03-TP3190	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
103	310-03-BH3073	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
104	310-03-BH3074	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
105	310-03-TP3191	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
106	310-03-BH3075	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
107	310-03-BH3076	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
108	310-03-TP3192	Present	11.3.21/11.3.24	No	-	Absent	Yes	P2 (a)	Yes
109	310-03-BH3609	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
110	310-03-TP3193	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes
111	310-03-BH3077	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
112	310-03-TP3194	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
113	310-03-BH3078	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
114	310-03-TP3195	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
115	310-03-BH3079	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
116	310-03-TP3196	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
117	310-03-BH3080	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
118	310-03-TP3197	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
119	310-03-TP3198	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
120	310-03-BH3610	Present	11.3.21/11.3.24	Yes	-	Absent	No	N/A	Yes
121	310-03-BH3081	Absent	11.8.11	Yes	Absent	Absent	No	N/A	Yes

Note: PBGWAP = Poplar Box Grassy Woodland on Alluvial Plains, BGL = Brigalow (Acacia harpophylla dominant and co-dominant) ecological community

Access tracks clearing proposed site categories

Item	Test Site ID	Grassland TEC	Pre-clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
3224	AT-310-03-TP3501	Absent	11.5.4/11.5.1/11.7.7, 11.3.2/11.3.4	No	Absent	Present	Yes	P2 (c)	ARTC to Request Access
3227	AT-310-03-CP3202	Absent	11.5.4/11.5.1/11.7.7, 11.3.2/11.3.4/11.3.25	No	Absent	Present	Yes	P2 (c)	LAA Received
3234	AT-310-03-TP3061	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	LAA Received
3235	AT-310-03-TP3062	Absent	11.3.2/11.3.4/11.9.7	No	PBGWAP	Present	Yes	P2 (b)	LAA Received
5242	AT-310-03-TP3713	Absent	11.3.2/11.3.4/11.3.25, 11.5.20/11.9.5	No	PBGWAP	Present	Yes	P2 (b)	LAA Received
5243	AT-310-03-TP3712	Absent	11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	LAA Received
5640	AT-310-03-BH3010	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	LAA Received
5641	AT-310-03-BH3710	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	LAA Received
5643	AT-310-03-TP3501	Absent	11.5.20/11.9.5, 11.3.2/11.3.4/11.3.25	No	PBGWAP	Present	Yes	P2 (b)	LAA Received
5644	AT-310-03-TP3085	Absent	11.5.20/11.9.5	No	BGL	Present	Yes	P2 (b)	LAA Received
7282	AT-310-03-BH3064	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	LAA Received
7654	AT-310-03-BH3324	Absent	11.8.5	No	Absent	Present	Yes	P2 (c)	LAA Received
7689	AT-310-03-BH3066	Absent	11.8.5	Yes	Absent	Absent	No	N/A	See Land Access Table
7691	AT-310-03-BH3158	Absent	11.8.5	No	Absent	Absent	No	N/A	LAA Received
8895	AT-310-03-TP3310	Present	11.3.21	No	-	Present	Yes	P2 (a)	ARTC to Request Access

Item	Test Site ID	Grassland TEC	Pre-clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
8905	AT-310-03-BH3073	Present	11.3.21	No	-	Absent	Yes	P2 (a)	See Land Access table
8919	AT-310-03-BH3614	Present	11.8.11, 11.3.21/11.3.24	Yes	-	Absent	No	N/A	ARTC to Request Access
8920	AT-310-03-TP3213	Present	11.8.11, 11.3.21/11.3.24	Yes	-	Absent	No	N/A	ARTC to Request Access
9713	AT-310-03-TP3196	Present	11.3.21/11.3.24, 11.8.11	Yes	-	Absent	No	N/A	LAA Received
Note: PBGWAP = Poplar Box Grassy Woodland on Alluvial Plains, BGL = Brigalow (Acacia harpophylla dominant and co-dominant) ecological community									

Table 6-3 Access tracks clearing confirmed site categories

Item	Test Site ID	Grassland TEC	Pre-clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
4026	AT-310-03-TP3126	Absent	11.9.5/11.9.7/11.3.25	No	Absent	Present	Yes	P2 (c)	Open Access – road
4432	AT-310-03-BH3084	Absent	11.8.5	No	Absent	Absent	No	P2 (c)	Open Access – road
4842	AT-310-03-TP3209	Absent	11.8.5	Yes	Absent	Absent	No	P2 (c)	Open Access – road
7685	AT-310-03-TP3146	Absent	11.8.5	Yes	Absent	Absent	No	P2 (c)	Open Access – road
8084	AT-310-03-BH3037	Present	11.3.21 / 11.3.25/11.3.4/11.3.27b	No	-	Absent	No	P2 (a)	QR access
8086	AT-310-03-CP3024	Present	11.3.21	No	-	Absent	No	P2 (a)	QR access
8911	AT-310-03-CP3024	Absent	11.5.4/11.5.20/11.5.1	Yes	Absent	Present	Yes	P2 (c)	Open Access – road
8913	AT-310-03-TP3072	Absent	11.5.4/11.5.20/11.5.1	Yes	Absent	Present	Yes	P2 (c)	Open Access – road

Item	Test Site ID	Grassland TEC	Pre-clear RE	Evidence of cultivation	Any TEC	Woody Vegetation	Survey required	Site category	Land access
8914	AT-310-03-TP3071	Absent	11.5.4/11.5.20/11.5.1	Yes	Absent	Present	Yes	P2 (c)	Open Access – road
9727	AT-310-03-TP3073	Absent	11.5.4/11.5.20/11.5.1	Yes	Absent	Present	Yes	P2 (c)	Open Access – road

APPENDIX

D

SUITABLY QUALIFIED PERSON CVS



David Francis

Current Position

National Technical Director
Environmental Sciences &
Senior Principal Ecologist
Environmental Scientist

Profession

Ecology

Years' Experience

26

Joined Cardno

June 2000

Education

BSc(Hons), 1992, UQ

Professional Registrations

CEnvP

Affiliations

EIANZ

QELA

Australian Network for Plant
Conservation (ANPC)

Summary of Experience

David is an environmental scientist with over 26 years' experience in flora and fauna studies, vegetation mapping, ecological assessments, revegetation plans and environmental planning. He has an excellent botanical knowledge having undertaken studies in a geographical area spanning the Wet Tropics through to Victoria, and abroad in PNG. David has had considerable experience in Regional Ecosystem and wetland mapping and conservation significance assessments. He is an expert in nature conservation mapping systems and planning at a local and regional scale. His expertise also includes wildlife corridor planning, with particular knowledge of barrier mitigation measures for linear infrastructure such as roads. David's knowledge of Commonwealth, State and Local Government ecological statutory requirements enables him to provide sound planning advice.

David is actively involved in the environmental industry. This has included participation in DERM's Expert Panel for the SEQ Biodiversity and Planning Assessment and co-convening the EIANZ's 'Breaking the Barriers: Infrastructure Solutions to Ecological Problems' and organising participating in the organising of the Australasian Network for Ecology and Transportation (ANET) 2015 and 2018 conferences.

Professional expertise include:

- > Flora and fauna studies
- > Road Ecology
- > Ecological Restoration / Revegetation planning
- > EPBC Act threatened species and ecological community mapping
- > Vegetation mapping
- > Conservation Significance Mapping

Skills in:

- > Community Engagement
- > Project Management
- > GIS
- > Botany (Flora Studies/Vegetation Mapping)
- > Conservation Significance Mapping
- > Road Ecology
- > Ecological Restoration (Rehabilitation)

Significant Projects

State / Regional Planning

- > Independent review of the 15 Self-Assessable Codes (SACs) under the provisions of the Vegetation Management Act 1999 (2015)
- > SEQ Restoration Guidelines (2009-12)
- > SEQ National Reserve System Network Plan and Management Plan (2009)
- > Facilitation SEQ local government workshop on offsets

Flora Assessments

- > Iluka Resources, Baseline ecological assessments including Habitat Hectares assessment (>5,000ha) (2018)
- > Queensland Rail Eubenangee Swamp protected flora survey (2017)
- > Williamtown RAAF Base flora and fauna assessment, NSW (2016)
- > Saltash Air Weapons Range Vegetation Survey Report and Management Plan, NSW (2016)
- > Barry Beach Marine terminal vegetation assessment, Victoria (2016)
- > Kemmis SA4s2 Expansion - Flora & Habitat Survey (2013)
- > Pre-clearing surveys and other flora assessments for Saipem's GLNG pipeline between Roma and Gladstone (including searches for NCA and EPBC Act scheduled species and declared pests) (2012-13)
- > Bahrs Scrub Structure Plan for Logan City Council (included mapping of NCA and EPBC Act scheduled species and REs) (2010)
- > Sheraton Port Douglas - Flora assessments (2014)

Road Ecology

- > Deagon Wetlands macropod study (2017)
- > Green Camp Road upgrade fauna crossing advice (2016 and 2017)
- > Assisted in the development of the RMS Wildlife Connectivity Guidelines (2015) including workshops with RMS stakeholders
- > Wyaralong Dam Fauna Crossing Monitoring Plan (2010)
- > Flinders to Greenbank - Karawatha Corridor for the Queensland Department of Transport & Main Roads (preparation of mapping of fauna crossing locations along with crossing structure recommendations) (2010).
- > Ella Bay Access Road (design of fauna crossing structures) (2009)
- > Wongaling Corridors Fauna Crossings (conceptual design of crossing structures, largely targeted cassowary, in Mission Beach) (2008)
- > Conceptual Design of the Reedy Creek Fauna Crossings for Gold Coast City Council (2006)
- > Ecological Corridors and Edge Effects Project (literature review of world's best practice in fauna crossing structures. Preparation of a conceptual design for crossing structures within the Brisbane City Council component of the Greenbank Karawatha corridor) (2003)
- > Co-convener of the EIANZ 2009 'Breaking the Barriers Symposium' - The event attracted a national audience of over 200 participants, 2 international keynote presentations and speakers from throughout Australia to discuss best practice in wildlife management around linear infrastructure

Commonwealth Assessments/Environmental Impact Assessments

- > Lindeman Island EIS biosecurity chapters and native vegetation advice (2017)
- > Curtis Island EPBC Act Preliminary Documentation migratory bird chapters (2017)
- > Springview Estate EPBC Referral (2014)
- > Gold Coast Quarry EIS flora and fauna studies (including mapping of EPBC Act & NCA threatened flora, REs & impact assessments) (2012-13)
- > Great Keppel Island EIS flora and fauna studies (including mapping of EPBC Act threatened communities, REs & impact assessments) (2010-12)
- > Nathan Dam & Pipeline Project Flora Studies EIS (including mapping of EPBC Act threatened ecological communities e.g. mound springs, brigalow, native grasslands & vine thicket; NCA & EPBC Act listed species; & REs) (2008-12)
- > Clermont Coal EIS, riparian vegetation studies (2004)
- > Coordinated flora and fauna studies for the Dent Island Golf Course EIS (2001)

Conservation Significance Mapping and Reporting

- > Gold Coast Environmental Features mapping (2018)
- > Gold Coast RLEP and RRLEP mapping (2017)
- > Logan City expert panel facilitation for conservation significance mapping (2015)
- > Townsville City Environment and Biodiversity Study (2010)
- > Moreton Bay Regional Council Habitat and Biodiversity Study (2010)
- > Amberley Air Base Natural Heritage Assessment for the Department of Defence (2010-2012)
- > Mission Beach Biodiversity Significance Report (2007)
- > Common Nature Conservation Classification System Mapping for Caloundra City Council (2005), Beaudesert Shire Council (2003), Gold Coast City Council (2003) and Caboolture Shire Council (2007)
- > Redcliffe City Vegetation Mapping and Biodiversity Planning Study (2001)
- > Mirani and Nebo Habitat and Biodiversity Planning Study (2002)

Broad Scale Regional Ecosystem / Vegetation Mapping / Ecological Inventories

- > Gold Coast city-wide regrowth mapping for Council (2012 & 2018)
- > Regional Ecosystem mapping for the Mt Lindesay area for Logan City Council (2006)
- > Beaudesert Shire Council Vegetation Mapping (2007)
- > Tamborine Mountain Flora and Fauna Report – Project management, mapping of remnant vegetation, regional ecosystems, threat analysis and prescription of mitigative measures (2000)
- > Gold Coast City Council's Springbrook Conservation estate vegetation assessment (2005)

Environmental Planning

- > Rockhampton Regional Council Natural Environment Study (2019)
- > City of Gold Coast Environmental Covenant Study (2018)
- > Waterway Corridor mapping review project for Logan City Council (2015)
- > Brisbane City Council and Redland City Council Pest Management Plans (2011 & 2010)
- > Townsville City Environment and Biodiversity Study (2010). The study included numerous recommendations to protect ecological features such as shorebird roosts, cassowary habitat and threatened ecosystems
- > Western Downs Regional Council Environment and Biodiversity Study (2011)

- > Ecological planning studies for Beaudesert Shire's Whole of Shire Planning Project (2000)
- > Greater Flagstone (2008), Bromelton (2007) and Beaudesert (2005-06) Town outline structure plans
- > Richmond Valley Shire Council (NSW) Corridor and Wetland mapping (2007)
- > Maryborough – various ecological assessments for Council (2007)
- > Revision of the 'fire and biodiversity' section of the Gold Coast City Council Bushfire Strategy (2005)
- > Springbrook – Burleigh head corridor studies (including fauna crossing design in the Reedy Creek area) (2005)
- > Currumbin Sanctuary Environmental Constraints Study (2003)
- > Coomera Town Centre Environmental Management Strategy for Gold Coast City Council (2001)
- > Avatars Abode Vegetation mapping, Flora Assessment and Weed Management Strategy (2002)

Fauna Assessments

- > Mt Coot tha zip line fauna assessments and ecological studies (2017 - 2018)
- > Sgt Dan Stiller Reserve and Glider Reserve fauna and flora studies for Brisbane City Council (2017)
- > Canungra Field Training Area fauna monitoring (2015)
- > Brisbane Airport Corporation New Parallel Runway Wildlife Hazard Assessment Report (2015)
- > Tallowood Cemetery fauna assessment (2014)
- > Gold Coast Quarry fauna assessment (2012)
- > Maddison Estate fauna assessment (2009)
- > Koala Habitat mapping and conversation strategy for the Tinana area for Maryborough Shire Council (2005)

Rehabilitation Plans

- > Wivenhoe Dam rehabilitation planning for a 3,200ha study area (2015)
- > QCLNG Export Pipeline - Narrows Crossing mainland section rehabilitation plan (2011)
- > 'Viridian' Noosa rehabilitation plan (winner of the AILA 2008 National Awards for Landscape Architecture in the Conservation Division) (2004-08)
- > Rocklea Markets rehabilitation plan (including wetland design) (2008)
- > Redland Business Park (2006)
- > Burnett River Dam flora and fauna conservation strategy (2003)
- > Waterway Action and Rehabilitation Program (WASP) sites for Logan City Council (2005)

Environmental Offsets

- > Investigation of potential offset receive sites for impacts on koala habitat under the EPBC Act on behalf of Lockyer Regional Council (2015)
- > Assessment of receive sites under the Nature Conservation Act 1992 for impacts arising from an industrial development on behalf of Moreton Bay Regional Council (2015)
- > Identification of suitable Cassowary Habitat offsets under the EPBC Act in Mission Beach (2007)
- > Vegetation Management Act Offsets in Ormeau for Boral (2006)
- > Koala Plan net benefit 'offset' in Narangba for Boral (2006)
- > Identification of suitable Fisheries Offset under the Fisheries Act for Mackay Council (2002) and in Airlie Beach for Resort Corp (2005)

Expert Witness

Queensland Land Court

- > Byerwen Coal Pty Ltd v Colinta Holdings Pty Ltd (Land Court File Nos MRA 117-16, MRA 118-16 and MRA 119-16)
- > BHP Billiton Mitsui Coal Pty Ltd v Baulch & Anor and Chief Executive, Department of Environment and Heritage Protection [2014] QLC 43
- > Northeast Business Park Pty Ltd v Chief Executive, Dept. of Transport and Main Roads (AQL368/09)
- > Victor Leslie and Christine Angela Cumner v Chief Executive, Dept. of Transport and Main Roads (AQL308/09)
- > Alfred John Nucifora (as personal representative under the Will of Angelo John Nucifora) v Brisbane City Council (AQL1030-10)
- > Toan Van Pham & Others v Brisbane City Council (AQL455-10)
- > Cubdale Pty Ltd and Michelle Huang v Brisbane City Council (AQL433-13)

Planning and Environment Court

- > Stay Developments Pty Ltd v Brisbane City Council (No 3692 of 2019)
- > Cleanaway Solid Waste Pty Ltd v Ipswich City Council (No 4101 of 2019)
- > John Stuart Hofmann and Kathleen Mary Hofmann v Noosa Shire Council (No 3188 of 2017)
- > O'Hagan v Brisbane City Council (No 162 of 2017)
- > Boral Resources (QLD) Pty Ltd v Gold Coast City Council and Stop The Gold Coast Quarry Association Inc. (No 3084 of 2014)
- > Drywound Pty Ltd v Lockyer Valley Regional Council and others (No 2652 of 2015)
- > Tamborine Mountain Progress Association Inc. v Scenic Rim Regional Council (No 3796 of 2015)
- > Andrew Tanner v Moreton Bay Regional Council & others (No 2987 of 2010)

International

- > USAID Biodiversity workshop, Papua New Guinea (2019)
- > Predator Free Wellington, Miramar Peninsula fencing review, New Zealand (2019)
- > Brown-Naoro River Hydro, Papua New Guinea (included 4 weeks of intensive flora and fauna surveys) (2018-2019)
- > Biodiversity Risk Assessment Oil Search Limited Licence Areas & Residual Impact Assessment Strategy, Papua New Guinea (2017)
- > Highlands Highway (Asaro to Miunde), Papua New Guinea (2013)
- > Mendi Airport, Papua New Guinea (2015)
- > Taurama Barracks, Papua New Guinea (2015)
- > Brown-Naoro River, Papua New Guinea (included 2 weeks of intensive flora and fauna surveys in a 9,600ha area of remote rainforest) (2014)

Greening Australia, 1995 - 2000

Key Project Experience

- > Technical advice to Department of Main Roads on vegetation management, including trials, landscape design and species selection.
- > Community consultation and involvement in community based planting activities adjacent to road corridors. Involved over 2,000 volunteers in community based tree planting activities.

- > Initiation and organisation of "Transport Corridor Management Conference" (Brisbane, November 1999) with national and international speakers and a nation-wide audience of 265 people involved in the management of roadside vegetation.
- > Prepared preferred species manuals for the Department
- > Main Roads Metropolitan and Gympie Districts. Included maps of both districts based on broad vegetation categories and lists of commercially available native species suitable for roadways that were endemic to the broad categories

Publications/Papers and Posters

- > Mitigation hierarchy, EIANZ National Biodiversity Offsets Conference, 2019, Canberra
- > When is vegetation clearing truly necessary for the greater good? QELA 2019 Conference, Twin Waters
- > Are Offsets in Australia Fit Enough to Survive? International Association of Impact Assessment 2019, Brisbane
- > Driving vegetation management along transport corridors. 2018 Australasian Network for Ecology and Transportation Conference, Creswick
- > Will botanists be functionally extinct by 2050? EIANZ 2016 Conference, Brisbane.
- > Are 'pay and go' offsets under the Vegetation Management Act 1999 passé? QELA 2015, Gold Coast
- > The Australian legislative framework – Is it effectively addressing the impacts of linear infrastructure on wildlife? - 2014 Australasian Network for Ecology and Transportation Conference, Coffs Harbour
- > Understanding Resilience: an important principle of the SEQ Ecological Restoration Framework- The Hut 2013 Forum, Brisbane
- > Russell, M., Leiper, G., White, D. Francis, D., Hauser, J., McDonald, B. & Sims, S. (2013). Tamborine Mountain Flora and Fauna
- > The effectiveness of the Queensland statutory framework in mitigating road impacts on wildlife - The case example of the Flinders-Greenbank-Karawatha bioregional corridor. Infra Eco Network Europe (IENE) Conference, Potsdam, Germany, 2012
- > Planning corridors in an urbanising landscape - The Hut 2012 Forum, Brisbane
- > Breaking the Barriers: where have we come from and where are we going in the field of road ecology - EIANZ 2011 Conference, Sunshine Coast
- > Planning roads to protect Australia's Southern Cassowary (*Casuarius casuarius johnsonii*) - International Conference of Ecology and Transportation (ICOET), Seattle, USA, 2011
- > Fauna and Roads: What's the latest word on the street? - EIANZ 2010 Conference, Wellington, NZ
- > Wongaling Corridors Crossing Study. A case example in developing crossing options in a priority biodiversity area - Breaking the Barriers Symposium
- > Planting for Restoration - Gold Coast Bush Regeneration Fair, 2008
- > Sources and Resources - Australian Network for Plant Conservation Rehabilitation Workshops - Gatton and Mt Coot-tha, 2004
- > Use of Native Grasses for maintenance reduction in Road Verges - Shades of Green Conference PLA, 2003
- > Managing Flora and Fauna in Roadways - Northern Grassy Landscape Conference, 2000
- > Freeway Greening Project: a case example of vegetation management in transport corridors - Transport Corridor Management Conference, 1999
- > Greening Australia Activities Metropolitan District of Main Roads - Department of Main Roads South East Region Symposium, 1999
- > Roadways and Native Vegetation - Department of Main Roads Southern Region Symposium, 1998

- > Freeway Greening as a model for community involvement in tree planting - Managing and Growing Trees Conference, 1996

Awards and Offices

- > Co-convenor of the 2019 EIANZ National Biodiversity Offsets Conference, Canberra
- > Brisbane City Regional Ecosystem Benchmark Expert Workshop, Queensland Herbarium, 2017
- > Koala Expert Elicitation process panel member for EHP, 2017
- > Organising committee member for the 2014 and 2018 Australasian Network for Ecology and Transportation Conference
- > 2013 UDIA Enviro Development Technical Standards Taskforce: Ecosystems member
- > Co-convenor of the 2009 EIANZ Breaking the Barriers: Engineering Solutions to Ecological Problems Symposium
- > Expert Panel for DES's SEQ Biodiversity Planning Assessment in 2006 and 2016
- > Judge for the Ipswich City Environment Awards for Excellence 2006 - 2010
- > NRM's Vegetation Incentives Program southern region assessment panel member
- > Biodiversity Working Group for the 2003 Queensland State of the Environment Report
- > Member of the Greening Australia Queensland (Inc.) Board 2001-03
- > Finalist for the 1998 Young Australian of the Year Award for Outstanding Achievement in the Environment
- > Highly Commended Certificate at the Australasia Pacific Extension Network Awards for Excellence in Extension, 1999
- > Winner of the 1998 Queensland Arbor Day Awards in the Corporate Tree Planter Category, for the Freeway Greening Project (jointly with Department of Main Roads)
- > Golden Key National Honour Society, Griffith University Chapter 1999

Professional Development

- > Vegetation Quality Assessment (Victoria) competent assessor, 2017
- > Australasian Network for Ecology and Transportation Conference, Coffs Harbour, 2014
- > Infra Eco Network Europe (IENE) Conference, Potsdam, Germany, 2012.
- > International Conference of Ecology and Transportation (ICOET), Duluth, Minnesota, 2009 and Seattle, 2011
- > Identifying Regional Ecosystem Training Course (NRM, 2003)
- > Train the trainer (AIMS 1994)
- > Bush Tucker and Craft (Ithaca TAFE Adult Education 1994)
- > Community Extension, Gatton College 1995 Short Course
- > Botanical Illustration, Margaret Saul School of Botanical Illustration



David Wassman

Current Position

Principal Ecologist

Profession

Ecologist

Years' Experience

13

Joined Cardno

July 2010

Education

BSc (Environmental Management)

Affiliations

Certified Environmental Practitioner (CEnvP Registration 1174)

MEIANZ

Infrastructure Sustainability Council of Australia (IS Accredited Professional)

Summary of Experience

David Wassman is a CEnvP and ISAP and has been with Cardno since mid 2010. He has approximately 13 years experience in the environmental field working in both private and State Government sectors.

David qualifies as a suitably qualified person in accordance with Table 1 of the Protected Plants Flora Survey Guidelines - December 2016.

Attached to this CV are the following documents which support this SQP qualification:

- David's qualifications from the University of the Sunshine Coast (50 points).
- David's completion certificate for the Queensland Herbarium's RE Training (5 points).
- David's pre-existing Commonwealth Government Accreditation for flora surveys under the EPBC Act (30 Points).

In addition to the above evidence, below is a list of flora surveys recently led and/or co-ordinated by David.

Some relevant Protected Plants and Threatened flora projects that have benefited from David's experience include:

- > Maroochydore City Centre - Protected Plants Flora Survey.
- > Carnarvon Drive Upgrades, Beerwah - Protected Plants Flora Survey and Threatened Fauna Species Assessment.
- > Buderim Gardens Retirement Village - Protected Plants Flora Survey and Terrestrial fauna habitat assessments.
- > Pelican Waters Southern Lakes - Protected Plants Flora Survey (Phase 1 and Phase 2).
- > Ripley Valley PDA - Melaleuca irbyana surveys.
- > Telegraph Road Landfill Remediation - Protected Plants Flora Survey.
- > Simpson's Falls, Brisbane - Protected Plants Flora Survey.
- > Kewarra Beach Marina, Cairns - Targeted surveys for Myrmecodia beccarii.
- > Kewarra Beach Subdivision, Cairns - Targeted surveys for Myrmecodia beccarii and the Spectacled flying fox.
- > Tiger Brennan Drive Duplication, Darwin - Targeted surveys for Cycas armstrongii.
- > Burnett Highway Upgrades - Targeted surveys for Cadellia pentastylis and Acacia wardellii.
- > Gladstone Offshore Storage Dam - Targeted surveys for Cupaniopsis shirleyana and threatened fauna assessments.
- > Cairns Airport Business Park expansion - Targeted surveys for Myrmecodia beccarii.

Professional History

July 2010 to Current

Senior Ecologist - Cardno (Qld) Pty Ltd

David's position as an Environmental Scientist involves:

- > provision of environmental advice with respect to environmental constraints and approvals;
- > preparation of applications and supporting technical documentation for Commonwealth, State and Local government approvals;
- > undertaking environmental assessments (including fauna and flora surveys);
- > client liaison;
- > preparation of reports (including management plans and written advice);
- > co-ordination of tasks with other industry professionals; and
- > preparation of job proposals and detailed work cost estimates.

July 2008 to July 2010

Ecologist - Australian Wetlands

David's position as an ecologist involved:

- > Water quality monitoring and macroinvertebrate sampling.
- > Undertaking ecological assessments (including flora and fauna surveys).
- > Preparation of reports both scientific and management plan orientated.
- > Client liaison.
- > Preparation of fee proposals and cost estimates.

Sept 2006 to July 2008

Project Officer, Water Services - Department of Natural Resources and Water

David's role as Project Officer primarily involved service delivery and resource audits. This involved:

- > Providing advice to a variety of clients with respect to requirements under legislation. Particularly the Water Act 2000.
- > Undertaking catchment audits of the Lockyer and Mary Catchments to better determine resource demand and usage.
- > Creation of reporting and mapping products resulting from field work.

APPENDIX

E

STAGE 1 SURVEY LAND ACCESS
REQUIREMENTS

Land Access for Priority 1 Geotechnical Sites (including 100 m buffer area)

Site number	Test Site ID	Lot Plan	Protected Plant	Access
1	310-03-BH3300	2MH461	Yes	LAA Received
2	310-03-BH3301	2MH461	Yes	LAA Received
		58SP169187	Yes	LAA Received
3	310-03-TP3098	1RP100482	Proximate protected plant record	ARTC to request access
		27MH367	Proximate protected plant record	ARTC to request access
		37MH523	Proximate protected plant record	ARTC to request access
		168MH367	Proximate protected plant record	ARTC to request access
		RD01RP145435	Proximate protected plant record	Open access - road
		RD02MH367	Proximate protected plant record	Open access - road
		RD02MH367	Proximate protected plant record	Open access - road
4	310-03-CP3212	2SP260880	Yes	LAA Received
5	310-03-CP3213	2SP260880	Yes	LAA Received
	310-03-BH3027	140DER34129	Yes	LAA Received
	310-03-CP3214	3761DER34129	Yes	LAA Received
	310-03-BH3028 310-03-CP3017	3761DER34129	Yes	LAA Received
6	310-03-TP3137	3683DER34116	Yes	ARTC to request access
		1RP124356	Yes	ARTC to request access
		RD01RP124356	Yes	Open access - road
7	310-03-CP3020 310-03-CP3019	2RP99467	Proximate protected plant record	ARTC to request access
		3RP37102	Proximate protected plant record	ARTC to request access
		5RP16058	Proximate protected plant record	ARTC to request access
		1RP99467	Proximate protected plant record	ARTC to request access
		2RP61876	Proximate protected plant record	ARTC to request access
		WR04DER3493	Proximate protected plant record	Open access – river parcel
		132SP113908	Proximate protected plant record	QR Access required
		4RP16058	Proximate protected plant record	QR Access required
		201SP124721	Proximate protected plant record	QR Access required

Site number	Test Site ID	Lot Plan	Protected Plant	Access
		RD01DER3493	Proximate protected plant record	Open access - road
		RD01RP99465	Proximate protected plant record	Open access - road
8	310-03-TP3312	RD2RP14239A	Proximate protected plant record	LAA Received
		RD01AG1828	Proximate protected plant record	Open access - road
		1RP92662	Proximate protected plant record	LAA Received
		2RP14250	Proximate protected plant record	QR Access required
		91SP104978	Proximate protected plant record	QR Access required
		92SP104978	Proximate protected plant record	QR Access required
		2RP14241	Proximate protected plant record	QR Access required
9	310-03-TP3346	3546A341819	Yes	ARTC to request access
		1RP7470	Yes	LAA Received
10	310-03-BH3334	2RP205146	Yes	Potential Neg - Unlikely
	310-03-BH3336	2RP142680	Yes	ARTC to request access
	310-03-BH3333			
	310-03-TP3155			
	310-03-BH3332	RD01RP30865	Yes	Open access -road
	310-03-SR3032			
11	310-03-SR3031			
		2718A341307	Proximate protected plant record	HARD NO
		5RP841180	Proximate protected plant record	LAA Received
		9RP841180	Proximate protected plant record	ARTC to request access
		6RP203202	Proximate protected plant record	ARTC to request access
		4RP203202	Proximate protected plant record	ARTC to request access
		1789A34919	Proximate protected plant record	QR Access required
		RD3913044	Proximate protected plant record	ARTC to request access
		RD01RP203202	Proximate protected plant record	Open access - road
		RD01A341307	Proximate protected plant record	Open access - road
		BRP153393	Proximate protected plant record	ARTC to request access

Site number	Test Site ID	Lot Plan	Protected Plant	Access
		ARP153393	Proximate protected plant record	ARTC to request access
		ARP152985	Proximate protected plant record	ARTC to request access
12	310-03-BH3084 310-03-TP3209	3AG3669	Proximate protected plant record	ARTC to request access
		11SP285307	Proximate protected plant record	ARTC to request access
		9SP285304	Proximate protected plant record	ARTC to request access
		RD01SP285304	Proximate protected plant record	Open access - road
		2AG3599	Proximate protected plant record	
13	310-03-TP3217	2RP838203	Proximate protected plant record	ARTC to request access
		2RP76562	Proximate protected plant record	ARTC to request access
		33SP294200	Proximate protected plant record	ARTC to request access
		29SP294200	Proximate protected plant record	ARTC to request access
		10D3691	Proximate protected plant record	QR Access required
		RD01RP24609	Proximate protected plant record	Open access - road
		FSP294181	Proximate protected plant record	ARTC to request access

Land Access for Priority 2 Geotechnical Sites

Item	Test Site ID	Lot Plan	Access	Survey result/ exclusion
1	310-03-TP3053	245CP902340	Potential Neg	Excluded due to access
2	310-03-GM3001	143CP902340	Potential Neg	Excluded due to access
3	310-03-BH3307	143CP902340	Potential Neg	Excluded due to access
4	310-03-TP3500	142MH193	LAA Received	
5	310-03-BH3602	142MH193	LAA Received	
6	310-03-GM3002	142MH193	LAA Received	
7	310-03-BH3308	142MH193	LAA Received	
8	310-03-GM3003	141MH193	Potential Neg	Excluded due to access
9	310-03-TP3501	141MH193	Potential Neg	Excluded due to access
10	310-03-BH3603	141MH193	Potential Neg	Excluded due to access
11	310-03-BH3309	93MH819	Potential Neg	Excluded due to access
12	310-03-TP3054	93MH819	Potential Neg	Excluded due to access
13	310-03-GM3004	87MH16	LAA Received	

Item	Test Site ID	Lot Plan	Access	Survey result/ exclusion
14	310-03-BH3604	87MH16	LAA Received	
15	310-03-TP3056	87MH16	LAA Received	
16	310-03-BH3004	250MH270	LAA Received	
17	310-03-CP3202	250MH270	LAA Received	
18	310-03-BH3005	250MH270	LAA Received	
19	310-03-CP3002	97MH38	LAA Received	
20	310-03-BH3006	97MH38	LAA Received	
21	310-03-TP3057	97MH38	LAA Received	
22	310-03-TP3058	1RP156957	LAA Received	
23	310-03-TP3059	2RP156957	LAA Received	
24	310-03-TP3060	2SP109525	LAA Received	
25	310-03-TP3061	2SP109525	LAA Received	
26	310-03-TP3062	2SP109525	LAA Received	
27	310-03-TP3063	124MH79	LAA Received	
28	310-03-TP3084	10MH737	LAA Received	
29	310-03-GM3005	10MH737	LAA Received	
30	310-03-TP3085	10MH737	LAA Received	
31	310-03-TP3086	10MH737	LAA Received	
32	310-03-BH3009	10MH737	LAA Received	
33	310-03-CP3004	10MH737	LAA Received	
34	310-03-GM3008	10MH737	LAA Received	
35	310-03-CP3203	10MH737	LAA Received	
36	310-03-BH3010	10MH737	LAA Received	
37	310-03-TP3087	10MH737	LAA Received	
38	310-03-TP3710	10MH737	LAA Received	
39	310-03-TP3714	10MH737	LAA Received	
40	310-03-TP3711	10MH737	LAA Received	
41	310-03-TP3713	10MH737	LAA Received	
42	310-03-TP3712	31SP118699	LAA Received	
43	310-03-TP3088	31SP118699	LAA Received	
44	310-03-TP3131	3RP233820	LAA Received	
45	310-03-CP3014	3RP233820	LAA Received	
46	310-03-BH3023	3RP233820	LAA Received	
47	310-03-CP3210	3RP233820	LAA Received	
48	310-03-BH3025	2SP260880	LAA Received	
49	310-03-CP3015	2SP260880	LAA Received	
50	310-03-BH3605	2SP260880	LAA Received	
52	310-03-CP3016	2SP260880	LAA Received	
53	310-03-BH3026	2SP260880	LAA Received	
59	310-03-BH3320	3RP7480	LAA Received	

Item	Test Site ID	Lot Plan	Access	Survey result/ exclusion
60	310-03-TP3338	3RP7480	LAA Received	
61	310-03-BH3321	3RP7480	LAA Received	
62	310-03-BH3322	3RP7480	LAA Received	
63	310-03-BH3323	3RP7480	LAA Received	
64	310-03-TP3340	3RP7480	LAA Received	
65	310-03-BH3324	3RP7480	LAA Received	
66	310-03-BH3325	3RP7480	LAA Received	
67	310-03-TP3342	3A341936	LAA Received	
68	310-03-TP3343	3A341936	LAA Received	
69	310-03-BH3326	3A341936	LAA Received	
70	310-03-TP3344	3A341936	LAA Received	
71	310-03-TP3147	62SP146089	Potential Neg	Excluded due to access
72	310-03-BH3063	62SP146089	Potential Neg	Excluded due to access
73	310-03-BH3064	61SP146089	LAA Received	
74	310-03-BH3337	21RP913044	LAA Received	
75	310-03-TP3158	21RP913044	LAA Received	
78	310-03-BH3348	1RP194766	LAA Received	
79	310-03-BH3349	2RP155499	LAA Received	
80	310-03-BH3350	2RP155499	LAA Received	
81	310-03-BH3351	863A34637	LAA Received	
82	310-03-TP3179	863A34637	LAA Received	
83	310-03-TP3180	863A34637	LAA Received	
84	310-03-TP3181	12SP228312	LAA Received	
85	310-03-BH3352	15RP36572	LAA Received	
86	310-03-BH3353	15RP36572	LAA Received	
87	310-03-TP3182	16RP36572	LAA Received	
88	310-03-TP3183	250D35274	LAA Received	
89	310-03-BH3354	250D35274	LAA Received	
90	310-03-TP3184	250D35274	LAA Received	
91	310-03-BH3355	250D35274	LAA Received	
92	310-03-TP3185	250D35274	LAA Received	
93	310-03-TP3186	2RP149961	LAA Received	
94	310-03-BH3606	2RP149961	LAA Received	
95	310-03-TP3187	2RP149961	LAA Received	
96	310-03-BH3607	2RP149961	LAA Received	
97	310-03-BH3071	2AG3200	LAA Received	
98	310-03-BH3608	2AG3200	LAA Received	
99	310-03-TP3188	2AG3200	LAA Received	
100	310-03-TP3189	5RP47487	LAA Received	
101	310-03-BH3072	5RP47487	LAA Received	

Item	Test Site ID	Lot Plan	Access	Survey result/ exclusion
102	310-03-TP3190	5RP47487	LAA Received	
103	310-03-BH3073	WR06RP48192	LAA Received	
104	310-03-BH3074	2RP48192	LAA Received	
105	310-03-TP3191	2RP48192	LAA Received	
106	310-03-BH3075	2RP48192	LAA Received	
107	310-03-BH3076	2RP48192	LAA Received	
108	310-03-TP3192	2RP48192	LAA Received	
109	310-03-BH3609	1RP48192	LAA Received	
110	310-03-TP3193	2RP48191	LAA Received	
111	310-03-BH3077	2RP48191	LAA Received	
112	310-03-TP3194	WR02RP48191	LAA Received	
113	310-03-BH3078	1RP155674	LAA Received	
114	310-03-TP3195	1RP155674	LAA Received	
115	310-03-BH3079	1RP155674	LAA Received	
116	310-03-TP3196	1RP155674	LAA Received	
117	310-03-BH3080	1RP155674	LAA Received	
118	310-03-TP3197	1RP155674	LAA Received	
119	310-03-TP3198	1RP155674	LAA Received	
120	310-03-BH3610	1RP155674	LAA Received	
121	310-03-BH3081	1RP155674	LAA Received	

Land access for access tracks clearing confirmed

Object ID	Test Site ID	Lot Plan	Access
Access tracks clearing confirmed			
4026	AT-310-03-TP3126	RD32SP126840	Open Access – road
9727	AT-310-03-TP3073	RD04SP214649	Open Access – road
4432	AT-310-03-BH3084	RD01SP285304	Open Access – road
4842	AT-310-03-TP3209	RD01SP285304	Open Access – road
7685	AT-310-03-TP3146	RD31SP256680	Open Access – road
		4RP208562	ARTC to request access
8084	AT-310-03-BH3037	6RP37102	QR access
		2RP37103	
		9RP37102	
		5RP37103	
8086	AT-310-03-CP3024	201SP124721	QR access
8911	AT-310-03-TP3802	RD02SP129536	Open Access – road
		RD01SP129536	
8913	AT-310-03-TP3072	RD04SP214649	Open Access – road
8914	AT-310-03-TP3071	RD01MH643	Open Access – road

Object ID	Test Site ID	Lot Plan	Access
Access tracks clearing confirmed			

Land access for access tracks clearing proposed

Object ID	Test Site ID	Lot Plan	Access
3224	AT-310-03-TP3501	141MH193	ARTC to request access
5644	AT-310-03-TP3085	10MH737	LAA Received
7282	AT-310-03-BH3064	61SP146089	LAA Received
		R06SP146089	Open Access – road
7654	AT-310-03-BH3324	3RP7480	LAA Received
7689	AT-310-03-BH3066	6RP212368	ARTC to request access
		RD01AG3984	Open Access – road
7691	AT-310-03-BH3158	21RP913044	LAA Received
8895	AT-310-03-TP3310	2RP37133	ARTC to request access
8905	AT-310-03-BH3073	2RP48192	LAA Received
		1RP24606	ARTC to request access
		2AG3200	LAA Received
		2RP24615	ARTC to request access
		1RP24615	ARTC to request access
		WR03RP48192	River
		RD01AG1982	Open Access – road
		RD06RP24615	Open Access – road
8919	AT-310-03-BH3614	44AG109	ARTC to request access
		RDAG109	Open Access – road
8920	AT-310-03-TP3213	44AG109	ARTC to request access
		RDAG109	Open Access – road
9713	AT-310-03-TP3196	1RP155674	LAA Received
		RD01RP24067	Open Access – road
3227	AT-310-03-CP3202	250MH270	LAA Received
		87MH16	LAA Received
3234	AT-310-03-TP3061	2SP109525	LAA Received
3235	AT-310-03-TP3062	2SP109525	LAA Received
5242	AT-310-03-TP3713	10MH737	LAA Received
5243	AT-310-03-TP3712	31SP118699	LAA Received
5640	AT-310-03-BH3010	10MH737	LAA Received
5641	AT-310-03-BH3710	10MH737	LAA Received
5643	AT-310-03-TP3714	10MH737	LAA Received

APPENDIX

B

FLORA SURVEY SITES

Flora Sites

BORDER TO GOWRIE
ECOLOGICAL ASSESSMENT

Legend

-  Flora Study Area
-  Post-Wet Survey Quaternary
-  Spring Survey Quaternary
-  Post-Wet Survey Biocondition Transect
-  Major Watercourse (DNRME, 2020)

Suburb labels as per
Australian Bureau of Statistics (2011)

1:35,000 Scale at A3

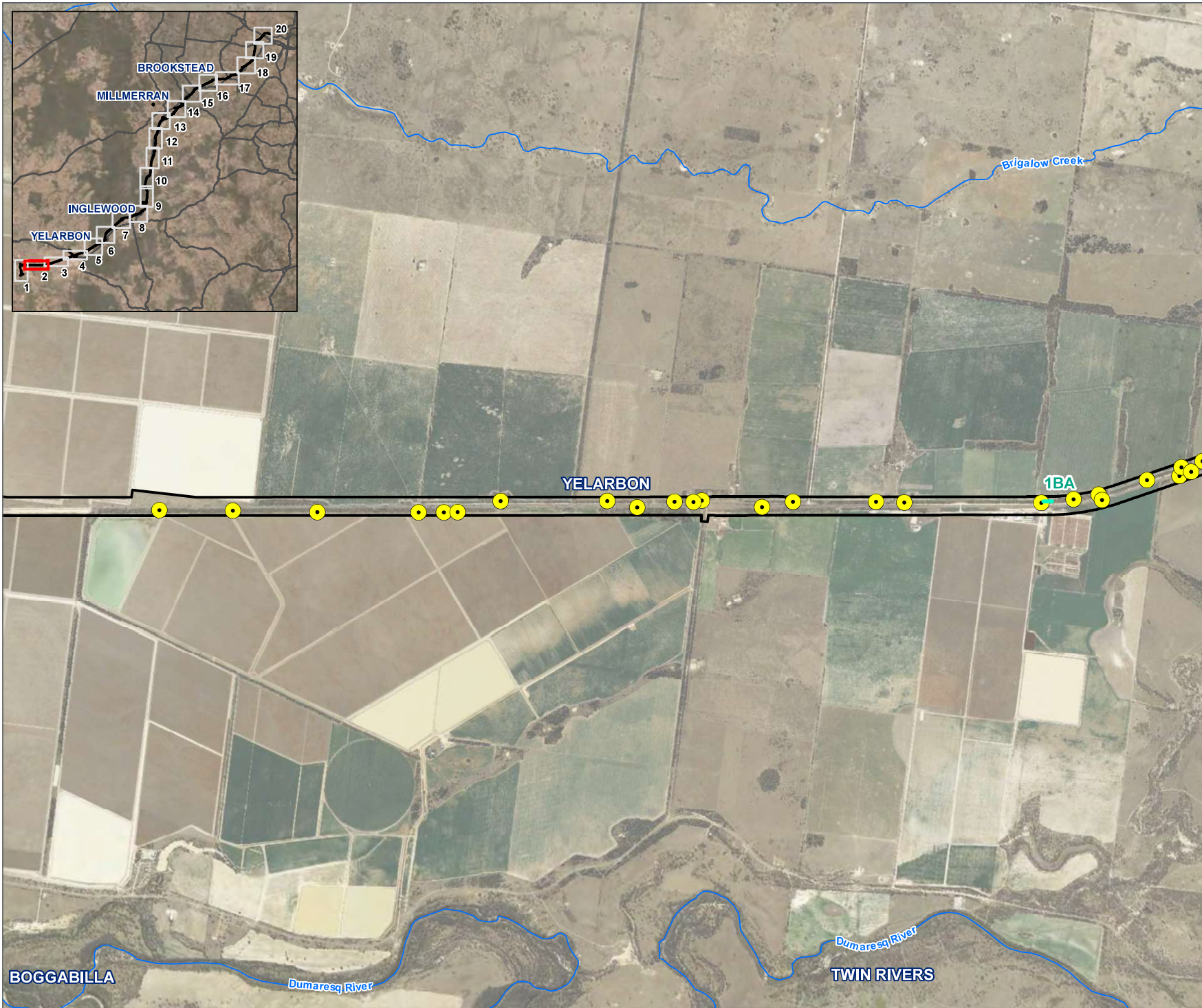
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 Cardno

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ARTC

Flora Sites

BORDER TO GOWRIE
ECOLOGICAL ASSESSMENT

Legend

- Flora Study Area
- Spring Survey Quaternary
- Spring Survey Biocondition Transect
- Major Watercourse (DNRME, 2020)

Suburb labels as per
Australian Bureau of Statistics (2011)

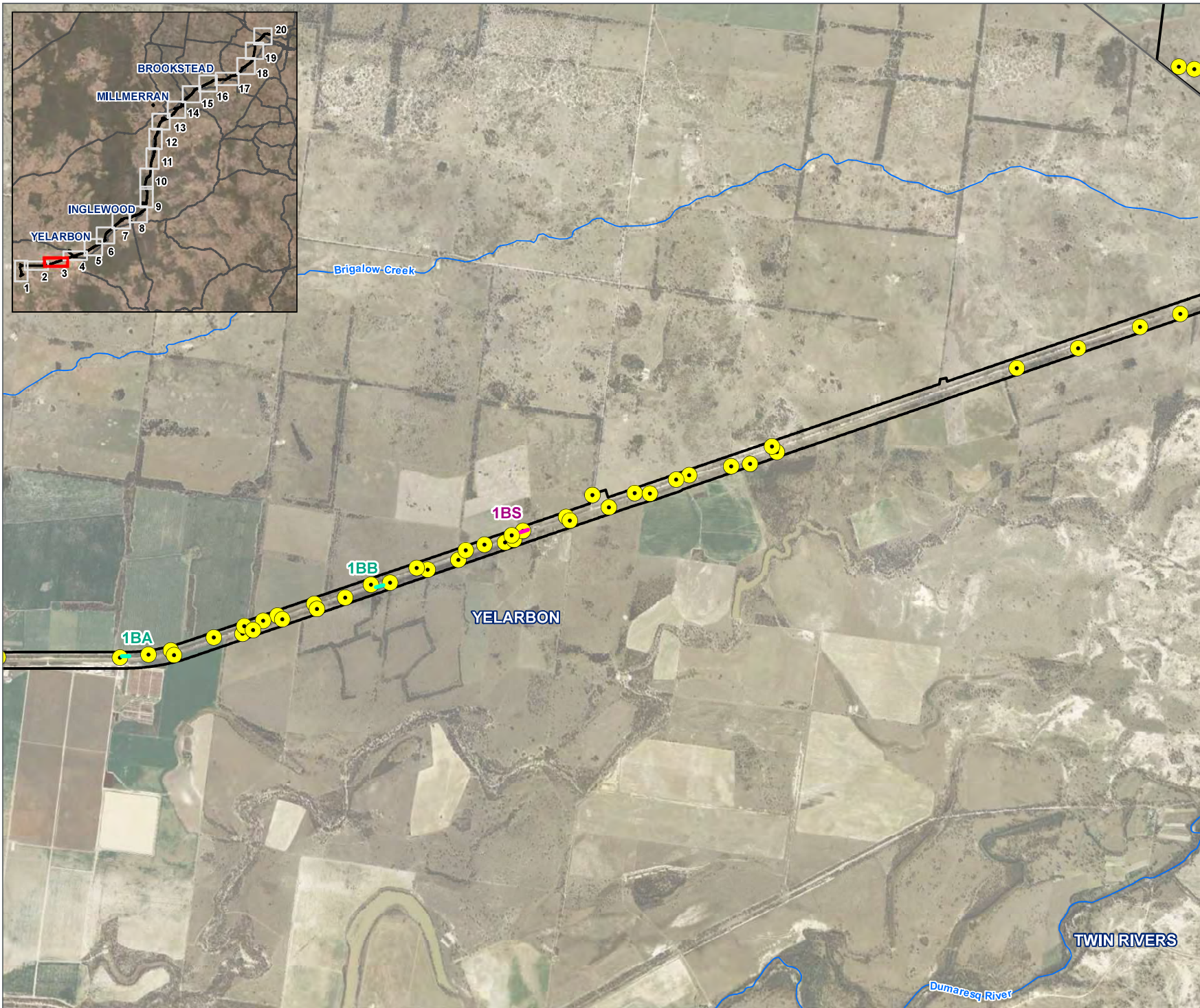
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m



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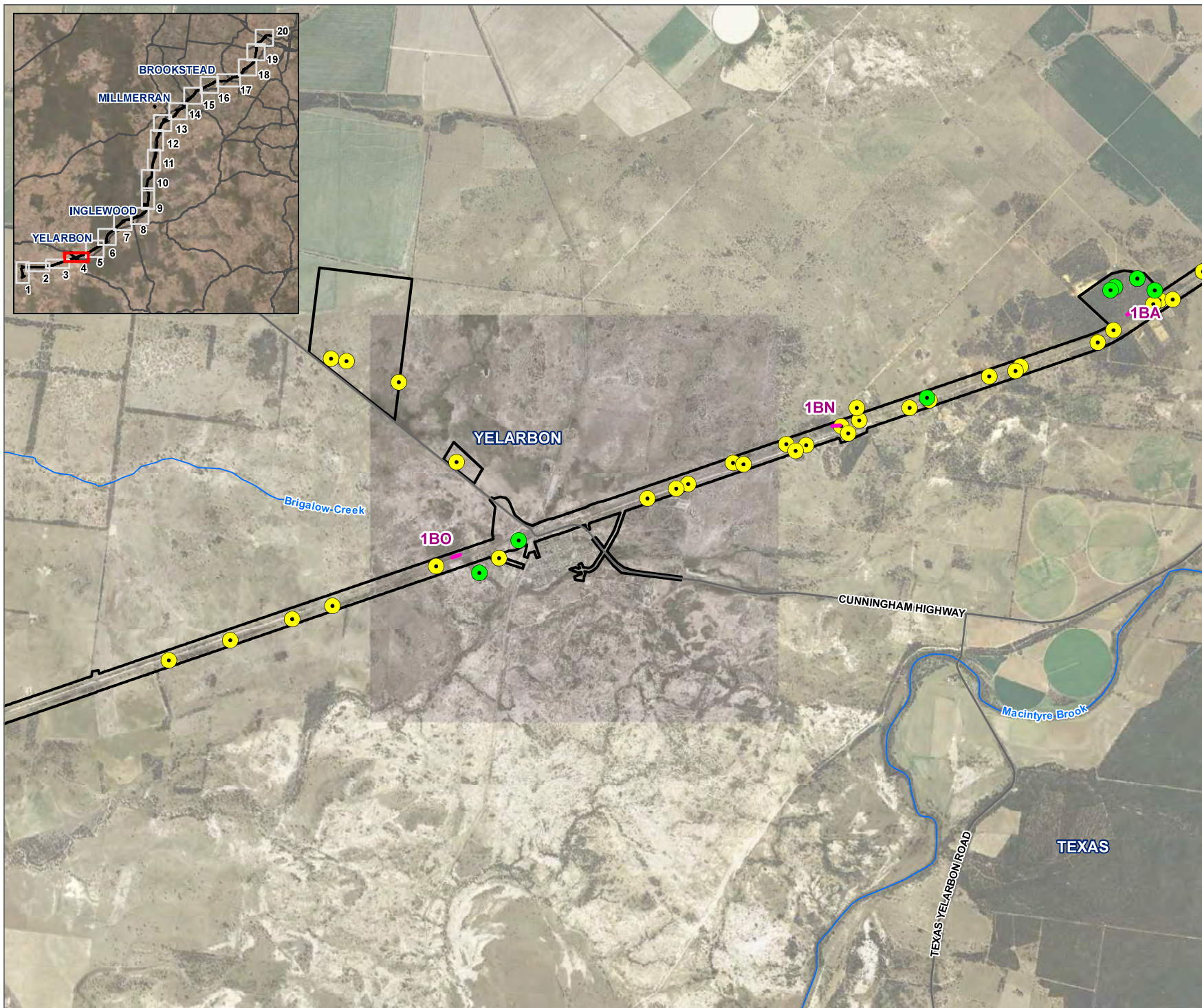
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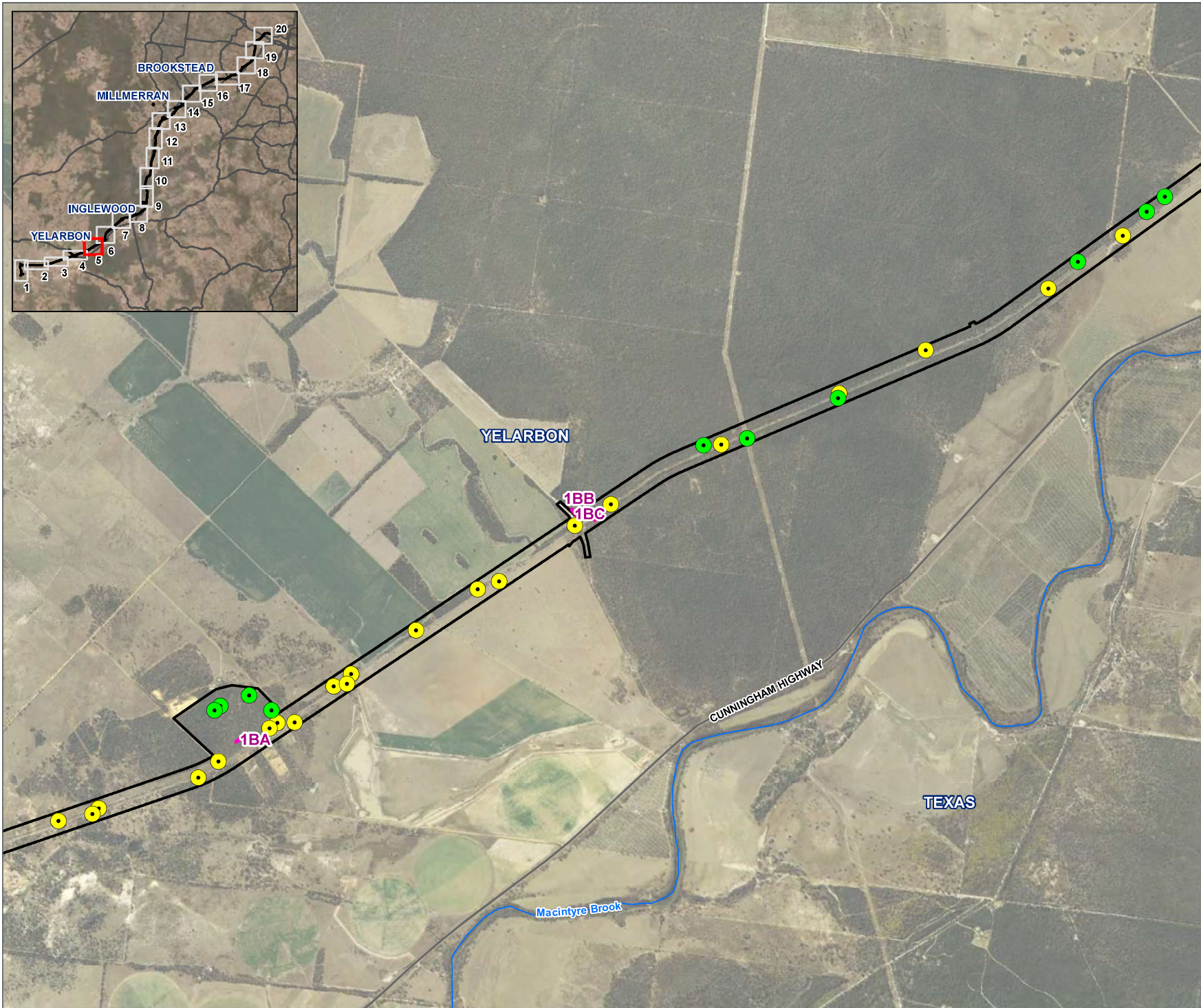
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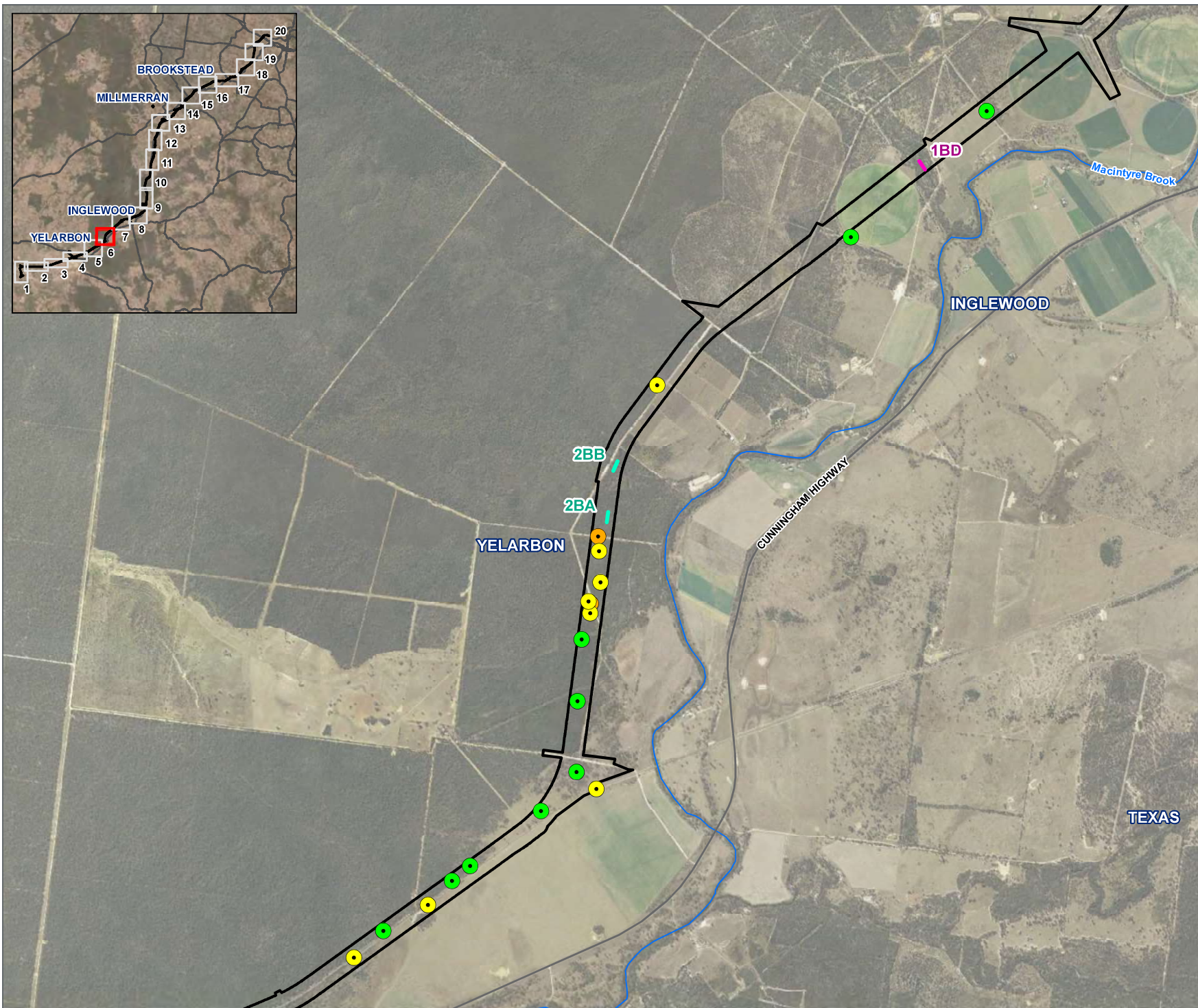
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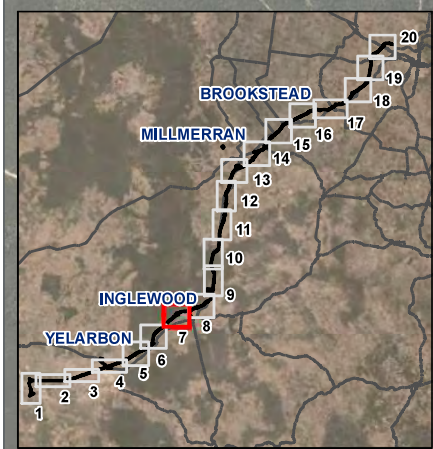
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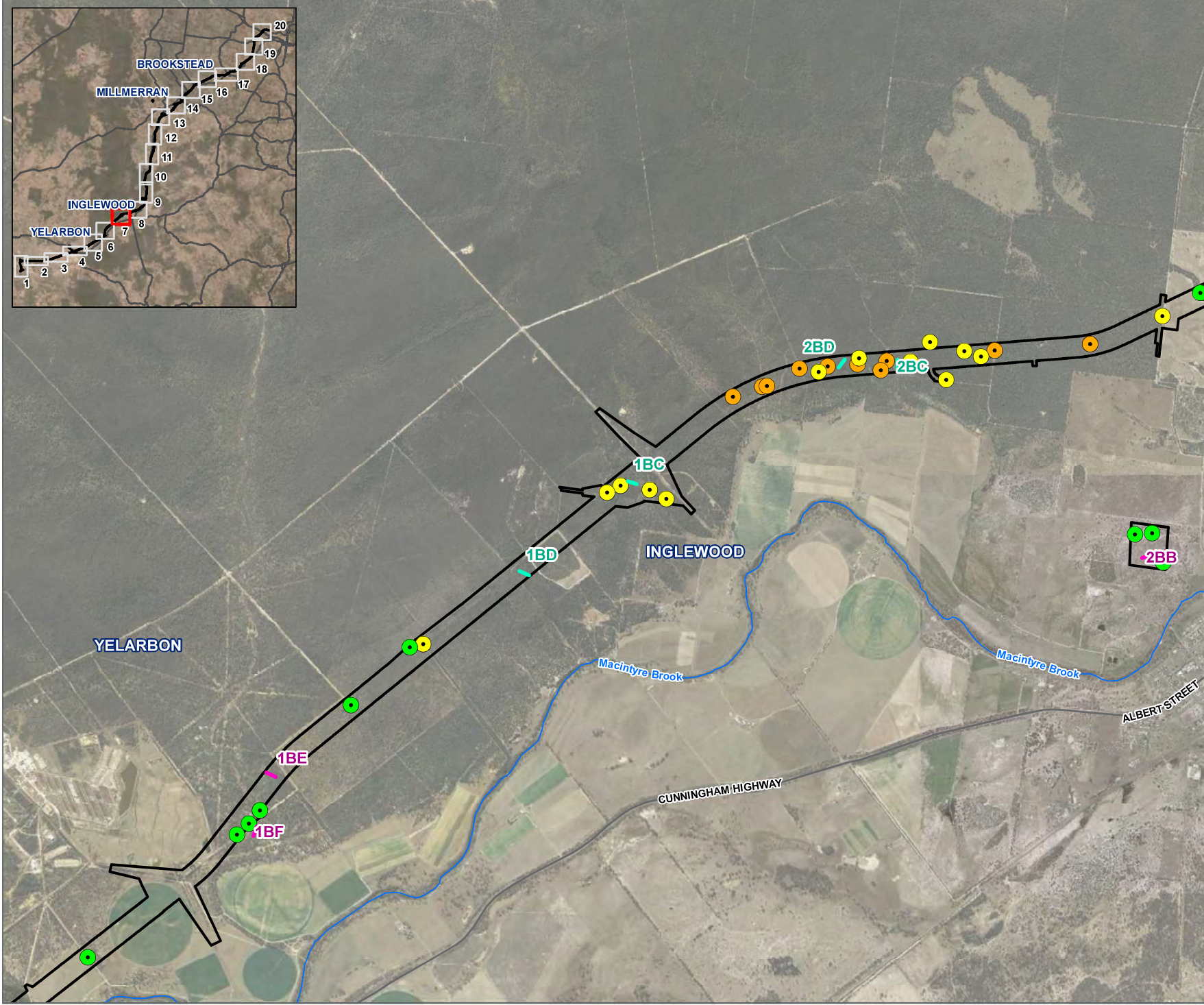


Flora Sites

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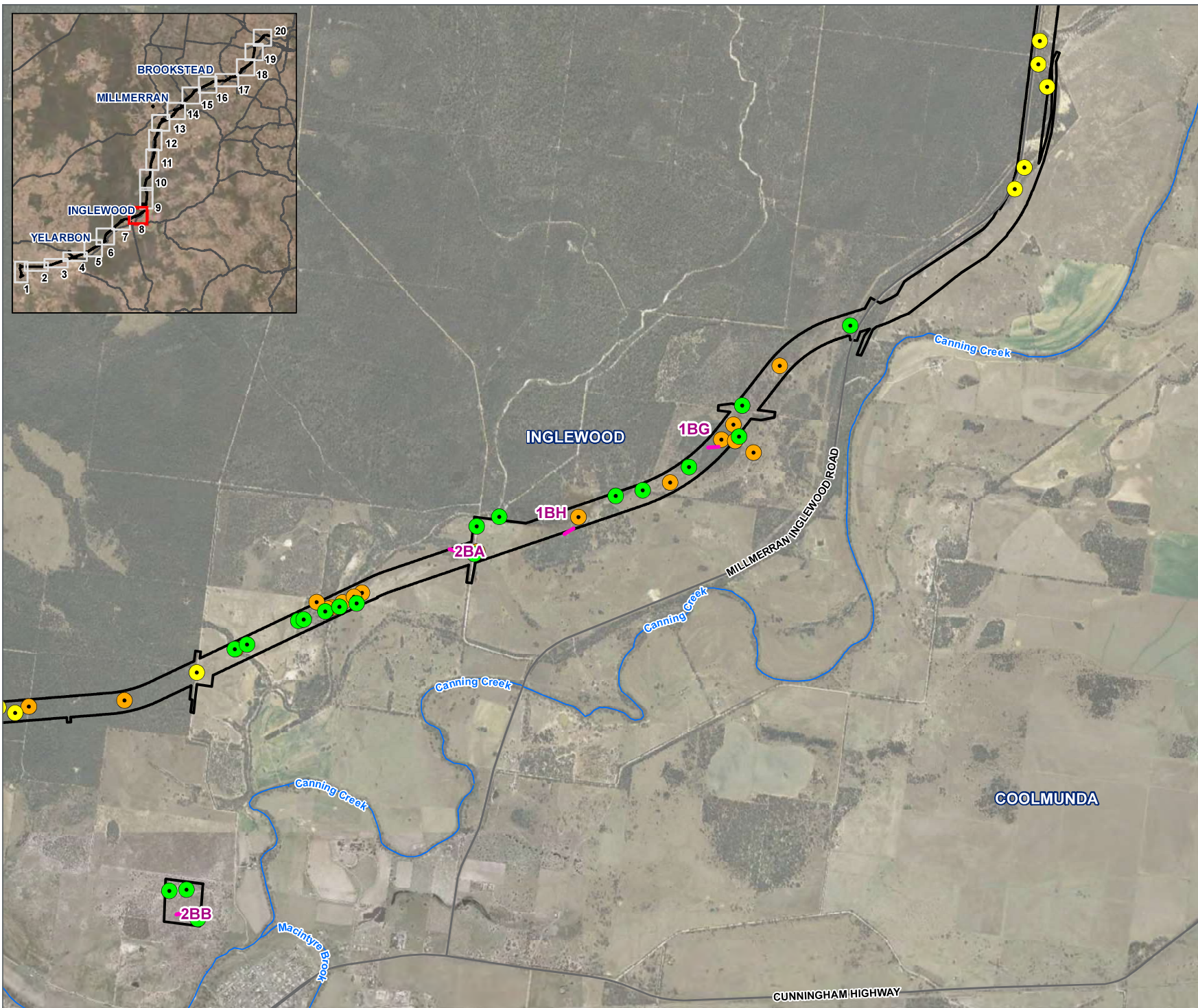
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Flora Sites

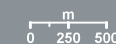
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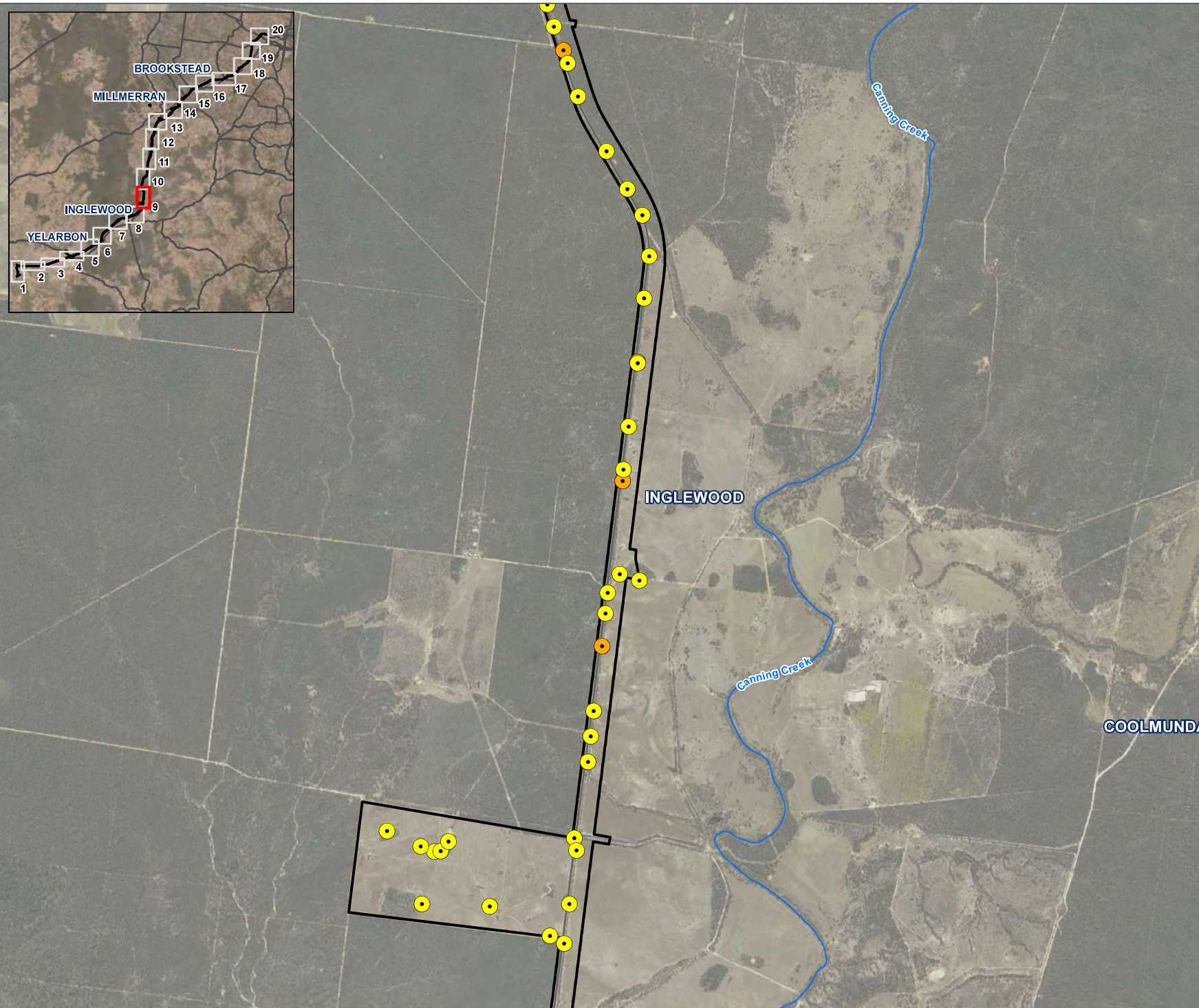
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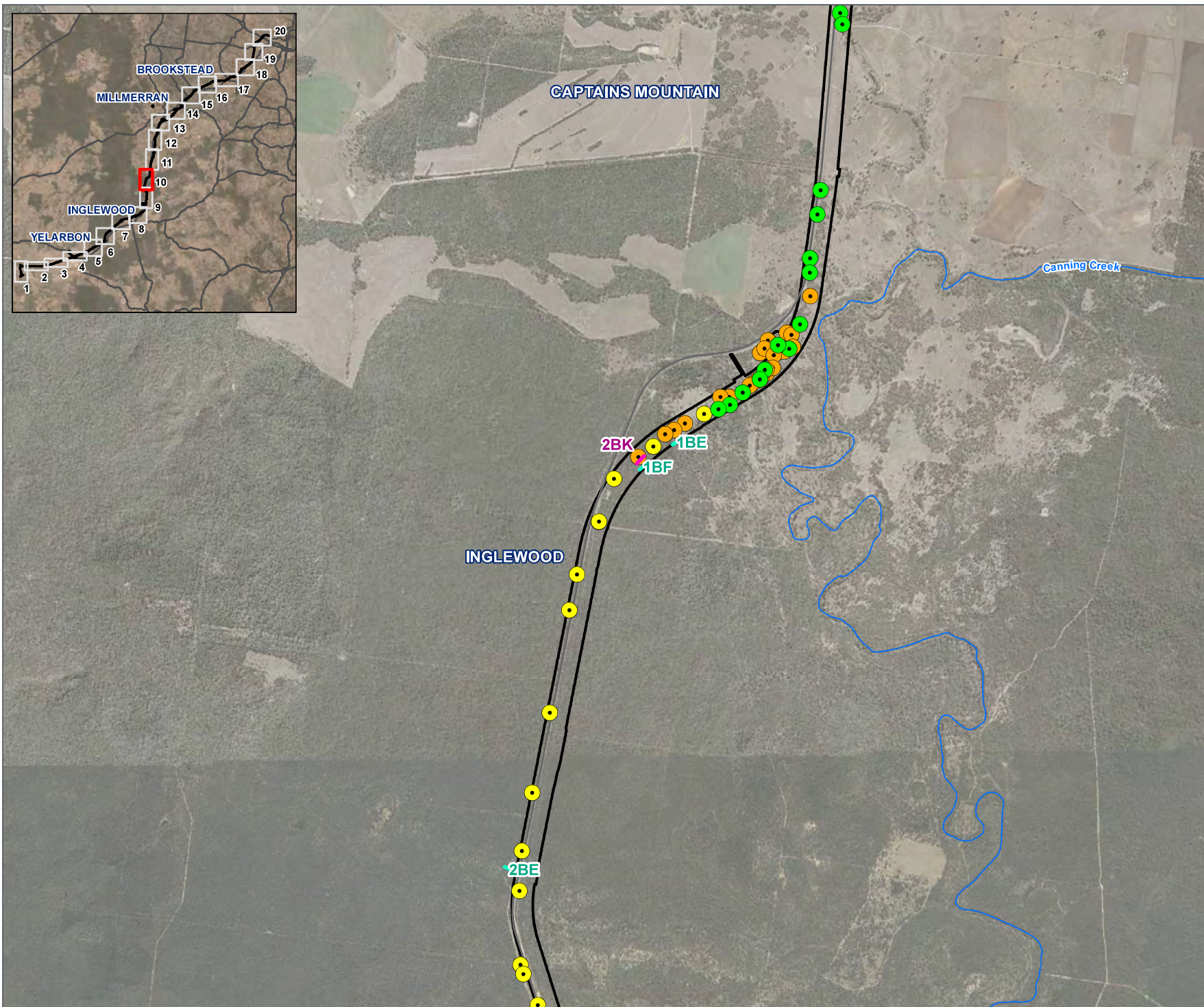
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Flora Sites

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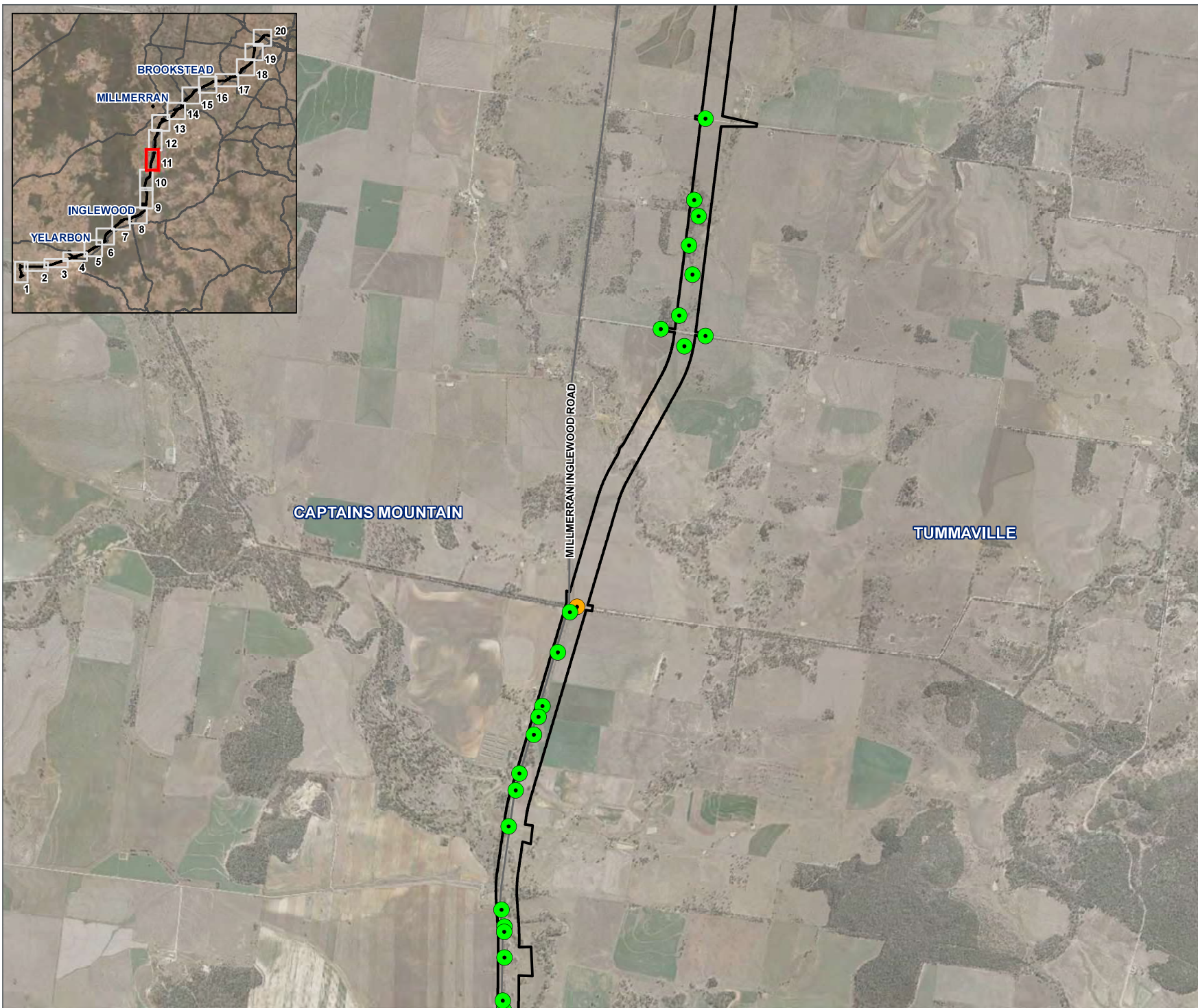
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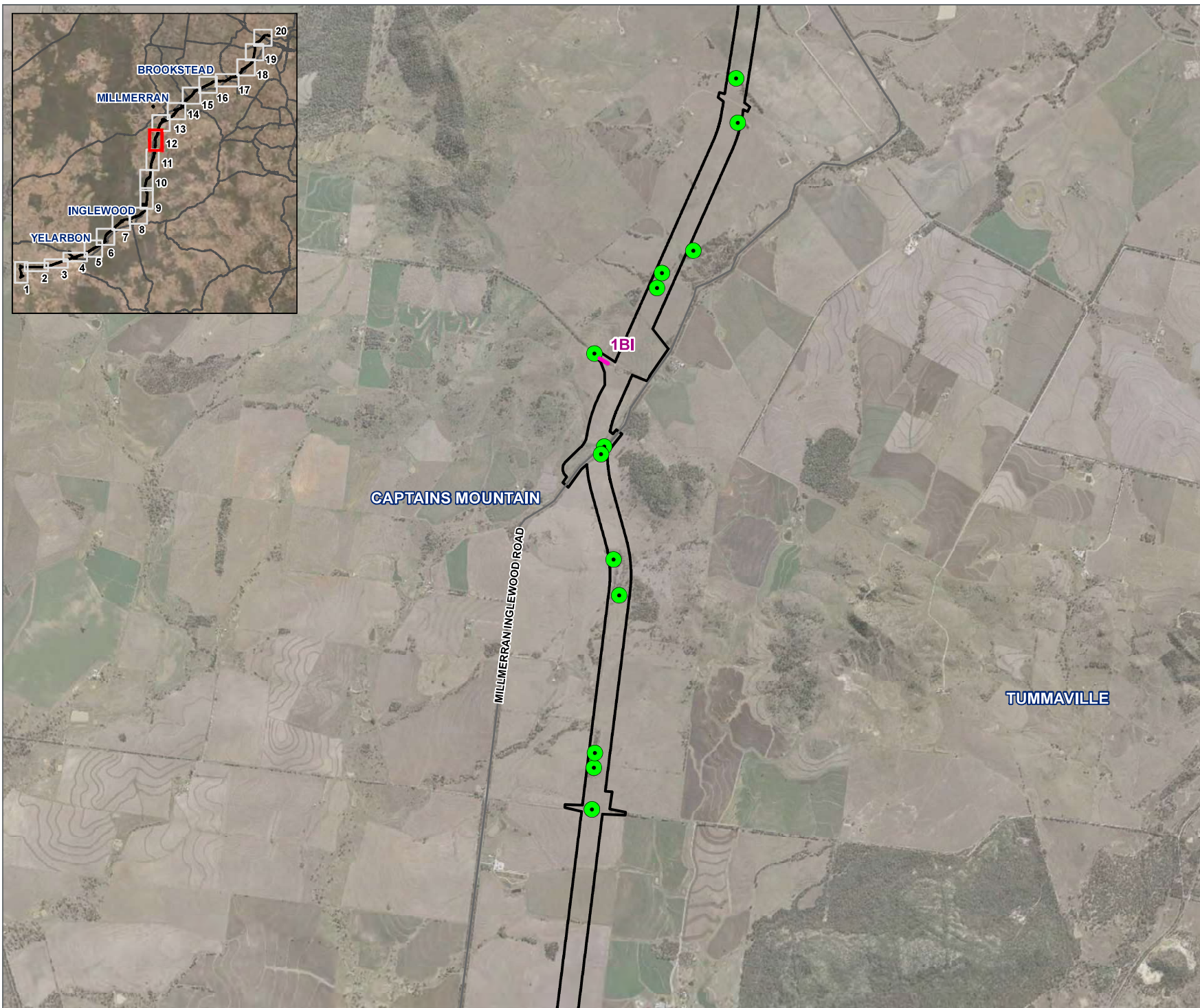
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Flora Sites

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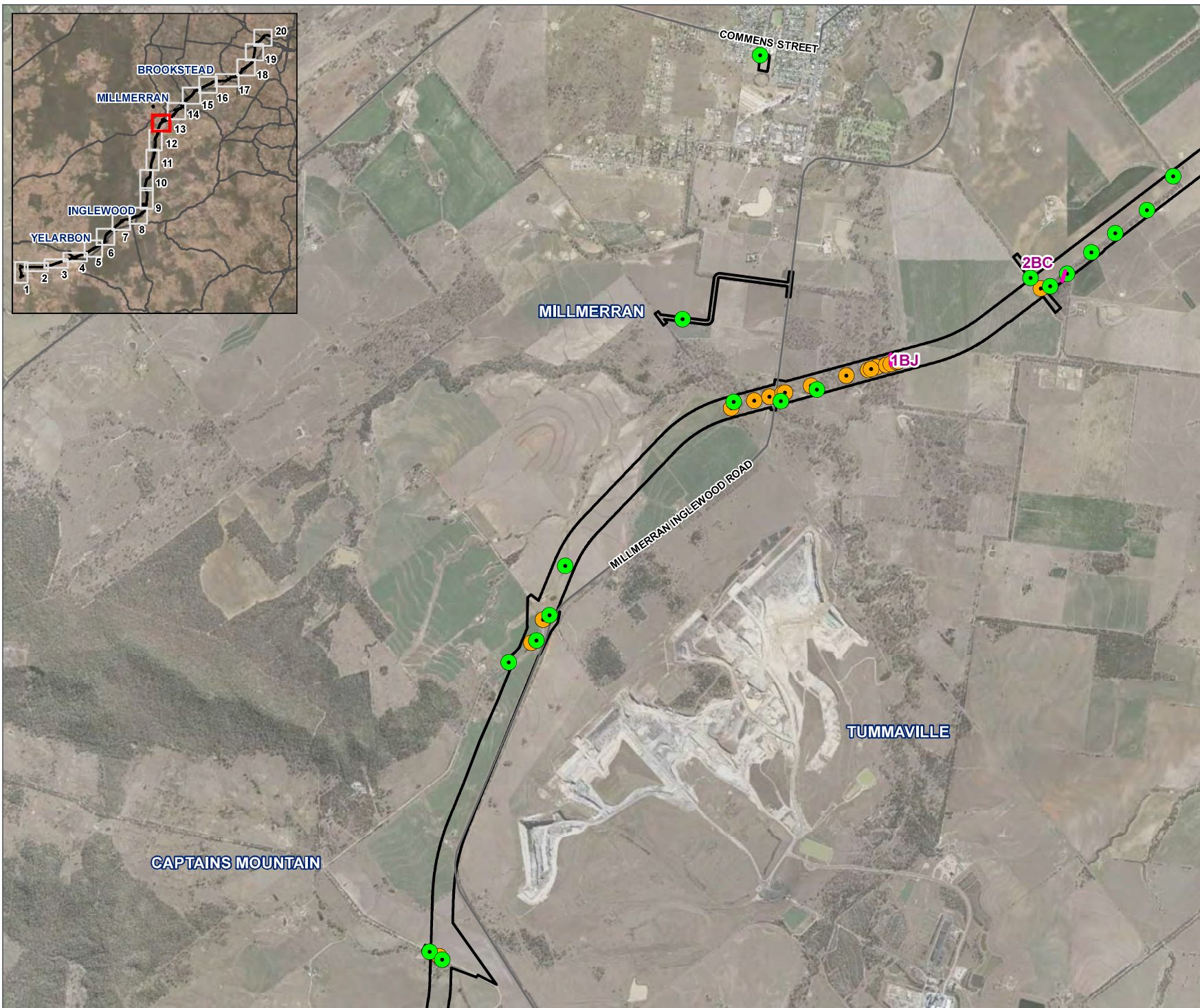
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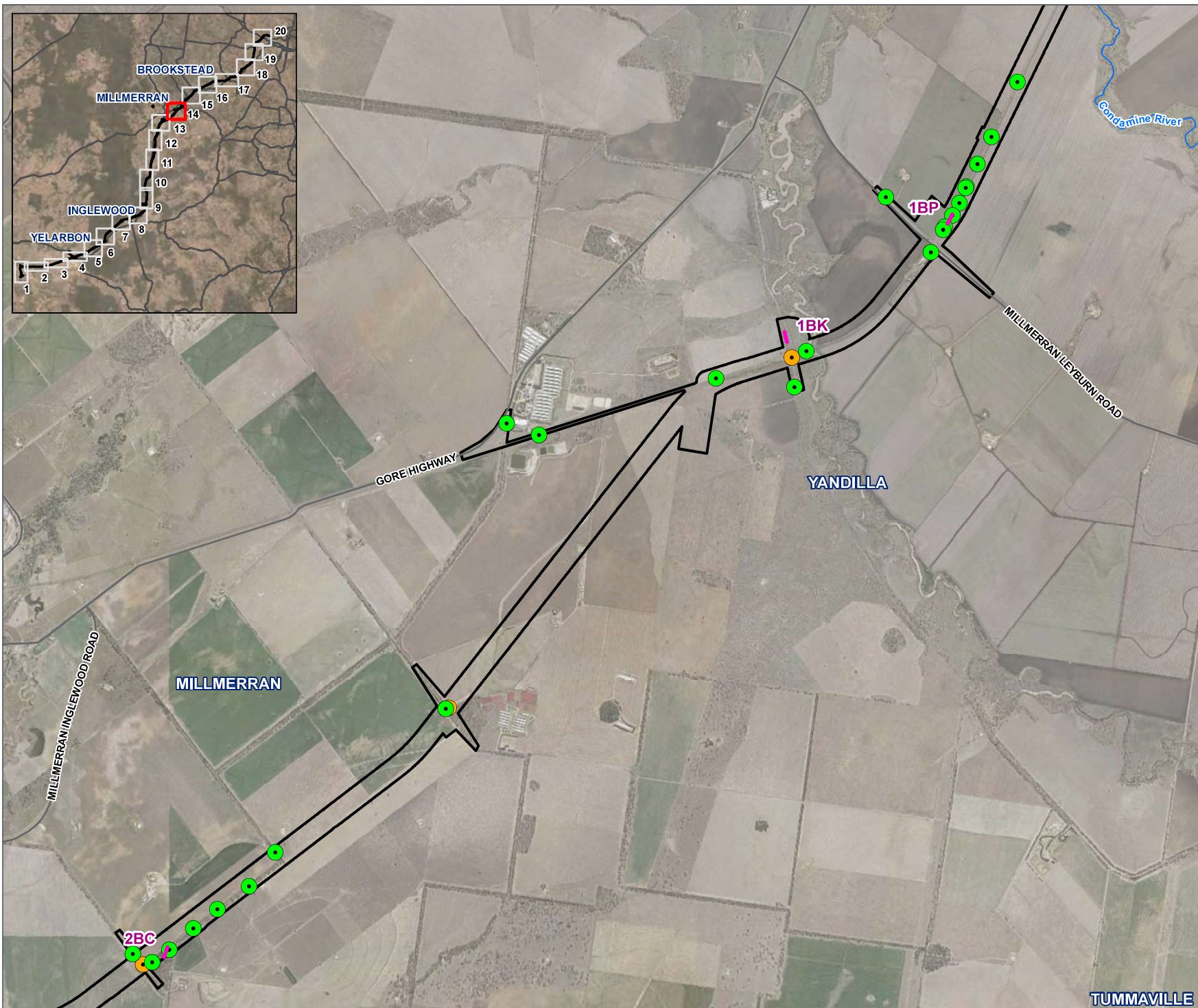
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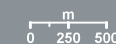
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TUMMAVILLE



Flora Sites

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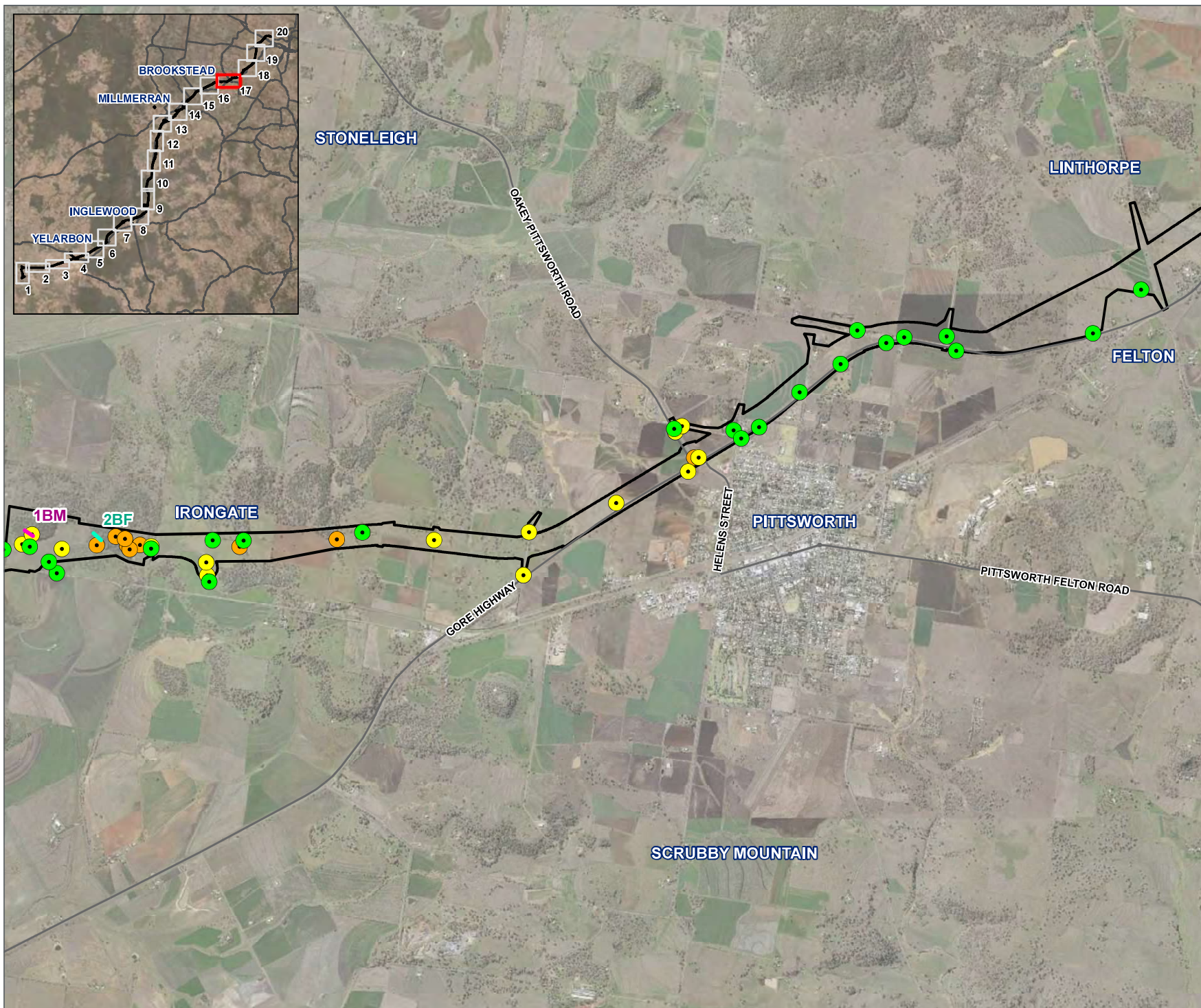
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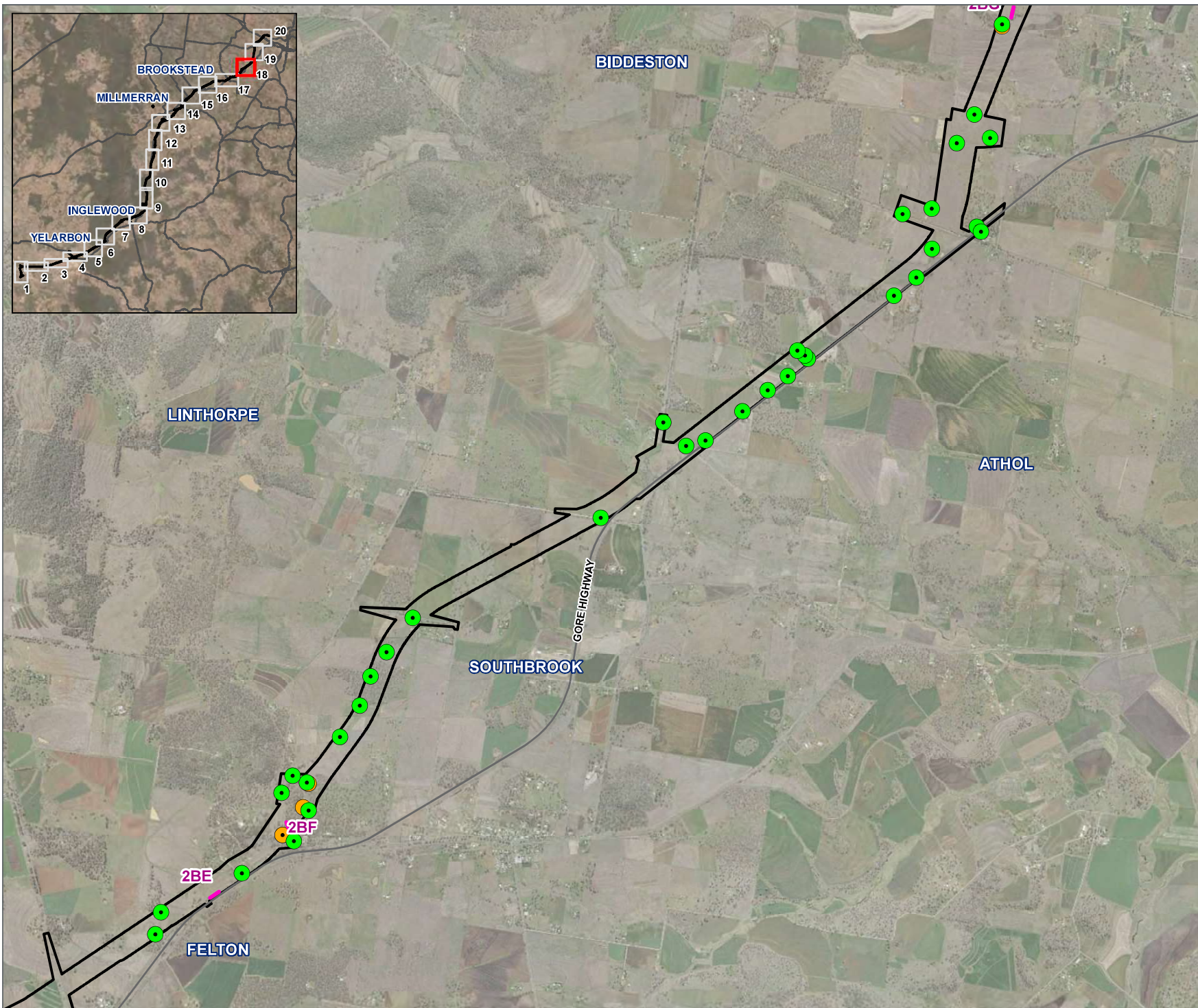
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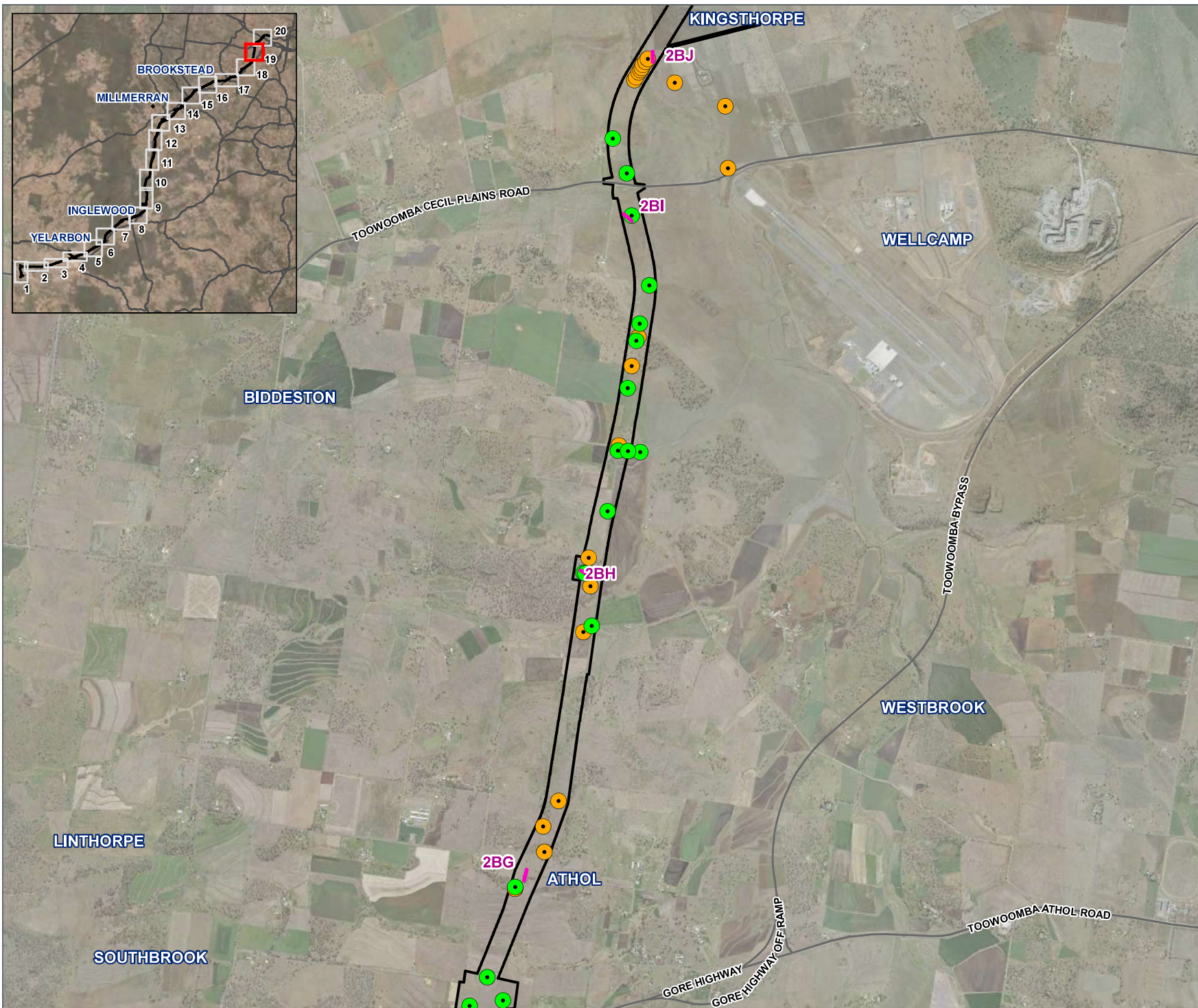
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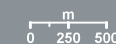
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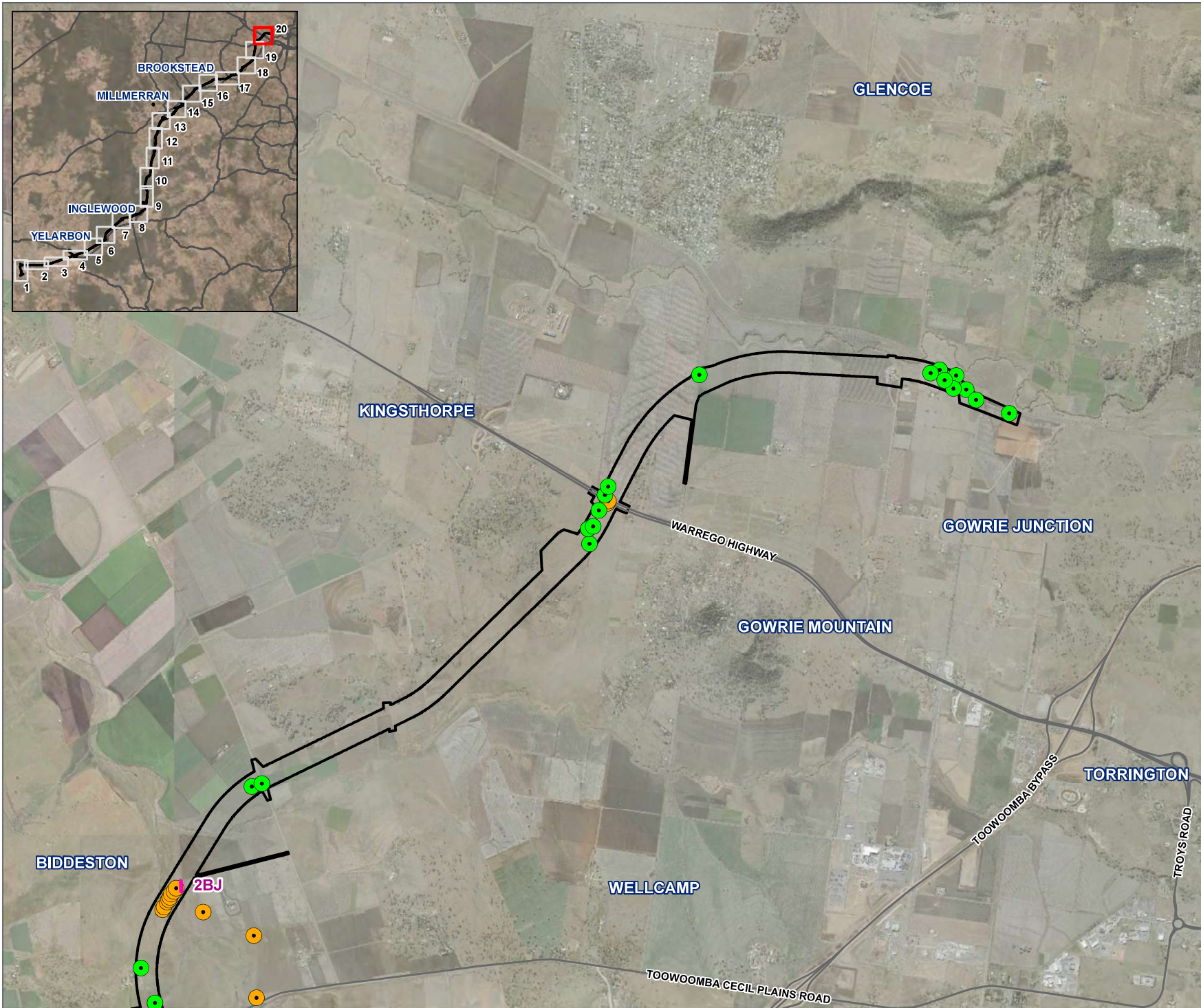
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APPENDIX

C

BIOCONDITION DATA

Spring biocondition data

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BA
	Date:	5/11/2020
	Observers:	DF_AF

100 x 50m Area SITE INFORMATION

Location:	Brigalow Belt - South		Bioregion:	Brigalow belt				
Datum:	GDA94							
Plot Origin:	Zone:	56	Easting:	150.5920	Northing:	-28.6157	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:	70°				
Locality description:								

Regional Ecosystem and Tree Heights

Habitat Description:	<i>Casuarina cristata</i> open forest						
Regional Ecosystem:	11.4.3	Median Tree Canopy ht:	10	Emergent ht:		Subcanopy ht:	5

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 20

Per ha Total (m): 200

Site Total (m): 100

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass		5	1			1.2
% Native annual grass						
% Native forbs and other species	3		2	1	4	2
% Native shrubs (<1m in height)	2		1	4		1.4
% Non-native grass						
% Non-native forbs & shrubs		6				1.2
% Litter	89	64	48	30	66	59.4
% Rock						
% Bare ground	6	25	45	65	30	34.2
% Cryptograms			3			0.6
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BA
Entered:.....	Date:	5/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	33%
Total No. Large Trees:	6
Total No. Large Trees per ha:	12
Native Tree Species Richness:	4
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 6
	# of trees >= benchmark per ha: 12

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	11
Grass spp. richness:	5
Forbs and others spp. richness:	13
Non-native plant cover (%)	8%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Casuarina cristata</i>		Canopy		Yes
<i>Atalaya hemiglauc</i>		Canopy	Subcanopy	
<i>Capparis loranthifolia</i>			Subcanopy	
<i>Santalum lanceolatum</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Abutilon fraseri</i>		Forbs/Other	
<i>Acacia harpophylla</i>		Tree	
<i>Apophyllum anomalum</i>		Shrub	
<i>Atalaya hemiglauc</i>		Tree	
<i>Austrostipa scabra</i>		Grass	
<i>Brunoniella australis</i>		Forbs/Other	
<i>Calotis cuneata</i>		Forbs/Other	
<i>Capparis lasiantha</i>		Shrub	
<i>Capparis mitchellii</i>		Tree	
<i>Carissa ovata</i>		Shrub	
<i>Casuarina cristata</i>		Tree	
<i>Cheilanthes distans</i>		Forbs/Other	
<i>Citrus glauca</i>		Shrub	
<i>Einadia nutans</i>		Forbs/Other	
<i>Elaeodendron australe</i> var. <i>integrifolium</i>		Tree	
<i>Enteropogon ramosus</i>		Grass	
<i>Eremophila deserti</i>		Shrub	
<i>Eremophila mitchellii</i>		Tree	
<i>Eriochloa crebra</i>		Grass	
<i>Geijera parviflora</i>		Shrub	
<i>Glycine tabacina</i>		Forbs/Other	
<i>Harrisia martinii</i>		Shrub	*
<i>Jasminum didymum</i> subsp. <i>lineare</i>		Forbs/Other	
<i>Lomandra leucocephala</i>		Grass	
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	*
Species indeterminate	Native Poaceae	Grass	
<i>Nyssanthus erecta</i>		Forbs/Other	
<i>Opuntia tomentosa</i>		Shrub	*
<i>Parsonsia eucalyptophylla</i>		Forbs/Other	
<i>Pittosporum angustifolium</i>		Tree	
<i>Portulaca oleracea</i>		Forbs/Other	
<i>Rhagodia spinescens</i>		Shrub	
<i>Zygophyllum apiculatum</i>		Forbs/Other	
<i>Santalum lanceolatum</i>		Shrub	
<i>Scaevola spinescens</i>		Shrub	
<i>Sclerolaena birchii</i>		Shrub	
<i>Sclerolaena tetracuspis</i>		Forbs/Other	
<i>Senna artemisioides</i>		Shrub	
<i>Sida cunninghamii</i>		Forbs/Other	
<i>Tetragonia tetragonoides</i>		Forbs/Other	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BA
Entered:.....	Date:	5/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	8.4
Canopy total (m):	34.8
Emergent total (m):	0
Shrub total (m):	50.4

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Casuarina cristata</i>	Canopy	0	7.7	7.7
<i>Geijera parviflora</i>	Shrub	0.6	6.6	6
<i>Atalaya hemiglauc</i>	Canopy	7.3	8.7	1.4
<i>Geijera parviflora</i>	Shrub	12.6	22	9.4
<i>Casuarina cristata</i>	Subcanopy	13.6	14.6	1
<i>Atalaya hemiglauc</i>	Canopy	15.5	21.8	6.3
<i>Casuarina cristata</i>	Canopy	22.6	27.2	4.6
<i>Eremophila deserti</i>	Shrub	21.1	21.4	0.3
<i>Atalaya hemiglauc</i>	Subcanopy	24.2	25.3	1.1
<i>Capparis loranthifolia</i>	Subcanopy	29.9	33	3.1
<i>Atalaya hemiglauc</i>	Shrub	30.4	30.6	0.2
<i>Atalaya hemiglauc</i>	Subcanopy	30.3	30.8	0.5
<i>Citrus glauca</i>	Shrub	31.7	32.2	0.5
<i>Geijera parviflora</i>	Shrub	32.1	37.7	5.6
<i>Santalum lanceolatum</i>	Subcanopy	36	36.5	0.5
<i>Casuarina cristata</i>	Canopy	39.5	48.4	8.9
<i>Geijera parviflora</i>	Shrub	38.7	39	0.3
<i>Geijera parviflora</i>	Shrub	47.8	58.5	10.7
<i>Geijera parviflora</i>	Shrub	59.9	64.5	4.6
<i>Scaevola spinescens</i>	Shrub	60.6	62.1	1.5
<i>Casuarina cristata</i>	Subcanopy	62.9	65.6	2.7
<i>Geijera parviflora</i>	Shrub	66.4	77.5	11.1
<i>Apophyllum anomalum</i>	Shrub	75	76.1	1.1
<i>Citrus glauca</i>	Subcanopy	78.7	80.9	2.2
<i>Casuarina cristata</i>	Canopy	85.3	88.9	3.6
<i>Eremophila deserti</i>	Shrub	85.8	87	1.2
<i>Eremophila deserti</i>	Shrub	87.4	88.4	1
<i>Geijera parviflora</i>	Shrub	88.9	90.1	1.2
<i>Casuarina cristata</i>	Canopy	94.5	97.2	2.7
<i>Scaevola spinescens</i>	Shrub	94.8	95.2	0.4

<i>Eremophila deserti</i>		Shrub	95.1	95.8	0.7
<i>Geijera parviflora</i>		Shrub	96.7	98.8	2.1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BB
	Date:	5/11/2020
	Observers:	DF_AF

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South	Bioregion:	Brigalow belt					
Plot Origin:	Zone:	56	Easting:	150.624	Northing:	-28.6086	Accuracy:	+/-10m
Datum:	GDA94	Plot bearing:	60°					
Locality description:								

Regional Ecosystem and Tree Heights

Habitat Description:	<i>Casuarina cristata</i> forest						
Regional Ecosystem:	11.4.3	Median Tree Canopy ht:	18	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 106

Per ha Total (m): 1060

Site Total (m): 530

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass		15	5	20	7	9.4
% Native annual grass						
% Native forbs and other species	1	5	1	5	3	3
% Native shrubs (<1m in height)						
% Non-native grass						
% Non-native forbs & shrubs				3	1	0.8
% Litter	89	75	91	66	85	81.2
% Rock				3		0.6
% Bare ground	10	5		3	4	4.4
% Cryptogams			3			0.6
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BB
Entered:.....	Date:	5/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	34
Total No. Large Trees per ha:	68
Native Tree Species Richness:	1
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 34
	# of trees >= benchmark per ha: 68

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	4
Grass spp. richness:	2
Forbs and others spp. richness:	15
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Casuarina cristata</i>		Canopy	Subcanopy	Yes

50 x 10m area

Species		Life Form	Status
<i>Abutilon oxycarpum</i>		Forbs/Other	
<i>Alectryon diversifolius</i>		Shrub	
<i>Alternanthera denticulata</i>		Forbs/Other	
<i>Amyema cambagei</i>		Forbs/Other	
<i>Brachyscome dentata</i>		Forbs/Other	
<i>Casuarina cristata</i>		Tree	
<i>Casuarina cristata</i>		Tree	
<i>Cirsium vulgare</i>		Forbs/Other	*
<i>Dysphania carinata</i>		Forbs/Other	
<i>Einadia nutans</i>		Forbs/Other	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs/Other	
<i>Euphorbia dallachyana</i>		Forbs/Other	
<i>Harrisia martinii</i>		Shrub	*
<i>Leptochloa digitata</i>		Grass	
Species indeterminate	Native Cyperaceae	Forbs/Other	
<i>Opuntia tomentosa</i>		Shrub	*
<i>Phyllanthus maderaspatensis</i>		Shrub	
<i>Physalis lanceifolia</i>		Forbs/Other	*
<i>Plantago debilis</i>		Forbs/Other	
<i>Portulaca oleracea</i>		Forbs/Other	
<i>Sclerolaena birchii</i>		Shrub	
<i>Sclerolaena muricata</i> var. <i>villosa</i>		Shrub	
<i>Sclerolaena tetracuspis</i>		Forbs/Other	
<i>Sida cunninghamii</i>		Forbs/Other	
<i>Solanum ellipticum</i>		Forbs/Other	
<i>Sonchus oleraceus</i>		Forbs/Other	*
<i>Tetragonia tetragonoides</i>		Forbs/Other	
<i>Walwhalleya subxerophila</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BB
Entered:.....	Date:	5/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	5.5
Canopy total (m):	67
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Casuarina cristata</i>		Canopy	2.5	11	8.5
<i>Casuarina cristata</i>		Canopy	15.5	23.5	8
<i>Casuarina cristata</i>		Canopy	26	36.5	10.5
<i>Casuarina cristata</i>		Canopy	40	66.5	26.5
<i>Casuarina cristata</i>		Subcanopy	52	57.5	5.5
<i>Casuarina cristata</i>		Canopy	78.5	83.5	5
<i>Casuarina cristata</i>		Canopy	85	93.5	8.5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BC
	Date:	7/11/2020
	Observers:	DF_AF

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South	Bioregion:	Brigalow belt					
Plot Origin:	Zone:	56	Easting:	151.0230	Northing:	-28.3998	Accuracy:	+/-10m
Datum:	GDA94	Plot bearing:	270°					
Locality description:	144MH194							

Regional Ecosystem and Tree Heights

Habitat Description:	Poplar box and Narrow leaf iron bark open forest						
Regional Ecosystem:	11.5.1	Median Tree Canopy ht:	13	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	94
Per ha Total (m):	940
Site Total (m):	470

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	5	3	5	5	2	4
% Native annual grass						
% Native forbs and other species	1	2	10	13		5.2
% Native shrubs (<1m in height)		5		2		1.4
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	59	85	75	70	53	68.4
% Rock	5		5	5	15	6
% Bare ground	30	5	5	5	30	15
% Cryptograms						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BC
Entered:.....	Date:	7/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	3
Total No. Large Trees per ha:	6
Native Tree Species Richness:	2
Eucalypts:	# of trees >= benchmark: 3
	# of trees >= benchmark per ha: 6
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	8
Grass spp. richness:	6
Forbs and others spp. richness:	15
Non-native plant cover (%)	0.1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Callitris glaucophylla</i>			Subcanopy	
<i>Eucalyptus crebra</i>		Canopy	Subcanopy	Yes
<i>Eucalyptus populnea</i>		Canopy		Yes

50 x 10m area

Species		Life Form	Status
<i>Abutilon oxycarpum</i>		Forbs/Other	
<i>Acacia crassa</i>		Shrub	
<i>Acacia decora</i>		Shrub	
<i>Ancistrachne uncinulata</i>		Grass	
<i>Aristida caput-medusae</i>		Grass	
<i>Aristida jerichoensis</i>		Grass	
<i>Brunoniella australis</i>		Forbs/Other	
<i>Callitris glaucophylla</i>		Tree	
<i>Capparis mitchellii</i>		Forbs/Other	
<i>Cheilanthes distans</i>		Forbs/Other	
<i>Denhamia silvestris</i>		Shrub	
<i>Dodonaea viscosa</i>		Shrub	
<i>Dysphania carinata</i>		Forbs/Other	
<i>Einadia hastata</i>		Forbs/Other	
<i>Sporobolus caroli</i>		Grass	
<i>Eremophila debilis</i>		Forbs/Other	
<i>Eucalyptus crebra</i>		Tree	
<i>Eucalyptus populnea</i>		Tree	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>		Forbs/Other	
<i>Gahnia aspera</i>		Forbs/Other	
<i>Jasminum didymum</i> subsp. <i>lineare</i>		Forbs/Other	
<i>Lomandra filiformis</i>		Forbs/Other	
<i>Lomandra longifolia</i>		Forbs/Other	
<i>Maireana enchylaenoides</i>		Forbs/Other	
<i>Monotoca scoparia</i>		Shrub	
<i>Myoporum acuminatum</i>		Shrub	
Species indeterminate	Native <i>Eragrostis</i>	Grass	
<i>Opuntia tomentosa</i>		Shrub	*
<i>Parsonsia eucalyptophylla</i>		Forbs/Other	
<i>Paspalidium distans</i>		Grass	
<i>Phyllanthus virgatus</i>		Shrub	
<i>Phyllanthus virgatus</i>		Forbs/Other	
<i>Rhagodia spinescens</i>		Shrub	
<i>Solanum ellipticum</i>		Forbs/Other	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BC
Entered:.....	Date:	7/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	27
Canopy total (m):	58.5
Emergent total (m):	0
Shrub total (m):	7

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Eucalyptus populnea</i>	Canopy	0	4.5	4.5
<i>Acacia decora</i>	Shrub	0	2	2
<i>Callitris glaucophylla</i>	Subcanopy	6.5	8.5	2
<i>Eucalyptus populnea</i>	Canopy	15.5	24	8.5
<i>Eucalyptus populnea</i>	Canopy	26	32.5	6.5
<i>Callitris glaucophylla</i>	Canopy	26	31.5	5.5
<i>Acacia decora</i>	Shrub	27	28.5	1.5
<i>Acacia decora</i>	Shrub	31	32	1
<i>Acacia decora</i>	Shrub	34.5	35	0.5
<i>Callitris glaucophylla</i>	Subcanopy	35.5	42.5	7
<i>Eucalyptus crebra</i>	Canopy	43	48	5
<i>Callitris glaucophylla</i>	Subcanopy	44	45.5	1.5
<i>Callitris glaucophylla</i>	Subcanopy	46.5	47.5	1
<i>Eucalyptus populnea</i>	Canopy	48	61	13
<i>Callitris glaucophylla</i>	Subcanopy	49	53	4
<i>Callitris glaucophylla</i>	Subcanopy	57.5	59	1.5
<i>Eucalyptus crebra</i>	Subcanopy	62.5	63	0.5
<i>Callitris glaucophylla</i>	Subcanopy	64.5	66	1.5
<i>Callitris glaucophylla</i>	Subcanopy	67	68.5	1.5
<i>Eucalyptus populnea</i>	Canopy	67.5	79	11.5
<i>Callitris glaucophylla</i>	Subcanopy	70.5	73	2.5
<i>Callitris glaucophylla</i>	Subcanopy	79	80.5	1.5
<i>Eucalyptus crebra</i>	Canopy	89.5	100	10.5
<i>Acacia conferta</i>	Shrub	90	92	2
<i>Callitris glaucophylla</i>	Subcanopy	93	95.5	2.5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BD
	Date:	8/11/2020
	Observers:	DF_AF

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South	Bioregion:	Brigalow belt					
Plot Origin:	Zone:	56	Easting:	151.011	Northing:	-28.4072	Accuracy:	+/-10m
Datum:	GDA94	Plot bearing:	80°					
Locality description:	60MA3456							

Regional Ecosystem and Tree Heights

Habitat Description:	<i>Eucalyptus fibrosa</i> & <i>Corymbia trachyphloia</i> open forest						
Regional Ecosystem:	11.7.7	Median Tree Canopy ht:	18	Emergent ht:		Subcanopy ht:	10

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 45

Per ha Total (m): 165

Site Total (m): 225

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	69	72	30	69	51	58.2
% Native annual grass						
% Native forbs and other species	15	3	25	15	20	15.6
% Native shrubs (<1m in height)	1			1	3	1
% Non-native grass						
% Non-native forbs & shrubs						
% Litter		25	43	15	25	21.6
% Rock	10					2
% Bare ground	5		2		1	1.6
% Cryptograms						
Total	100%	100%	100%	100%	100%	

Quadrat 1:

Note: no 1 x 1 m quadrat photos recorded for this site.

Quadrat 2:

Quadrat 3:

Quadrat 4:

Quadrat 5:

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BD
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	25%
Total No. Large Trees:	3
Total No. Large Trees per ha:	6
Native Tree Species Richness:	8
Eucalypts:	# of trees>= benchmark: 0
	# of trees>= benchmark per ha: 0
Non-eucalypts:	# of trees>= benchmark: 3
	# of trees>= benchmark per ha: 6

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	5
Forbs and others spp. richness:	11
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Acacia crassa</i>			Subcanopy	
<i>Eucalyptus fibrosa</i>		Canopy		
<i>Eucalyptus crebra</i>		Canopy		Yes
<i>Eucalyptus chloroclada</i>		Canopy		
<i>Allocasuarina inophloia</i>			Subcanopy	
<i>Corymbia trachyphloia</i>		Canopy		
<i>Acacia shirleyi</i>				
<i>Callitris glaucophylla</i>	Dead	Canopy		

50 x 10m area

Species		Life Form	Status
<i>Acacia conferta</i>		Shrub	
<i>Acacia crassa</i>		Shrub	
<i>Acacia shirleyi</i>		Tree	
<i>Actinotus gibbonsii</i>		Forbs/Other	
<i>Aristida caput-medusae</i>		Grass	
<i>Aristida jerichoensis</i>		Grass	
<i>Brunoniella australis</i>		Forbs/Other	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs/Other	
<i>Cryptandra amara</i>		Shrub	
<i>Dodonaea triangulare</i>		Shrub	
<i>Dysphania carinata</i>		Forbs/Other	
<i>Entolasia minutifolia</i>		Grass	
<i>Goodenia glabra</i>		Forbs/Other	
<i>Haloragis aspera</i>		Forbs/Other	
<i>Hibiscus sturtii</i>		Shrub	
Species indeterminate	Native <i>Solanum</i>	Forbs/Other	
<i>Oxalis perennans</i>		Forbs/Other	
<i>Phyllanthus maderaspatensis</i>		Shrub	
<i>Pomax umbellata</i>		Forbs/Other	
<i>Thyridolepis xerophila</i>		Grass	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs/Other	
<i>Wahlenbergia communis</i>		Forbs/Other	
<i>Walwhalleya subxerophila</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BD
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	8.5
Canopy total (m):	29.5
Emergent total (m):	0
Shrub total (m):	6

100m Transect: Tree Shrub and Canopy Cover:

Species		Type	Start	Finish	Total
Acacia crassa		Subcanopy	0	3	3
Eucalyptus fibrosa		Canopy	5	6.5	1.5
Eucalyptus crebra		Canopy	6.5	14	7.5
Eucalyptus crebra		Canopy	15	17	2
Acacia crassa		Subcanopy	16	18	2
Acacia conferta		Shrub	18	18.5	0.5
Eucalyptus crebra		Canopy	19	26	7
Acacia crassa		Shrub	30	31.5	1.5
Eucalyptus crebra		Canopy	33	36	3
Acacia conferta		Shrub	37	38	1
Eucalyptus crebra		Canopy	40.5	42	1.5
Acacia crassa		Shrub	41	44	3
Eucalyptus crebra		Canopy	44	46	2
Eucalyptus chloroclada		Canopy	46.5	48.5	2
Acacia crassa		Subcanopy	59.5	61	1.5
Allocasuarina inophloia		Subcanopy	61	63	2
Corymbia trachyphloia		Canopy	66	69	3
Callitris glaucophylla	Dead	Canopy	72.5	100	27.5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BA
	Date:	8/11/2020
	Observers:	BJ_KS

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South		Bioregion:	Brigalow belt				
Plot Origin:	Zone:	56	Easting:	150.9310	Northing:	-28.4738	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:	210°				
Locality description:			58SP169187					

Regional Ecosystem and Tree Heights

Habitat Description:		<i>Eucalyptus chloroclada</i> and <i>Callitris glaucophylla</i> woodland					
Regional Ecosystem:	11.5.1	Median Tree Canopy ht:	12	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:

Note: only three site photos recorded for this location.

50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 113

Per ha Total (m): 1130

Site Total (m): 565

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	25	40	77	65	80	57.4
% Native annual grass						
% Native forbs and other species		3	3	2	4	2.4
% Native shrubs (<1m in height)	1	1			1	0.6
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	39	27	10	21	10	21.4
% Rock						
% Bare ground	35	29	10	12	5	18.2
% Cryptograms						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BA
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	BJ_KS
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	75%
Total No. Large Trees:	20
Total No. Large Trees per ha:	40
Native Tree Species Richness:	10
Eucalypts:	# of trees >= benchmark: 3
	# of trees >= benchmark per ha: 6
Non-eucalypts:	# of trees >= benchmark: 7
	# of trees >= benchmark per ha: 14

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	3
Grass spp. richness:	7
Forbs and others spp. richness:	8
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus chloroclada</i>		Canopy		Yes
<i>Corymbia clarksoniana</i>		Canopy		Yes
<i>Corymbia glaucophylla</i>		Canopy		Yes
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Allocasuarina inophloia</i>			Subcanopy	
<i>Alphitonia excelsa</i>			Subcanopy	
<i>Brachychiton populneus</i>		Canopy		
<i>Acacia leiocalyx</i>			Subcanopy	
<i>Acacia concurrens</i>			Subcanopy	
<i>Alstonia constricta</i>			Subcanopy	

50 x 10m area

10		Life Form	Status
<i>Phyllanthus fuernrohrii</i>		Forbs and Other Species	
<i>Digitaria brownii</i>		Grass	
<i>Aristida jerichoensis</i>		Grass	
Species indeterminate	<i>Aristida</i> sp.	Grass	
Species indeterminate	<i>Cheilanthes</i> sp.	Forbs and Other Species	
<i>Cleistochloa subjuncea</i>		Grass	
<i>Acacia conferta</i>		Shrub	
Species indeterminate	<i>Cheilanthes</i> sp.	Grass	
<i>Calotis cuneifolia</i>		Forbs and Other Species	
<i>Portulaca australis</i>		Forbs and Other Species	
Species indeterminate	<i>Oxalis</i> sp.	Forbs and Other Species	
<i>Gahnia aspera</i>		Forbs and Other Species	
<i>Opuntia tomentosa</i>		Shrub	*
<i>Lomandra multiflora</i>		Forbs and Other Species	
<i>Setaria surgens</i>		Grass	
<i>Alphitonia excelsa</i>		Shrub	
<i>Opuntia aurantiaca</i>		Shrub	*
Species indeterminate	<i>Paspalidium</i> sp.	Grass	
<i>Haloragis aspera</i>		Forbs and Other Species	
<i>Acacia leiocalyx</i>		Shrub	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BA
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	BJ_KS
Corrected:.....		

100 x 50m Area

SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	14.3
Canopy total (m):	16.9
Emergent total (m):	0
Shrub total (m):	0.6

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
	Canopy	42.8	49.3	6.5
	Subcanopy	51.2	54.4	3.2
	Canopy	55	57	2
	Shrub	57.4	58	0.6
	Canopy	58.8	60	1.2
	Subcanopy	64.9	65.3	0.4
	Subcanopy	70.3	71.1	0.8
	Canopy	74.7	79.9	5.2
	Subcanopy	80	82.4	2.4
	Subcanopy	85	87.2	2.2
	Canopy	87.1	89.1	2
	Subcanopy	93.7	98.3	4.6
	Subcanopy	99.3	100	0.7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BB
	Date:	8/11/2020
	Observers:	BJ_KS

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South	Bioregion:	Brigalow belt					
Plot Origin:	Zone:	56	Easting:	150.9319	Northing:	-28.4703	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:	0°				
Locality description:			58SP169187					

Regional Ecosystem and Tree Heights

Habitat Description:		Woodland dominated by <i>Eucalyptus tereticornis</i> , <i>Angophora leiocarpa</i> and <i>Callitris glaucophylla</i> .					
Regional Ecosystem:	11.3.14	Median Tree Canopy ht:	14	Emergent ht:		Subcanopy ht:	7

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 169

Per ha Total (m): 1690

Site Total (m): 845

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass			23			4.6
% Native annual grass						
% Native forbs and other species			2	3		1
% Native shrubs (<1m in height)		8	1			1.8
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	90	92	57	92	95	85.2
% Rock						
% Bare ground	10		17	5	5	7.4
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BB
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	BJ_KS
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	17
Total No. Large Trees per ha:	34
Native Tree Species Richness:	7
Eucalypts:	# of trees >= benchmark: 12
	# of trees >= benchmark per ha: 24
Non-eucalypts:	# of trees >= benchmark: 5
	# of trees >= benchmark per ha: 10

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	5
Grass spp. richness:	9
Forbs and others spp. richness:	12
Non-native plant cover (%)	0.10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus chloroclada</i>		Canopy	Subcanopy	Yes
<i>Callitris glaucophylla</i>		Canopy	Subcanopy	Yes
<i>Angophora leiocarpa</i>		Canopy	Subcanopy	Yes
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Eucalyptus crebra</i>		Canopy	Subcanopy	Yes
<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>		Canopy	Subcanopy	Yes
<i>Xylomelum cunninghamianum</i>		Canopy		Yes

50 x 10m area

Species		Life Form	Status
<i>Allocasuarina luehmannii</i>		Shrub	
<i>Gahnia aspera</i>		Forbs and Other Species	
Species indeterminate		Grass	
<i>Lomandra leucocephala</i>		Forbs and Other Species	
Species indeterminate		Grass	
<i>Opuntia tomentosa</i>		Shrub	*
<i>Lomandra multiflora</i>		Forbs and Other Species	
<i>Acacia neriifolia</i>		Shrub	
<i>Alloteropsis semialata</i>		Grass	
<i>Chrysopogon fallax</i>		Grass	
Species indeterminate		Grass	
<i>Phyllanthus virgatus</i>		Forbs and Other Species	
<i>Brunoniella australis</i>		Forbs and Other Species	
Species indeterminate		Forbs and Other Species	
<i>Cheilanthes brownii</i>		Forbs and Other Species	
<i>Arundinella nepalensis</i>		Grass	
Species indeterminate		Grass	
<i>Panicum effusum</i>		Grass	
<i>Pomax umbellata</i>		Forbs and Other Species	
Species indeterminate		Grass	
<i>Goodenia rotundifolia</i>		Forbs and Other Species	
<i>Lomandra longifolia</i>		Forbs and Other Species	
<i>Knoxia sumatrensis</i>		Forbs and Other Species	
<i>Boronia bipinnata</i>		Shrub	
<i>Leptospermum lamellatum</i>		Shrub	
Species indeterminate		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BB
Entered:.....	Date:	8/11/2020
Checked:.....	Observers:	BJ_KS
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	30.8
Canopy total (m):	56.9
Emergent total (m):	0
Shrub total (m):	2.3

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
	Canopy	0	3.9	3.9
	Subcanopy	1.2	6	4.8
	Subcanopy	7.4	8.5	1.1
	Canopy	10.4	17.4	7
	Subcanopy	10.8	13.4	2.6
	Subcanopy	17.9	20.2	2.3
	Canopy	19.4	31	11.6
	Subcanopy	22.7	24.8	2.1
	Subcanopy	34.7	39.2	4.5
	Canopy	40.2	53.3	13.1
	Subcanopy	41.9	43.9	2
	Subcanopy	44.7	47.4	2.7
	Subcanopy	53	54.4	1.4
	Canopy	58.5	67	8.5
	Subcanopy	64.7	66	1.3
	Subcanopy	65	71	6
	Shrub	69.7	71.1	1.4
	Canopy	69.8	80.3	10.5
	Shrub	82.6	83.5	0.9
	Canopy	97.7	100	2.3

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BC
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

Location:		Brigalow Belt - South		Bioregion:		Brigalow belt									
Plot Origin:		Zone:	56	Easting:		151.048		Northing:		-28.3905		Accuracy:		+/-10m	
Datum:			GDA94		Plot bearing:				170°						
Locality description:				141MH193											

Regional Ecosystem and Tree Heights

Habitat Description:		Woodland dominated by <i>Eucalyptus tereticornis</i> and <i>Eucalyptus chloroclada</i> with <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> and <i>Angophora subvelutina</i> and a grassy ground layer					
Regional Ecosystem:	11.3.4	Median Tree Canopy ht:	13	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	40.5
Per ha Total (m):	405
Site Total (m):	202.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	73	63	35	1	6	35.6
% Native annual grass						
% Native forbs and other species	1	5	1	6	1	2.8
% Native shrubs (<1m in height)			1			0.2
% Non-native grass						
% Non-native forbs & shrubs	5	2	1	12	6	5.2
% Litter	15	25	57	81	87	53
% Rock						
% Bare ground	6	5	5			3.2
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BC
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	14
Total No. Large Trees per ha:	28
Native Tree Species Richness:	5
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 14
	# of trees >= benchmark per ha: 28

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	15
Forbs and others spp. richness:	15
Non-native plant cover (%)	3.10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus tereticornis</i>		Canopy	Subcanopy	Yes
<i>Eucalyptus chloroclada</i>		Canopy	Subcanopy	Yes
<i>Callitris glaucophylla</i>		Canopy	Subcanopy	Yes
<i>Allocasuarina luehmannii</i>		Canopy	Subcanopy	Yes
<i>Angophora subvelutina</i>		Canopy	Subcanopy	Yes

50 x 10m area

Species	Life Form	Status
<i>Glandularia aristigera</i>	Forbs and Other Species	*
<i>Enteropogon ramosus</i>	Grass	
<i>Aristida calycina</i>	Grass	
<i>Aristida jerichoensis</i>	Grass	
<i>Solanum ellipticum</i>	Forbs and Other Species	
<i>Dysphania carinata</i>	Forbs and Other Species	
<i>Heliotropium amplexicaule</i>	Forbs and Other Species	*
<i>Lomandra longifolia</i>	Forbs and Other Species	
<i>Rostellularia adscendens</i>	Forbs and Other Species	
<i>Einadia hastata</i>	Forbs and Other Species	
<i>Alternanthera denticulata</i>	Forbs and Other Species	
<i>Phyllanthus fuernrohrii</i>	Forbs and Other Species	
<i>Dichanthium sericeum</i>	Grass	
<i>Solanum nigrum</i>	Forbs and Other Species	*
<i>Panicum effusum</i>	Grass	
<i>Ancistrachne uncinulata</i>	Grass	
Species indeterminate	Forbs and Other Species	
<i>Setaria surgens</i>	Grass	
Species indeterminate	Grass	
Species indeterminate	Grass	
Species indeterminate	Grass	
Species indeterminate	Grass	
<i>Eragrostis spartinooides</i>	Grass	
<i>Calotis cuneifolia</i>	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
<i>Allocasuarina luehmannii</i>	Shrub	
<i>Lomandra leucocephala</i>	Forbs and Other Species	
<i>Aristida benthamii</i>	Grass	
<i>Arundinella nepalensis</i>	Grass	
<i>Melinis repens</i>	Grass	*

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BC
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	6.3
Canopy total (m):	42.1
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
	Other	6.6	9	2.4
	Canopy	9.4	19.2	9.8
	Subcanopy	13.9	15.3	1.4
	Canopy	21	24.5	3.5
	Canopy	30.4	34.1	3.7
	Canopy	35.7	37	1.3
	Subcanopy	37.9	39.9	2
	Canopy	41.2	43	1.8
	Canopy	52.8	56.3	3.5
	Canopy	56.8	59.4	2.6
	Subcanopy	58	60.9	2.9
	Canopy	62.7	67.5	4.8
	Canopy	70.5	71.9	1.4
	Canopy	87.3	90	2.7
	Canopy	93	100	7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BD
	Date:	9/11/2020
	Observers:	BJ_LA

100 x 50m Area SITE INFORMATION

Location:	Brigalow Belt - South		Bioregion:	Brigalow belt				
Plot Origin:	Zone:	56	Easting:	151.0430	Northing:	-28.3894	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:	240°				
Locality description:			141MH193					

Regional Ecosystem and Tree Heights

Habitat Description:		<i>Eucalyptus crebra</i> dominated open forest.					
Regional Ecosystem:	11.7.7	Median Tree Canopy ht:	23	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	34.5
Per ha Total (m):	345
Site Total (m):	172.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	62	30	89	20	60	52.2
% Native annual grass						
% Native forbs and other species		3	1	12	5	4.2
% Native shrubs (<1m in height)	1	1	4	15	5	5.2
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	35	63	6	53	30	37.4
% Rock						
% Bare ground	2	3				1
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



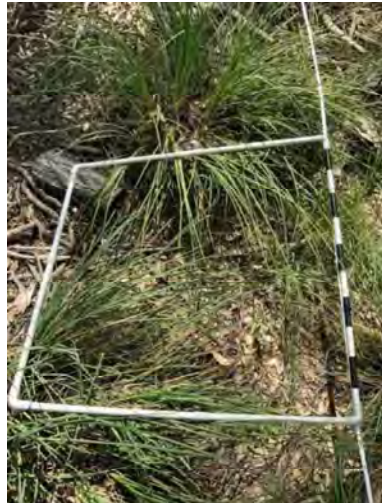
Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BD
	Date:	9/11/2020
	Observers:	BJ_LA

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	0%
Total No. Large Trees:	9
Total No. Large Trees per ha:	18
Native Tree Species Richness:	6
Eucalypts:	# of trees >= benchmark: 9
	# of trees >= benchmark per ha: 18
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	5
Forbs and others spp. richness:	9
Non-native plant cover (%)	0.01%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus crebra</i>		Canopy		
<i>Angophora leiocarpa</i>		Canopy		
<i>Callitris glaucophylla</i>			Subcanopy	
<i>Acacia shirleyi</i>			Subcanopy	
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Allocasuarina inophloia</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
Digitaria brownii		Grass	
Species indeterminate		Forbs and Other Species	
Species indeterminate		Grass	
Scleria mackaviensis		Forbs and Other Species	
Cleistochloa subjuncea		Grass	
Boronia bipinnata		Shrub	
Solanum ellipticum		Forbs and Other Species	
Species indeterminate		Grass	
Aristida calycina		Grass	
Acacia leiocalyx		Shrub	
Commelina lanceolata		Forbs and Other Species	
Sida rohlenae		Forbs and Other Species	
Goodenia rotundifolia		Forbs and Other Species	
Opuntia tomentosa		Shrub	*
Einadia hastata		Forbs and Other Species	
Alphitonia excelsa		Shrub	
Gahnia aspera		Forbs and Other Species	
Lomandra multiflora		Forbs and Other Species	
Maireana microphylla		Shrub	
Acacia shirleyi		Shrub	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BD
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	18.4
Canopy total (m):	50.4
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
	Canopy	3	7	4
	Canopy	5.2	18	12.8
	Subcanopy	17.6	18.7	1.1
	Subcanopy	23.3	25.7	2.4
	Canopy	28.4	37	8.6
	Subcanopy	27.7	34.5	6.8
	Canopy	41.7	50.5	8.8
	Canopy	58.5	67.5	9
	Subcanopy	79.6	87.7	8.1
	Canopy	89	98	9

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BE
	Date:	9/11/2020
	Observers:	DF_AF

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South	Bioregion:	Brigalow belt					
Plot Origin:	Zone:	56	Easting:	151.1710	Northing:	-28.1917	Accuracy:	+/-10m
Datum:	GDA94	Plot bearing:	220°					
Locality description:	10MH737							

Regional Ecosystem and Tree Heights

Habitat Description:	<i>Acacia harpophylla</i> and <i>Casuarina cristata</i> forest						
Regional Ecosystem:	11.9.5	Median Tree Canopy ht:	15	Emergent ht:		Subcanopy ht:	3

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 169

Per ha Total (m): 1690

Site Total (m): 845

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	1	1	2	1	3	1.6
% Native annual grass						
% Native forbs and other species	5	10	10	5	3	6.6
% Native shrubs (<1m in height)						
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	54	89	63	84	74	72.8
% Rock						
% Bare ground	40		25	10	20	19
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BE
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	60%
Total No. Large Trees:	11
Total No. Large Trees per ha:	22
Native Tree Species Richness:	4
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 11
	# of trees >= benchmark per ha: 22

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	3
Grass spp. richness:	2
Forbs and others spp. richness:	13
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus woollsiana</i>		Canopy		
<i>Acacia harpophylla</i>		Canopy	Subcanopy	Yes
<i>Casuarina cristata</i>		Canopy		Yes
<i>Eremophila mitchellii</i>			Subcanopy	

50 x 10m area

Species	Life Form	Status
<i>Abutilon oxycarpum</i>	Forbs/Other	
<i>Acacia harpophylla</i>	Tree	
<i>Brunoniella australis</i>	Forbs/Other	
<i>Casuarina cristata</i>	Tree	
<i>Cheilanthes distans</i>	Forbs/Other	
<i>Commelina diffusa</i>	Forbs/Other	
<i>Enchylaena tomentosa</i>	Forbs/Other	
<i>Enteropogon acicularis</i>	Grass	
<i>Eremophila mitchellii</i>	Tree	
<i>Geijera parviflora</i>	Shrub	
<i>Glycine tabacina</i>	Forbs/Other	
<i>Lycium ferocissimum</i>	Shrub	*
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Forbs/Other	
<i>Opuntia tomentosa</i>	Exotic	*
<i>Paspalidium gracile</i>	Grass	
<i>Portulaca oleracea</i>	Forbs/Other	
<i>Pseuderanthemum variabile</i>	Forbs/Other	
<i>Rhagodia spinescens</i>	Shrub	
<i>Zygophyllum apiculatum</i>	Forbs/Other	
<i>Rostellularia adscendens</i>	Forbs/Other	
<i>Sclerolaena tetracuspis</i>	Forbs/Other	
<i>Teucrium junceum</i>	Shrub	
<i>Tribulus micrococcus</i>	Forbs/Other	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BE
Entered:.....	Date:	9/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	3.5
Canopy total (m):	53.5
Emergent total (m):	0
Shrub total (m):	10

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Acacia harpophylla</i>	Canopy	0	3	3
<i>Acacia harpophylla</i>	Shrub	0.5	3	2.5
<i>Acacia harpophylla</i>	Canopy	13	22.5	9.5
<i>Acacia harpophylla</i>	Shrub	13.5	15.5	2
<i>Acacia harpophylla</i>	Canopy	31.5	37	5.5
<i>Acacia harpophylla</i>	Subcanopy	36	37.5	1.5
<i>Geijera parviflora</i>	Shrub	42.5	44.5	2
<i>Casuarina cristata</i>	Canopy	47	48	1
<i>Acacia harpophylla</i>	Canopy	47.5	54	6.5
<i>Acacia harpophylla</i>	Canopy	60	72	12
<i>Eucalyptus microcarpa</i>	Canopy	64	73	9
<i>Geijera parviflora</i>	Shrub	71.5	75	3.5
<i>Acacia harpophylla</i>	Canopy	77	80	3
<i>Casuarina cristata</i>	Canopy	80	87	7
<i>Acacia harpophylla</i>	Canopy	86.5	90	3.5
<i>Acacia harpophylla</i>	Canopy	93	95.5	2.5
<i>Acacia harpophylla</i>	Subcanopy	95.5	97.5	2
	No canopy	97.5	100	2.5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BF
	Date:	10/11/2020
	Observers:	DF_AF

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South		Bioregion:	Brigalow belt		
Plot Origin:	Zone:	56	Easting:	151.1680	Northing:	-28.1937
			Accuracy:	+/-10m		
Datum:	GDA94	Plot bearing:	225°			
Locality description:	10MH737					

Regional Ecosystem and Tree Heights

Habitat Description:	<i>Eucalyptus chloroclada</i> woodland with <i>Allocasuarina luehmannii</i> subcanopy						
Regional Ecosystem:	11.5.4	Median Tree Canopy ht:	12	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 97

Per ha Total (m): 970

Site Total (m): 485

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	5	7	3	7	55	15.4
% Native annual grass						
% Native forbs and other species	1		2	5	2	2
% Native shrubs (<1m in height)			2			0.4
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	64	41	75	78	37	59
% Rock						
% Bare ground	20	17	15	10	5	13.4
% Cryptogams	10	35	3		1	9.8
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BF
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	40%
Total No. Large Trees:	91
Total No. Large Trees per ha:	182
Native Tree Species Richness:	5
Eucalypts:	# of trees >= benchmark: 23
	# of trees >= benchmark per ha: 46
Non-eucalypts:	# of trees >= benchmark: 68
	# of trees >= benchmark per ha: 136

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	3
Forbs and others spp. richness:	14
Non-native plant cover (%)	0.01%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus populnea</i>		Canopy		Yes
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Callitris glaucophylla</i>		Canopy	Subcanopy	
<i>Eucalyptus chloroclada</i>		Canopy		
<i>Casuarina cristata</i>		Canopy		

50 x 10m area

Species		Life Form	Status
Species indeterminate	Cyperaceae sp.	Forbs/Other	
<i>Acacia decora</i>		Shrub	
<i>Aristida calycina</i>		Grass	
<i>Brunoniella australis</i>		Forbs/Other	
<i>Calandrinia pickeringii</i>		Forbs/Other	
<i>Commelina diffusa</i>		Forbs/Other	
<i>Dysphania carinata</i>		Forbs/Other	
<i>Enchylaena tomentosa</i>		Forbs/Other	
<i>Enteropogon ramosus</i>		Grass	
<i>Euphorbia drummondii</i>		Forbs/Other	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>		Forbs/Other	
<i>Glycine tabacina</i>		Forbs/Other	
<i>Lomandra confertifolia</i> subsp. <i>pallida</i>		Forbs/Other	
Species indeterminate	Native <i>Boerhavia</i>	Forbs/Other	
Species indeterminate	Native Campanulaceae	Forbs/Other	
<i>Paspalidium distans</i>		Grass	
<i>Rostellularia adscendens</i>		Forbs/Other	
<i>Solanum ellipticum</i>		Forbs/Other	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BF
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	56
Canopy total (m):	60.5
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Allocasuarina luehmannii</i>	Subcanopy	0	1.5	1.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	5	7	2	
<i>Allocasuarina luehmannii</i>	Subcanopy	10	17	7	
<i>Eucalyptus populnea</i>	Canopy	11.5	17	5.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	20	21.5	1.5	
<i>Eucalyptus populnea</i>	Canopy	20.5	27	6.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	22.5	25	2.5	
<i>Callitris glaucophylla</i>	Subcanopy	28	29	1	
<i>Allocasuarina luehmannii</i>	Subcanopy	29.5	30	0.5	
<i>Callitris glaucophylla</i>	Subcanopy	30	32	2	
<i>Allocasuarina luehmannii</i>	Subcanopy	31	35.5	4.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	38	40	2	
<i>Eucalyptus populnea</i>	Canopy	38	52	14	
<i>Allocasuarina luehmannii</i>	Subcanopy	41	42.5	1.5	
<i>Callitris glaucophylla</i>	Canopy	45	48	3	
<i>Allocasuarina luehmannii</i>	Subcanopy	47.5	52	4.5	
<i>Callitris glaucophylla</i>	Subcanopy	50	52	2	
<i>Eucalyptus populnea</i>	Canopy	53.5	64.5	11	
<i>Allocasuarina luehmannii</i>	Subcanopy	53.5	55	1.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	57.5	60	2.5	
<i>Callitris glaucophylla</i>	Canopy	56.5	59	2.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	61	62.5	1.5	
<i>Allocasuarina luehmannii</i>	Subcanopy	65	66.5	1.5	
<i>Callitris glaucophylla</i>	Canopy	66	69	3	
<i>Allocasuarina luehmannii</i>	Subcanopy	67.5	70	2.5	
<i>Eucalyptus chloroclada</i>	Canopy	69	80	11	
<i>Allocasuarina luehmannii</i>	Subcanopy	73.5	76.5	3	
<i>Allocasuarina luehmannii</i>	Subcanopy	78	82	4	

<i>Eucalyptus populnea</i>		Canopy	81	86	5
<i>Allocasuarina luehmannii</i>		Subcanopy	84	86	2
<i>Callitris glaucophylla</i>		Canopy	86	87	1
<i>Allocasuarina luehmannii</i>		Subcanopy	88	90.5	2.5
<i>Callitris glaucophylla</i>		Canopy	88.5	91	2.5
<i>Callitris glaucophylla</i>		Canopy	93.5	95.5	2
<i>Eucalyptus chloroclada</i>		Canopy	94.5	100	5.5
<i>Allocasuarina luehmannii</i>		Subcanopy	94.5	100	5.5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BE
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area

SITE INFORMATION

Location:		Brigalow Belt - South		Bioregion:		Brigalow belt									
Plot Origin:		Zone:	56	Easting:		151.154		Northing:		-28.2287		Accuracy:		+/-10m	
Datum:			GDA94		Plot Alignment description:				270°						
Locality description:				341FTY1881											

Regional Ecosystem and Tree Heights

Habitat Description:		Eucalyptus tereticornis open forest with Lomandra longifolia dominated ground layer.					
Regional Ecosystem:	11.3.25	Median Tree Canopy ht:	26.8	Emergent ht:		Subcanopy ht:	10

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 31.6

Per ha Total (m): 316

Site Total (m): 158

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	1		3		1	1
% Native annual grass						
% Native forbs and other species	20	70	72	60	53	55
% Native shrubs (<1m in height)					1	0.2
% Non-native grass						
% Non-native forbs & shrubs						
% Litter	79	30	25	40	45	43.8
% Rock						
% Bare ground						
% Cryptograms						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



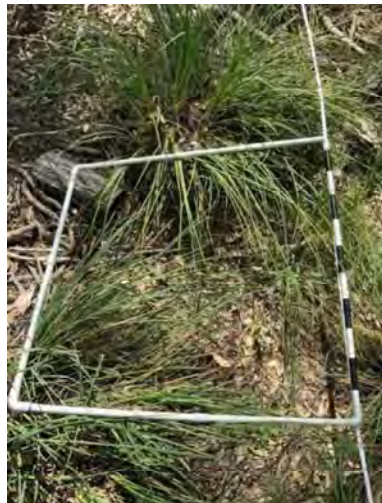
Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BE
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	22
Total No. Large Trees per ha:	44
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 15
	# of trees >= benchmark per ha: 30
Non-eucalypts:	# of trees >= benchmark: 7
	# of trees >= benchmark per ha: 14

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	2
Grass spp. richness:	2
Forbs and others spp. richness:	22
Non-native plant cover (%)	0.10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus tereticornis</i>		Canopy	Subcanopy	Yes
<i>Angophora floribunda</i>		Canopy	Subcanopy	Yes
<i>Callitris glaucophylla</i>		Canopy	Subcanopy	Yes

50 x 10m area

Species	Life Form	Status
<i>Lomandra longifolia</i>	Forbs and Other Species	
<i>Centella asiatica</i>	Forbs and Other Species	
<i>Sonchus oleraceus</i>	Forbs and Other Species	*
<i>Centipeda minima</i>	Forbs and Other Species	
<i>Cyperus exaltatus</i>	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
<i>Leptospermum polygalifolium</i>	Shrub	
<i>Erigeron bonariensis</i>	Forbs and Other Species	*
<i>Leersia hexandra</i>	Grass	
<i>Dianella longifolia</i>	Forbs and Other Species	
<i>Hydrocotyle acutiloba</i>	Forbs and Other Species	
<i>Themeda avenacea</i>	Grass	
Other Species	Forbs and Other Species	
<i>Lysimachia arvensis</i>	Forbs and Other Species	*
<i>Solanum nigrum</i>	Forbs and Other Species	*
Species indeterminate	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
<i>Sigesbeckia orientalis</i>	Forbs and Other Species	
<i>Cirsium vulgare</i>	Forbs and Other Species	*
<i>Verbena litoralis</i>	Forbs and Other Species	*
<i>Glandularia aristigera</i>	Forbs and Other Species	*
Species indeterminate	Forbs and Other Species	
<i>Bidens pilosa</i>	Forbs and Other Species	*
<i>Solanum ellipticum</i>	Forbs and Other Species	
<i>Acacia neriifolia</i>	Shrub	
<i>Heliotropium amplexicaule</i>	Forbs and Other Species	*
Species indeterminate	Forbs and Other Species	
<i>Commelina lanceolata</i>	Forbs and Other Species	
<i>Gahnia aspera</i>	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
<i>Lomandra multiflora</i>	Forbs and Other Species	
<i>Euchiton sphaericus</i>	Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BE
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	3.8
Canopy total (m):	91.1
Emergent total (m):	0
Shrub total (m):	2.2

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
		Canopy	0	10.4	10.4
		Subcanopy	4.2	8	3.8
		Canopy	14.3	23.7	9.4
		Canopy	24.8	44.3	19.5
		Canopy	48.2	100	51.8
		Shrub	59.2	61.4	2.2

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BF
	Date:	11/11/2020
	Observers:	BJ_LA

100 x 50m Area

SITE INFORMATION

Location:	Brigalow Belt - South		Bioregion:	Brigalow belt				
Plot Origin:	Zone:	56	Easting:	151.5680	Northing:	-27.7141	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:	277°				
Locality description:			3RP7480					

Regional Ecosystem and Tree Heights

Habitat Description:		<i>Eucalyptus orgadophilla</i> , <i>Callitris glaucophylla</i> woodland with <i>Carissa ovata</i> shrub layer and grassy ground layer. Loose surface rocks abundant throughout.					
Regional Ecosystem:	11.8.5	Median Tree Canopy ht:	16	Emergent ht:		Subcanopy ht:	11

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 16.5

Per ha Total (m): 165

Site Total (m): 82.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	7		2			1.8
% Native annual grass						
% Native forbs and other species	60	15	20		10	21
% Native shrubs (<1m in height)		45	5	30	15	19
% Non-native grass						
% Non-native forbs & shrubs	5		15		15	7
% Litter	15	40	24	65	50	38.8
% Rock	5		14	5	10	6.8
% Bare ground	8		20			5.6
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BF
	Date:	10/11/2020
	Observers:	BJ_LA

100 x 50m Area SITE INFORMATION

100 x 50m area	
%EDL Recruitment:	100%
Total No. Large Trees:	6
Total No. Large Trees per ha:	12
Native Tree Species Richness:	11
Eucalypts:	# of trees >= benchmark: 6
	# of trees >= benchmark per ha: 12
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	8
Grass spp. richness:	3
Forbs and others spp. richness:	15
Non-native plant cover (%)	7.10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus orgadophila</i>		Canopy	Subcanopy	Yes
<i>Callitris glaucophylla</i>		Canopy	Subcanopy	Yes
<i>Auranticarpa rhombifolia</i>			Subcanopy	
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>			Subcanopy	
<i>Acacia decora</i>			Subcanopy	
<i>Psyrax odorata</i>			Subcanopy	
<i>Elaeodendron australe</i> var. <i>australe</i>			Subcanopy	
<i>Geijera parviflora</i>			Subcanopy	
<i>Notelaea microcarpa</i>			Subcanopy	
<i>Alphitonia excelsa</i>			Subcanopy	
<i>Acacia maidenii</i>			Subcanopy	

50 x 10m area

Species	Life Form	Status
<i>Carissa ovata</i>	Shrub	
<i>Malvastrum americanum</i> var. <i>americanum</i>	Forbs and Other Species	*
<i>Glandularia aristigera</i>	Forbs and Other Species	*
<i>Acacia decora</i>	Shrub	
<i>Psydrax odorata</i>	Shrub	
<i>Opuntia tomentosa</i>	Shrub	*
<i>Sigesbeckia orientalis</i>	Forbs and Other Species	
<i>Vittadinia cuneata</i>	Forbs and Other Species	
<i>Jasminum didymum</i>	Forbs and Other Species	
<i>Cyperus gracilis</i>	Forbs and Other Species	
Species indeterminate	Grass	
<i>Asclepias curassavica</i>	Forbs and Other Species	*
Species indeterminate	Forbs and Other Species	
<i>Cirsium vulgare</i>	Forbs and Other Species	*
<i>Megathyrsus maximus</i>	Grass	*
Species indeterminate	Forbs and Other Species	
<i>Einadia hastata</i>	Forbs and Other Species	
<i>Einadia nutans</i>	Forbs and Other Species	
Species indeterminate	Forbs and Other Species	
<i>Geitonoplesium cymosum</i>	Forbs and Other Species	
<i>Paspalidium caespitosum</i>	Grass	
<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>	Shrub	
<i>Breynia oblongifolia</i>	Shrub	
<i>Asparagus africanus</i>	Forbs and Other Species	*
<i>Abutilon oxycarpum</i>	Shrub	
Species indeterminate	Shrub	
<i>Capparis mitchellii</i>	Shrub	
<i>Solanum nigrum</i>	Forbs and Other Species	*
<i>Austrostipa verticillata</i>	Grass	
Species indeterminate	Shrub	
<i>Opuntia stricta</i>	Shrub	*

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BF
Entered:.....	Date:	10/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	15.1
Canopy total (m):	24.5
Emergent total (m):	0
Shrub total (m):	44.3

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
	Subcanopy	0.4	6	5.6
	Shrub	3.7	6.2	2.5
	Subcanopy	6.7	11.7	5
	Shrub	14.9	20.9	6
	Subcanopy	17.8	22.3	4.5
	Shrub	21.2	22.3	1.1
	Shrub	23.2	23.7	0.5
	Shrub	28.3	28.9	0.6
	Shrub	32	32.3	0.3
	Other	32.5	35.6	3.1
	Canopy	40.7	53	12.3
	Shrub	40.2	47.6	7.4
	Shrub	48.3	50.8	2.5
	Other	47.2	49	1.8
	Shrub	54.8	59.4	4.6
	Other	56.3	60.1	3.8
	Shrub	61.7	67.3	5.6
	Shrub	71	82	11
	Other	73.4	77.6	4.2
	Canopy	75	80.5	5.5
	Shrub	83.7	85.9	2.2
	Other	88.8	91.7	2.9
	Canopy	93.3	100	6.7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BG
Entered:.....	Date:	11/11/2020
Checked:.....	Observers:	DF_AF
Corrected:.....		

100 x 50m Area

SITE INFORMATION

Location:		Brigalow Belt - South		Bioregion:		Brigalow belt									
Plot Origin:		Zone:	56	Easting:		151.4110		Northing:		-27.7924		Accuracy:		+/-10m	
Datum:			GDA94		Plot bearing:				30°						
Locality description:				22SP124720											

Regional Ecosystem and Tree Heights

Habitat Description:		Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland					
Regional Ecosystem:	Non-rem 11.3.21	Median Tree Canopy ht:	0	Emergent ht:		Subcanopy ht:	0

Note: As per Biocondition assessment guidelines (Eyre et al., 2015, p.14), woody-type site attributes such as tree canopy cover, tree canopy height, large trees etc are not assessable for grassland REs and the final condition score is standardised accordingly.

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 0

Per ha Total (m): 0

Site Total (m): 0

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	80	30	90	15	40	51
% Native annual grass						
% Native forbs and other species	10	10	1			4.2
% Native shrubs (<1m in height)						
% Non-native grass						
% Non-native forbs & shrubs				35	30	13
% Litter	5	15		5	30	11
% Rock						
% Bare ground	5	45	9	45		20.8
% Cryptogams						
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BG
Entered:.....	Date:	12/11/2020
Checked:.....	Observers:	BJ_LA
Corrected:.....		

100 x 50m Area

SITE INFORMATION

Location:		Brigalow Belt - South		Bioregion:		Brigalow belt									
Plot Origin:		Zone:	56	Easting:		151.4510		Northing:		-27.7551		Accuracy:		+/-10m	
Datum:			GDA94		Plot bearing:				120°						
Locality description:				RD02RP838169											

Regional Ecosystem and Tree Heights

Habitat Description:		Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland					
Regional Ecosystem:	Non-rem 11.3.21	Median Tree Canopy ht:	0	Emergent ht:		Subcanopy ht:	0

Note: As per Biocondition assessment guidelines (Eyre et al., 2015, p.14), woody-type site attributes such as tree canopy cover, tree canopy height, large trees etc are not assessable for grassland REs and the final condition score is standardised accordingly.

Site Photos:

North:



* Note: only one photo taken for this Site

South:

East:

West:

50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 0

Per ha Total (m): 0

Site Total (m): 0

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	71	63	69	75	45	64.6
% Native annual grass						
% Native forbs and other species	5	5	3	3	3	3.8
% Native shrubs (<1m in height)						
% Non-native grass						
% Non-native forbs & shrubs	3	10	3	3		3.8
% Litter	6	20	25	15	15	16.2
% Rock						
% Bare ground	15	2		4	37	11.6
% Cryptograms						
Total	100%	100%	100%	100%	100%	

Quadrat 1:

Note: no 1x1 m quadrat photos recorded at this site.

Quadrat 2:

Quadrat 3:

Quadrat 4:

Quadrat 5:

Post-wet biocondition data

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BA
Entered:.....	Date:	26/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	287354.69938	Northing:	6840041.02051	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus populnea, Eucalyptus woollsiana and Callitris glaucophylla</i> open forest					
Regional Ecosystem:	11.5.1a	Median Tree Canopy ht:	15	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 151

Per ha Total (m): 1510

Site Total (m): 755

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	25	10	30	30	20	23%
% Native annual grass						0%
% Native forbs and other species	5	10		10	20	9%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	20	50	50	40	40	40%
% Rock						0%
% Bare ground	50	30	20	20	20	28%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BA
	Date:	26/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	33%
Total No. Large Trees:	5
Total No. Large Trees per ha:	10
Native Tree Species Richness:	7
Eucalypts:	# of trees >= benchmark: 4
	# of trees >= benchmark per ha: 8
Non-eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	13
Forbs and others spp. richness:	18
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus populnea</i>		Canopy		
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Corymbia tessellaris</i>		Canopy		
<i>Capparis mitchellii</i>			Subcanopy	
<i>Acacia decurrens</i>			Subcanopy	
<i>Callitris glaucophylla</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Geijera parviflora</i>		Shrub	
<i>Allocasuarina luehmannii</i>		Shrub	
<i>Callitris glaucophylla</i>		Shrub	
<i>Commelina ensifolia</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
<i>Portulaca filifolia</i>		Forbs and Other Species	
<i>Calandrinia pickeringii</i>		Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Evolvulus alsinoides</i>		Forbs and Other Species	
Other	Cyperaceae 1	Forbs and Other Species	
Other	Cyperaceae 2	Forbs and Other Species	
Other	Eragrostis sp1	Grass	
<i>Calotis cuneifolia</i>		Forbs and Other Species	
<i>Lomandra multiflora</i>		Forbs and Other Species	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
Other	Solanum sp	Forbs and Other Species	
<i>Crinum flaccidum</i>		Forbs and Other Species	
<i>Bryophyllum delagoense</i>		Forbs and Other Species	Exotic
Other	Eragrostis sp2	Grass	
Other	Poaceae sp1	Grass	
<i>Enteropogon unispiceus</i>		Grass	
<i>Gomphrena celosioides</i>		Forbs and Other Species	Exotic
<i>Acacia oswaldii</i>		Forbs and Other Species	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
<i>Aristida caput medusae</i>		Grass	
<i>Eremophila debilis</i>		Forbs and Other Species	
Other	Aristida sp1	Grass	
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic
<i>Enteropogon acicularis</i>		Grass	
<i>Lomandra longifolia</i>		Forbs and Other Species	
<i>Eremophila deserti</i>		Shrub	
<i>Pittosporum angustifolium</i>		Shrub	
Other	Aristida sp2	Grass	
Other	Poaceae sp2	Grass	
<i>Capparis mitchellii</i>		Shrub	
<i>Dactyloctenium radulans</i>		Grass	
<i>Erigeron bonariensis</i>		Forbs and Other Species	Exotic
<i>Cymbopogon refractus</i>		Grass	
<i>Thellungia advena</i>		Grass	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Opuntia aurantiaca</i>		Forbs and Other Species	Exotic
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	Exotic

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BA
Entered:.....	Date:	26/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	19.9
Canopy total (m):	54.7
Emergent total (m):	0
Shrub total (m):	8

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Callitris glaucophylla</i>	Canopy	3.2	5.8	2.6
<i>Allocasuarina luehmannii</i>	Subcanopy	5.8	6.9	1.1
<i>Callitris glaucophylla</i>	Canopy	9.2	11.1	1.9
<i>Callitris glaucophylla</i>	Canopy	11.2	17.6	6.4
<i>Callitris glaucophylla</i>	Subcanopy	12.9	15.5	2.6
<i>Allocasuarina luehmannii</i>	Subcanopy	18.3	20.6	2.3
<i>Eucalyptus populnea</i>	Canopy	18.5	29.8	11.3
<i>Callitris glaucophylla</i>	Canopy	21.6	26.3	4.7
<i>Allocasuarina luehmannii</i>	Subcanopy	22.2	23	0.8
<i>Allocasuarina luehmannii</i>	Subcanopy	26.6	28.2	1.6
<i>Callitris glaucophylla</i>	Canopy	25	28.1	3.1
<i>Allocasuarina luehmannii</i>	Subcanopy	36.5	38.5	2
<i>Allocasuarina luehmannii</i>	Subcanopy	50.6	52	1.4
<i>Eucalyptus populnea</i>	Canopy	53.9	79.7	25.8
<i>Geijera parviflora</i>	Shrub	61.2	66.9	5.7
<i>Allocasuarina luehmannii</i>	Subcanopy	63.8	65.6	1.8
<i>Allocasuarina luehmannii</i>	Subcanopy	69.6	74.9	5.3
<i>Geijera parviflora</i>	Shrub	75.5	77.8	2.3
<i>Callitris glaucophylla</i>	Canopy	86.5	89.4	2.9
<i>Callitris glaucophylla</i>	Canopy	92.9	97.6	4.7
<i>Callitris glaucophylla</i>	Canopy	99	99.8	0.8
<i>Allocasuarina luehmannii</i>	Subcanopy	99	100	1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BB
	Date:	27/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	290684.36636	Northing:	6842095.54084	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> and <i>Geijera parviflora</i> open forest					
Regional Ecosystem:	11.5.1	Median Tree Canopy ht:	12	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 71

Per ha Total (m): 710

Site Total (m): 355

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	20	30	60	20	10	28%
% Native annual grass						0%
% Native forbs and other species				10		2%
% Native shrubs (<1m in height)				10		2%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	50	20	30	50	80	46%
% Rock						0%
% Bare ground	30	50	10	10	10	22%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

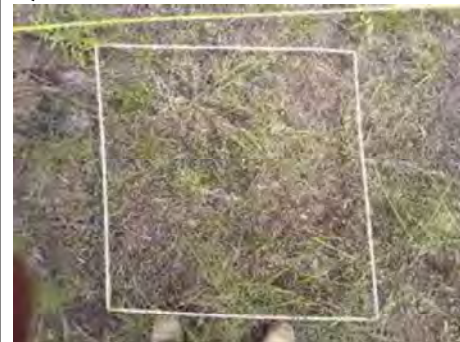
Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BB
	Date:	27/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	290684.36636	Northing:	6842095.54084	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> and <i>Geijera parviflora</i> open forest					
Regional Ecosystem:	11.5.1	Median Tree Canopy ht:	12	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 71

Per ha Total (m): 710

Site Total (m): 355

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	20	30	60	20	10	28%
% Native annual grass						0%
% Native forbs and other species				10		2%
% Native shrubs (<1m in height)				10		2%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	50	20	30	50	80	46%
% Rock						0%
% Bare ground	30	50	10	10	10	22%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

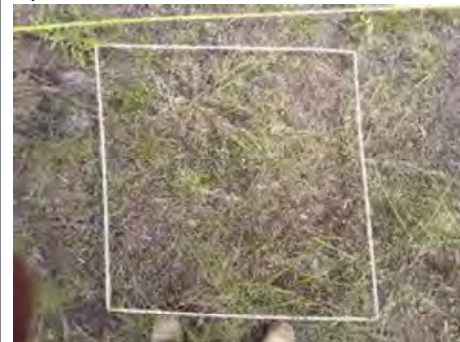
Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BB
Entered:.....	Date:	27/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	34.9
Canopy total (m):	39
Emergent total (m):	0
Shrub total (m):	8.9

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Callitris glaucophylla</i>	Subcanopy	6.2	8.3	2.1
<i>Callitris glaucophylla</i>	Subcanopy	8.5	9.2	0.7
<i>Callitris glaucophylla</i>	Subcanopy	10.1	11.8	1.7
<i>Callitris glaucophylla</i>	Subcanopy	13.2	15.1	1.9
<i>Eucalyptus chloroclada</i>	Canopy	13.7	19.8	6.1
<i>Callitris glaucophylla</i>	Subcanopy	15.9	18.4	2.5
<i>Allocasuarina luehmannii</i>	Shrub	19	19.7	0.7
<i>Eucalyptus crebra</i>	Canopy	19	19.8	0.8
<i>Allocasuarina luehmannii</i>	Shrub	21.7	22.3	0.6
<i>Eucalyptus crebra</i>	Canopy	28.8	33.9	5.1
<i>Callitris glaucophylla</i>	Subcanopy	29.2	32.2	3
<i>Callitris glaucophylla</i>	Canopy	32.7	39	6.3
<i>Allocasuarina luehmannii</i>	Shrub	34.3	35.2	0.9
<i>Allocasuarina luehmannii</i>	Subcanopy	37.2	39.6	2.4
<i>Callitris glaucophylla</i>	Subcanopy	39.7	40.2	0.5
<i>Callitris glaucophylla</i>	Subcanopy	40.8	41.5	0.7
<i>Callitris glaucophylla</i>	Canopy	44.9	50.6	5.7
<i>Allocasuarina luehmannii</i>	Shrub	46.5	48.7	2.2
<i>Eucalyptus crebra</i>	Shrub	50.9	51.6	0.7
<i>Callitris glaucophylla</i>	Shrub	53.5	55.3	1.8
<i>Callitris glaucophylla</i>	Subcanopy	58.9	78.3	19.4
<i>Eucalyptus chloroclada</i>	Canopy	72	74.8	2.8
<i>Eucalyptus crebra</i>	Canopy	74.8	80	5.2
<i>Callitris glaucophylla</i>	Shrub	80	80.9	0.9
<i>Eucalyptus crebra</i>	Canopy	82	85.2	3.2
<i>Allocasuarina luehmannii</i>	Shrub	84.7	85.8	1.1
<i>Callitris glaucophylla</i>	Canopy	94.2	100	5.8

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BC
Entered:.....	Date:	27/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area

SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	290529.87042	Northing:	6842126.91765	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		<i>Acacia harpophylla</i> forest					
Regional Ecosystem:	11.4.3	Median Tree Canopy ht:	15	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 89

Per ha Total (m): 890

Site Total (m): 445

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	25		20	30	55	26%
% Native annual grass						0%
% Native forbs and other species		5	60	30	25	24%
% Native shrubs (<1m in height)		10				2%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	5	75	20	5		21%
% Rock						0%
% Bare ground	40	10		30	15	19%
% Cryptogams	30			5	5	8%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BC
	Date:	27/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	16
Total No. Large Trees per ha:	32
Native Tree Species Richness:	9
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 16
	# of trees >= benchmark per ha: 32

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	7
Forbs and others spp. richness:	22
Non-native plant cover (%)	2%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Acacia harpophylla</i>		Canopy		Yes
<i>Casuarina cristata</i>		Canopy		Yes
<i>Eucalyptus populnea</i>			Canopy	
<i>Eremophila mitchellii</i>			Subcanopy	
<i>Capparis mitchellii</i>			Subcanopy	
<i>Eucalyptus woollsiana</i>			Canopy	
<i>Callitris glaucophylla</i>			Subcanopy	
<i>Geijera parviflora</i>			Subcanopy	
<i>Pittosporum angustifolium</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Acacia harpophylla</i>		Shrub	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Nyssanthes erecta</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Cheilanthes distans</i>		Forbs and Other Species	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
<i>Calotis cuneifolia</i>		Forbs and Other Species	
<i>Solanum nigrum</i>		Forbs and Other Species	Exotic
<i>Carissa ovata</i>		Shrub	
<i>Tetragonia tetragonoides</i>		Forbs and Other Species	
<i>Brunoniella australis</i>		Forbs and Other Species	
<i>Solanum stelligerum</i>		Shrub	
<i>Coleus australis</i>		Forbs and Other Species	
<i>Calandrinia pickeringii</i>		Forbs and Other Species	
<i>Tragus australianus</i>		Grass	
<i>Enteropogon ramosus</i>		Grass	
<i>Enteropogon acicularis</i>		Grass	
<i>Abutilon oxycarpum</i>		Forbs and Other Species	
<i>Sporobolus caroli</i>		Grass	
<i>Salsola australis</i>		Shrub	
<i>Sclerolaena tetracuspis</i>		Forbs and Other Species	
<i>Sclerolaena birchii</i>		Shrub	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Panicum effusum</i>		Grass	
<i>Portulaca filifolia</i>		Forbs and Other Species	
<i>Commelina ensifolia</i>		Forbs and Other Species	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Capparis lasiantha</i>		Shrub	
<i>Sclerolaena bicornis</i>		Forbs and Other Species	
<i>Marsilea hirsuta</i>		Forbs and Other Species	
<i>Cyperus gracilis</i>		Forbs and Other Species	
Other	Poaceae sp1	Grass	
Other	Cyperaceae sp1	Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BC
Entered:.....	Date:	27/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	24.2
Canopy total (m):	40.3
Emergent total (m):	0
Shrub total (m):	8.2

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Allocasuarina luehmannii</i>	Canopy	0	2.2	2.2
<i>Acacia harpophylla</i>	Canopy	4	9.8	5.8
<i>Geijera parviflora</i>	Subcanopy	9	10.5	1.5
<i>Acacia harpophylla</i>	Canopy	11.8	19.4	7.6
<i>Geijera parviflora</i>	Subcanopy	12.8	17.3	4.5
<i>Pittosporum angustifolium</i>	Subcanopy	20	21.7	1.7
<i>Geijera parviflora</i>	Subcanopy	21.7	25.7	4
<i>Eremophila mitchellii</i>	Subcanopy	23.2	24.3	1.1
<i>Acacia harpophylla</i>	Subcanopy	32.5	37.3	4.8
<i>Acacia harpophylla</i>	Shrub	38.6	39.1	0.5
<i>Acacia harpophylla</i>	Canopy	39.2	48.4	9.2
<i>Geijera parviflora</i>	Subcanopy	40	42.7	2.7
<i>Eremophila mitchellii</i>	Shrub	46.4	48.4	2
<i>Capparis mitchellii</i>	Shrub	50.9	52.9	2
<i>Geijera parviflora</i>	Subcanopy	52.6	54.7	2.1
<i>Acacia harpophylla</i>	Canopy	54.9	56.2	1.3
<i>Eremophila mitchellii</i>	Shrub	55.6	56.9	1.3
<i>Allocasuarina luehmannii</i>	Canopy	71	74.4	3.4
<i>Eremophila mitchellii</i>	Subcanopy	72.1	72.8	0.7
<i>Geijera parviflora</i>	Shrub	75.3	79.6	4.3
<i>Eremophila mitchellii</i>	Shrub	75.8	76.7	0.9
<i>Eucalyptus populnea</i>	Canopy	72.6	83	10.4
<i>Geijera parviflora</i>	Subcanopy	84.2	87.8	3.6
<i>Eucalyptus populnea</i>	Canopy	85	87.2	2.2
<i>Eremophila mitchellii</i>	Shrub	95	96	1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BD
	Date:	28/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	300457.15385	Northing:	6851830.67398	Accuracy:	+/-10m
Datum:	GDA94		Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		<i>Angophora floribunda</i> , <i>Eucalyptus chloroclada</i> and <i>Callitris glaucophylla</i> open forest					
Regional Ecosystem:	11.3.14	Median Tree Canopy ht:	20	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 72

Per ha Total (m): 720

Site Total (m): 360

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	60	20	60	30	30	40%
% Native annual grass						0%
% Native forbs and other species			10	20	20	10%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs		5				1%
% Litter	40	75	30	50	40	47%
% Rock						0%
% Bare ground					10	2%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BD
	Date:	28/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	67%
Total No. Large Trees:	21
Total No. Large Trees per ha:	42
Native Tree Species Richness:	1
Eucalypts:	# of trees >= benchmark: 17
	# of trees >= benchmark per ha: 34
Non-eucalypts:	# of trees >= benchmark: 4
	# of trees >= benchmark per ha: 8

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	2
Grass spp. richness:	9
Forbs and others spp. richness:	13
Non-native plant cover (%)	10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus chloroclada</i>		Canopy		Yes
<i>Angophora floribunda</i>		Canopy		
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Opuntia tomentosa</i>			Sub-Canopy	

50 x 10m area

Species		Life Form	Status
<i>Opuntia tomentosa</i>		Shrub	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	Exotic
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Commelina ensifolia</i>		Forbs and Other Species	
<i>Thellungia advena</i>		Grass	
Other	Aristida sp1	Grass	
Other	Eragrostis sp1	Grass	
Other	Poaceae sp1	Grass	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs and Other Species	
<i>Cyperus aggregatus</i>		Forbs and Other Species	
<i>Panicum decompositum</i>		Grass	
<i>Cymbopogon refractus</i>		Grass	
<i>Bidens bipinnata</i>		Forbs and Other Species	Exotic
<i>Heliotropium amplexicaule</i>		Forbs and Other Species	Exotic
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
Other	Setaria sp	Grass	
<i>Solanum nigrum</i>		Forbs and Other Species	Exotic
<i>Desmodium rhytidophyllum</i>		Forbs and Other Species	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
<i>Eragrostis curvula</i>		Grass	Exotic
<i>Einadia hastata</i>		Forbs and Other Species	
<i>Pittosporum angustifolium</i>		Shrub	
<i>Lepidium bonariense</i>		Forbs and Other Species	Exotic
<i>Enteropogon ramosus</i>		Grass	
Other	Austostripa sp		
<i>Erigeron bonariensis</i>		Forbs and Other Species	Exotic
Other	Poaceae sp2	Grass	
Other	Pavonia	Forbs and Other Species	Exotic
Other	Asteracea sp		
<i>Pittosporum angustifolium</i>		Forbs and Other Species	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
Other	Cyperaceae sp2		
<i>Dysphania carinata</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BD
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	57.2
Canopy total (m):	66.8
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Callitris glaucophylla</i>	Subcanopy	0	4.1	4.1	
<i>Angophora floribunda</i>	Canopy	4.6	26.8	22.2	
<i>Callitris glaucophylla</i>	Subcanopy	8.3	13.4	5.1	
<i>Callitris glaucophylla</i>	Subcanopy	15.9	24.4	8.5	
<i>Callitris glaucophylla</i>	Subcanopy	28	37.1	9.1	
<i>Angophora floribunda</i>	Canopy	28.1	40.1	12	
<i>Callitris glaucophylla</i>	Subcanopy	38.9	40	1.1	
<i>Callitris glaucophylla</i>	Subcanopy	41.1	49.1	8	
<i>Eucalyptus chloroclada</i>	Canopy	49.2	55.2	6	
<i>Angophora floribunda</i>	Canopy	53.9	77.9	24	
<i>Callitris glaucophylla</i>	Subcanopy	60	73.4	13.4	
<i>Eucalyptus chloroclada</i>	Canopy	66.9	72.2	5.3	
<i>Eucalyptus chloroclada</i>	Canopy	77.9	86	8.1	
<i>Callitris glaucophylla</i>	Subcanopy	86.1	94	7.9	
<i>Angophora floribunda</i>	Canopy	98.5	100	1.5	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BA
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area

SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	313794.82748	Northing:	6859671.30167	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		Woodland canopy dominated by <i>Angophora floribunda</i> with <i>Eucalyptus chloroclada</i> , <i>Callitris glaucophylla</i> sub canopy <i>Callitris glaucophylla</i> . Very sparse shrub layer dominated by regenerating canopy species, ground layer dominated by native grasses and forbs.					
Regional Ecosystem:	11.3.14	Median Tree Canopy ht:	14	Emergent ht:		Subcanopy ht:	9

Site Photos:

North:



East:



South:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	52.5
Per ha Total (m):	525
Site Total (m):	262.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	15	10	35	40	30	26%
% Native annual grass						0%
% Native forbs and other species	10	10	15	15	25	15%
% Native shrubs (<1m in height)			10		25	7%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	70	70	40	40	20	48%
% Rock						0%
% Bare ground	5	10		5		4%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BA
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	40%
Total No. Large Trees:	20
Total No. Large Trees per ha:	40
Native Tree Species Richness:	5
Eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20
Non-eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	12
Forbs and others spp. richness:	4
Non-native plant cover (%)	2%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Angophora floribunda</i>		Canopy		Yes
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Eucalyptus chloroclada</i>		Canopy		
<i>Eucalyptus tereticornis</i>		Canopy	Canopy	
<i>Corymbia tessellaris</i>		Canopy	Canopy	

50 x 10m area

Species		Life Form	Status
Other	Aristida sp.	Grass	
<i>Thellungia advena</i>		Grass	
<i>Heliotropium amplexicaule</i>		Forbs and Other Species	Exotic
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Setaria surgens</i>		Grass	
<i>Digitaria brownii</i>		Grass	
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
<i>Aristida vagans</i>		Grass	
<i>Eragrostis curvula</i>		Grass	Exotic
<i>Lomandra multiflora</i>		Forbs and Other Species	
<i>Eragrostis brownii</i>		Grass	
<i>Glycine tomentella</i>		Forbs and Other Species	
<i>Panicum effusum</i>		Grass	
<i>Cymbopogon refractus</i>		Grass	
<i>Lomandra longifolia</i>		Forbs and Other Species	
Other	Cyperus sp.	Forbs and Other Species	
<i>Digitaria divaricatissima</i>		Grass	
<i>Enneapogon nigricans</i>		Grass	
<i>Chrysopogon fallax</i>		Grass	
Other	Aristida sp.	Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BA
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	15.2
Canopy total (m):	26.5
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Angophora floribunda</i>	Canopy	3.4	4	0.6	
<i>Angophora floribunda</i>	Subcanopy	4.3	5.8	1.5	
<i>Angophora floribunda</i>	Canopy	7.3	13.4	6.1	
<i>Angophora floribunda</i>	Canopy	17.7	24	6.3	
<i>Angophora floribunda</i>	Subcanopy	25	26.7	1.7	
<i>Angophora floribunda</i>	Subcanopy	35.5	38.5	3	
<i>Angophora floribunda</i>	Canopy	42.5	45.4	2.9	
<i>Angophora floribunda</i>	Subcanopy	42.9	43.6	0.7	
<i>Angophora floribunda</i>	Subcanopy	47	50.9	3.9	
<i>Angophora floribunda</i>	Canopy	51	52.2	1.2	
<i>Angophora floribunda</i>	Canopy	58.2	62	3.8	
<i>Angophora floribunda</i>	Canopy	67	70.6	3.6	
<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>	Subcanopy	78	82.4	4.4	
<i>Angophora floribunda</i>	Canopy	88	90	2	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BE
	Date:	28/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	302844.19307	Northing:	6854114.29524	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		<i>Callitris glaucophylla</i> , <i>Eucalyptus chloroclada</i> open forest - historic clearing					
Regional Ecosystem:	11.5.1	Median Tree Canopy ht:	12	Emergent ht:		Subcanopy ht:	4

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	62
Per ha Total (m):	620
Site Total (m):	310

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	10	10	5	15	5	9%
% Native annual grass						0%
% Native forbs and other species						0%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	60	70	35	60	65	58%
% Rock						0%
% Bare ground	30	20	60	25	30	33%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BE
	Date:	28/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	2
Total No. Large Trees per ha:	4
Native Tree Species Richness:	2
Eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2
Non-eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	9
Forbs and others spp. richness:	11
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus chloroclada</i>		Canopy		Yes
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Acacia crassa</i> subsp. <i>crassa</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
Other	Cyperaceae sp1	Forbs and Other Species	
Other	Campanulaceae sp	Forbs and Other Species	
Other	Poaceae sp 1	Grass	
Other	Eragrostis sp1	Grass	
<i>Cheilanthes distans</i>		Forbs and Other Species	
Other	Aristida sp1	Grass	
<i>Cyperus dietrichiae</i>		Forbs and Other Species	
<i>Opuntia aurantiaca</i>		Forbs and Other Species	Exotic
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Cymbopogon refractus</i>		Grass	
Other	Herb1	Forbs and Other Species	
<i>Lomandra longifolia</i>		Forbs and Other Species	
<i>Lomandra filiformis</i>		Forbs and Other Species	
<i>Eragrostis brownii</i>		Grass	
Other	Aristida sp2	Grass	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>		Forbs and Other Species	
<i>Panicum effusum</i>		Grass	
<i>Chrysopogon fallax</i>		Grass	
<i>Desmodium rhytidophyllum</i>		Forbs and Other Species	
Other	Cactus	Shrub	Exotic
<i>Acacia conferta</i>		Shrub	
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic
Other	Eragrostis sp2	Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BE
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	1.5
Canopy total (m):	53
Emergent total (m):	0
Shrub total (m):	2

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Callitris glaucophylla</i>	Canopy	0	0.2	0.2
<i>Callitris glaucophylla</i>	Canopy	1.2	11.2	10
<i>Eucalyptus chloroclada</i>	Canopy	11.3	15.3	4
<i>Eucalyptus chloroclada</i>	Canopy	15.4	22	6.6
<i>Callitris glaucophylla</i>	Canopy	25.3	26.5	1.2
<i>Callitris glaucophylla</i>	Canopy	29	33.5	4.5
<i>Eucalyptus chloroclada</i>	Canopy	32	38	6
<i>Callitris glaucophylla</i>	Canopy	34.5	35.5	1
<i>Eucalyptus chloroclada</i>	Canopy	45.5	50.5	5
<i>Callitris glaucophylla</i>	Subcanopy	47.5	49	1.5
<i>Eucalyptus chloroclada</i>	Canopy	57	59	2
<i>Callitris glaucophylla</i>	Canopy	61	64	3
<i>Callitris glaucophylla</i>	Canopy	76.5	85	8.5
<i>Acacia conferta</i>	Shrub	79	81	2
<i>Eucalyptus chloroclada</i>	Canopy	94	100	6

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BB
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	311126.0699	Northing:	6856205.70835	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		Mostly dead canopy of <i>Callitris glaucophylla</i> , <i>Eucalyptus chloroclada</i> and <i>Eucalyptus viridis</i>					
Regional Ecosystem:	Non-rem Cat C 11.3.14	Median Tree Canopy ht:	8	Emergent ht:		Subcanopy ht:	0

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	68
Per ha Total (m):	680
Site Total (m):	340

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	60	50	60	35	35	48%
% Native annual grass						0%
% Native forbs and other species	15	5	5	30	20	15%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	10	5	5	20	15	11%
% Rock	5	20	10		25	12%
% Bare ground	10	20	20	15	5	14%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BB
	Date:	28/02/2021
	Observers:	KR / BJ

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	0
Total No. Large Trees per ha:	0
Native Tree Species Richness:	2
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	7
Forbs and others spp. richness:	3
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus chloroclada</i>		Canopy		Yes
<i>Eucalyptus viridis</i>		Canopy		Yes
<i>Callitris glaucophylla</i>		Canopy		Yes

50 x 10m area

Species		Life Form	Status
Other	<i>Aristida sp.</i>	Grass	
<i>Mirbelia pungens</i>		Shrub	
<i>Eucalyptus chloroclada</i>		Shrub	
Other	<i>Eragrostis sp.</i>	Grass	
<i>Panicum effusum</i>		Grass	
<i>Phyllanthus virgatus</i>		Forbs and Other Species	
<i>Eucalyptus viridis</i>		Shrub	
Other	<i>Solanum sp.</i>	Forbs and Other Species	
<i>Gomphrena celosioides</i>		Forbs and Other Species	Exotic
<i>Denhamia silvestris</i>		Shrub	
Other	<i>Aristida sp.</i>	Grass	
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>		Shrub	
<i>Cymbopogon refractus</i>		Grass	
Other	<i>Eragrostis sp.</i>	Grass	
<i>Melinis repens</i>		Grass	Exotic
<i>Eulalia aurea</i>		Grass	
<i>Callitris glaucophylla</i>		Shrub	
<i>Stylidium graminifolium</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BB
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	0
Canopy total (m):	11.1
Emergent total (m):	0
Shrub total (m):	3.4

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Eucalyptus viridis</i>	Shrub	8	8.3	0.3	
<i>Eucalyptus viridis</i>	Shrub	11.4	11.8	0.4	
<i>Denhamia silvestris</i>	Shrub	15.5	15.7	0.2	
<i>Eucalyptus viridis</i>	Shrub	15.8	16.2	0.4	
<i>Eucalyptus viridis</i>	Canopy	20.9	22	1.1	
<i>Eucalyptus viridis</i>	Canopy	25.6	27	1.4	
<i>Eucalyptus viridis</i>	Shrub	27.5	27.7	0.2	
<i>Callitris glaucophylla</i>	Canopy	31.7	33	1.3	
<i>Eucalyptus viridis</i>	Shrub	35.8	36.2	0.4	
<i>Callitris glaucophylla</i>	Canopy	37.1	38.1	1	
<i>Eucalyptus viridis</i>	Shrub	42.2	42.8	0.6	
<i>Eucalyptus viridis</i>	Canopy	52.7	54.2	1.5	
<i>Callitris glaucophylla</i>	Canopy	63	66.3	3.3	
<i>Eucalyptus viridis</i>	Shrub	76.4	76.7	0.3	
<i>Mirbelia pungens</i>	Shrub	82	82.4	0.4	
<i>Callitris glaucophylla</i>	Canopy	92	93.5	1.5	
<i>Mirbelia pungens</i>	Shrub	98.6	98.8	0.2	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BF
	Date:	28/02/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:				Brigalow belt				
Plot Origin:	Zone:	56	Easting:	302654.59256	Northing:	6853642.64387	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus microcarpa</i> open forest					
Regional Ecosystem:	11.3.2	Median Tree Canopy ht:	20	Emergent ht:		Subcanopy ht:	5

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	87.5
Per ha Total (m):	875
Site Total (m):	437.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	40	40	5	60	40	37%
% Native annual grass						0%
% Native forbs and other species	10					2%
% Native shrubs (<1m in height)						0%
% Non-native grass	10	5			5	4%
% Non-native forbs & shrubs			15	10	10	7%
% Litter	40	50	80	30	30	46%
% Rock						0%
% Bare ground		5			15	4%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BF
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	50%
Total No. Large Trees:	19
Total No. Large Trees per ha:	38
Native Tree Species Richness:	4
Eucalypts:	# of trees >= benchmark: 18
	# of trees >= benchmark per ha: 36
Non-eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	2
Grass spp. richness:	8
Forbs and others spp. richness:	13
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus conica</i>		Canopy		Yes
<i>Casuarina cristata</i>			Canopy	
<i>Callitris glaucophylla</i>			Subcanopy	
<i>Pittosporum angustifolium</i>			Subcanopy	
Other	Cactus	Subcanopy		

50 x 10m area

Species		Life Form	Status
<i>Walwhalleya proluta</i>		Grass	
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Eulalia aurea</i>		Grass	
<i>Gomphrena celosioides</i>		Forbs and Other Species	Exotic
Other	Poaceae sp1	Grass	
<i>Eremophila debilis</i>		Forbs and Other Species	
Other	Cactus	Forbs and Other Species	Exotic
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs and Other Species	
Other	Poaceae sp2	Grass	
<i>Opuntia aurantiaca</i>		Forbs and Other Species	Exotic
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Heliotropium amplexicaule</i>		Forbs and Other Species	Exotic
Other	Poaceae sp2	Grass	
Other	Poaceae sp3	Grass	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Pittosporum angustifolium</i>		Forbs and Other Species	
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Glycine clandestina</i>		Forbs and Other Species	
Other	Sclerolaena sp	Forbs and Other Species	
<i>Sclerolaena birchii</i>		Shrub	
<i>Enteropogon ramosus</i>		Grass	
<i>Maireana microphylla</i>		Shrub	
<i>Solanum nigrum</i>		Forbs and Other Species	
Other	Cactus	Shrub	Exotic

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BF
Entered:.....	Date:	28/02/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	0
Canopy total (m):	76.7
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Eucalyptus conica</i>		Canopy	0	5	5
<i>Eucalyptus conica</i>		Canopy	20.6	62	41.4
<i>Eucalyptus conica</i>		Canopy	64	75.9	11.9
<i>Eucalyptus conica</i>		Canopy	81.6	100	18.4

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BG
Entered:.....	Date:	01/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area

SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	316205.56087	Northing:	6860667.4949	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus melanophloia</i> , <i>Eucalyptus populnea</i> , <i>Allocasuarina luehmannii</i> and <i>Callitris glaucophylla</i> open forest					
Regional Ecosystem:	11.9.7	Median Tree Canopy ht:	16	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	62.5
Per ha Total (m):	625
Site Total (m):	312.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	5	5	5	15	10	8%
% Native annual grass						0%
% Native forbs and other species		5	5	5	5	4%
% Native shrubs (<1m in height)		10				2%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	95	80	80	70	60	77%
% Rock						0%
% Bare ground			10	10	25	9%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BG
Entered:.....	Date:	01/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	37
Total No. Large Trees per ha:	74
Native Tree Species Richness:	7
Eucalypts:	# of trees >= benchmark: 4
	# of trees >= benchmark per ha: 8
Non-eucalypts:	# of trees >= benchmark: 33
	# of trees >= benchmark per ha: 66

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	3
Grass spp. richness:	8
Forbs and others spp. richness:	30
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus melanophloia</i>		Canopy		Yes
<i>Eucalyptus populnea</i>		Canopy		Yes
<i>Corymbia tessellaris</i>			Canopy	
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Eucalyptus woollsiana</i>			Canopy	
<i>Psydrax oleifolia</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Allocasuarina luehmannii</i>		Shrub	
<i>Geijera parviflora</i>		Shrub	
<i>Brunoniella australis</i>		Forbs and Other Species	
<i>Portulaca filifolia</i>		Forbs and Other Species	
<i>Cyperus gracilis</i>		Forbs and Other Species	
Other		Forbs and Other Species	
<i>Rostellularia adscendens</i>		Forbs and Other Species	
Other	<i>Sida</i> sp	Forbs and Other Species	
<i>Enteropogon ramosus</i>		Grass	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Cheilanthes distans</i>		Forbs and Other Species	
<i>Calandrinia pickeringii</i>		Forbs and Other Species	
<i>Aristida benthamii</i> var. <i>benthamii</i>		Grass	
Other	Cyperaceae sp1	Forbs and Other Species	
Other	<i>Eragrostis</i> sp1	Grass	
Other	Poaceae sp2	Grass	
<i>Evolvulus alsinoides</i>		Forbs and Other Species	
<i>Opuntia aurantiaca</i>		Forbs and Other Species	Exotic
<i>Eremophila debilis</i>		Forbs and Other Species	
Other	<i>Eragrostis</i> sp1	Grass	
<i>Psydrax oleifolia</i>		Forbs and Other Species	
<i>Glycine tabacina</i>		Forbs and Other Species	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
Other	Cactus	Forbs and Other Species	
<i>Acacia oswaldii</i>		Shrub	
<i>Jasminum didymum</i> subsp. <i>lineare</i>		Forbs and Other Species	
<i>Commelina ensifolia</i>		Forbs and Other Species	
<i>Lomandra filiformis</i>		Forbs and Other Species	
<i>Coleus australis</i>		Forbs and Other Species	
<i>Dysphania carinata</i>		Forbs and Other Species	
<i>Aristida caput medusae</i>		Grass	
<i>Solanum ellipticum</i>		Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
<i>Aristida benthamii</i> var. <i>benthamii</i>		Grass	
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Amyema linophylla</i> subsp. <i>orientalis</i>		Forbs and Other Species	
Other	<i>Seteria</i> sp	Grass	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs and Other Species	

<i>Aristida benthamii</i> var. <i>benthamii</i>		Grass	
<i>Oldenlandia mitrasacmoides</i> subsp. <i>trachymenoides</i>		Forbs and Other Species	
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic
<i>Einadia nutans</i> subsp. <i>nutans</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BG
Entered:.....	Date:	01/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	10.4
Canopy total (m):	84.8
Emergent total (m):	0
Shrub total (m):	21.8

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Allocasuarina luehmannii</i>	Canopy	0	6.6	6.6
<i>Eucalyptus populnea</i>	Canopy	0	11.8	11.8
<i>Callitris glaucophylla</i>	Subcanopy	3.4	6.2	2.8
<i>Geijera parviflora</i>	Shrub	7.8	9.5	1.7
<i>Callitris glaucophylla</i>	Canopy	7.8	11.8	4
<i>Allocasuarina luehmannii</i>	Canopy	12	15.9	3.9
<i>Geijera parviflora</i>	Shrub	12.3	14.6	2.3
<i>Callitris glaucophylla</i>	Canopy	16	22.5	6.5
<i>Eucalyptus populnea</i>	Canopy	17.9	22.5	4.6
<i>Geijera parviflora</i>	Shrub	23.3	30.9	7.6
<i>Eucalyptus populnea</i>	Canopy	24.5	48.2	23.7
<i>Allocasuarina luehmannii</i>	Canopy	25.6	30.8	5.2
<i>Callitris glaucophylla</i>	Canopy	28.5	30.8	2.3
<i>Allocasuarina luehmannii</i>	Shrub	31.2	33.7	2.5
<i>Geijera parviflora</i>	Shrub	34.5	36.3	1.8
<i>Callitris glaucophylla</i>	Canopy	34.5	39.1	4.6
<i>Geijera parviflora</i>	Shrub	39.4	42.7	3.3
<i>Allocasuarina luehmannii</i>	Canopy	40.1	43	2.9
<i>Callitris glaucophylla</i>	Canopy	43.2	50	6.8
<i>Allocasuarina luehmannii</i>	Subcanopy	43.3	47.1	3.8
<i>Allocasuarina luehmannii</i>	Canopy	50.2	55.8	5.6
<i>Callitris glaucophylla</i>	Canopy	54.2	63.9	9.7
<i>Corymbia tessellaris</i>	Shrub	57.9	58.2	0.3
<i>Allocasuarina luehmannii</i>	Canopy	60	66	6
<i>Callitris glaucophylla</i>	Canopy	66	67	1
<i>Eucalyptus populnea</i>	Subcanopy	66.9	70.7	3.8
<i>Callitris glaucophylla</i>	Canopy	69.3	84.4	15.1
<i>Allocasuarina luehmannii</i>	Shrub	76.2	77.4	1.2

<i>Allocasuarina luehmannii</i>		Shrub	82.3	83.4	1.1
<i>Eucalyptus melanophloia</i>		Canopy	85.3	95.7	10.4
<i>Allocasuarina luehmannii</i>		Canopy	85.7	91.2	5.5
<i>Callitris glaucophylla</i>		Canopy	95.8	100	4.2

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BH
Entered:.....	Date:	01/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	314831.8823	Northing:	6859835.6131	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus tereticornis</i> and <i>Angophora floribunda</i> open forest					
Regional Ecosystem:	11.3.4	Median Tree Canopy ht:	20	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 142

Per ha Total (m): 1420

Site Total (m): 710

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	25	20	35	10	5	19%
% Native annual grass						0%
% Native forbs and other species						0%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	50	20	50	10	5	27%
% Rock						0%
% Bare ground	25	60	15	80	90	54%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BH
	Date:	01/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	13
Total No. Large Trees per ha:	26
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20
Non-eucalypts:	# of trees >= benchmark: 3
	# of trees >= benchmark per ha: 6

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	11
Forbs and others spp. richness:	12
Non-native plant cover (%)	2%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus tereticornis</i>		Canopy		Yes
<i>Angophora floribunda</i>		Canopy		Yes
<i>Callitris glaucophylla</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Perotis rara</i>		Grass	
<i>Calandrinia balonensis</i>		Forbs and Other Species	
<i>Aristida calycina</i> var. <i>calycina</i>		Grass	
<i>Tragus australianus</i>		Grass	
Other	Cyperaceae sp1	Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	
Other	<i>Aristida</i> sp	Grass	
Other	Fabaceae sp1	Forbs and Other Species	
Other	Poaceae sp1	Grass	
<i>Lomandra leucocephala</i> subsp. <i>leucocephala</i>		Forbs and Other Species	
<i>Panicum decompositum</i>		Grass	
<i>Aristida benthamii</i> var. <i>benthamii</i>		Grass	
Other	<i>Setaria</i>	Grass	
Other	<i>Eragrostis</i> sp1	Grass	
Other	Cyperaceae sp3	Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Bidens pilosa</i>		Forbs and Other Species	Exotic
Other	Poaceae sp3	Grass	
<i>Lomandra longifolia</i>		Forbs and Other Species	
Other	<i>Senecio</i> sp	Forbs and Other Species	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs and Other Species	
<i>Erigeron sumatrensis</i>		Forbs and Other Species	Exotic
<i>Erigeron bonariensis</i>		Forbs and Other Species	Exotic
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
Other	<i>Wallenbergia</i> sp		
<i>Heliotropium amplexicaule</i>		Forbs and Other Species	Exotic
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Melinis repens</i>		Grass	Exotic
Other	Poaceae sp3	Grass	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
Other	Eriaceae	Shrub	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BH
Entered:.....	Date:	01/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	4.7
Canopy total (m):	45.2
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Angophora floribunda</i>	Canopy	0	9.2	9.2
<i>Eucalyptus tereticornis</i>	Canopy	0	10.1	10.1
<i>Angophora floribunda</i>	Canopy	20	27.8	7.8
<i>Callitris glaucophylla</i>	Canopy	21.6	39.8	18.2
<i>Callitris glaucophylla</i>	Canopy	41	44.1	3.1
<i>Angophora floribunda</i>	Canopy	52.7	61.7	9
<i>Callitris glaucophylla</i>	Subcanopy	74.9	77.7	2.8
<i>Callitris glaucophylla</i>	Subcanopy	79.6	81.5	1.9
<i>Eucalyptus tereticornis</i>	Canopy	86	100	14
<i>Callitris glaucophylla</i>	Canopy	87	89.2	2.2

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BI
	Date:	03/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	324683.33366	Northing:	6902649.2424	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		Acacia harpophylla open forest					
Regional Ecosystem:	11.9.5	Median Tree Canopy ht:	10	Emergent ht:		Subcanopy ht:	4

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 72

Per ha Total (m): 720

Site Total (m): 360

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	40	40	15	10	10	23%
% Native annual grass						0%
% Native forbs and other species	30	30	20	20	20	24%
% Native shrubs (<1m in height)					30	6%
% Non-native grass				50		10%
% Non-native forbs & shrubs			15		10	5%
% Litter	20	30	50	20	30	30%
% Rock						0%
% Bare ground	10					2%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BI
Entered:.....	Date:	03/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	6
Total No. Large Trees per ha:	12
Native Tree Species Richness:	6
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 6
	# of trees >= benchmark per ha: 12

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	12
Grass spp. richness:	5
Forbs and others spp. richness:	17
Non-native plant cover (%)	30%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Acacia harpophylla</i>		Canopy		Yes
<i>Melaleuca trichostachya</i>			Canopy	
<i>Santalum lanceolatum</i>			Subcanopy	
<i>Capparis lasiantha</i>			Subcanopy	
<i>Alectryon diversifolius</i>			Subcanopy	
<i>Eremophila deserti</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Carissa ovata</i>		Shrub	
<i>Enteropogon acicularis</i>		Grass	
<i>Coleus australis</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Tetragonia tetragonoides</i>		Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	Exotic
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Clematicissus opaca</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Setaria sphacelata</i>		Grass	Exotic
<i>Solanum nigrum</i>		Forbs and Other Species	
<i>Rhagodia spinescens</i>		Shrub	
<i>Acacia harpophylla</i>		Shrub	
<i>Malvastrum americanum</i> var. <i>americanum</i>		Forbs and Other Species	Exotic
<i>Abutilon oxycarpum</i>		Forbs and Other Species	
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Sclerolaena tetracuspis</i>		Forbs and Other Species	
<i>Zygophyllum apiculatum</i>		Forbs and Other Species	
<i>Eremophila deserti</i>		Forbs and Other Species	
<i>Capparis lasiantha</i>		Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Alectryon diversifolius</i>		Shrub	
<i>Geijera parviflora</i>		Shrub	
<i>Pimelea neoanglica</i>		Shrub	
<i>Jasminum didymum</i> subsp. <i>lineare</i>		Forbs and Other Species	
<i>Senna artemisioides</i>		Shrub	
<i>Melaleuca trichostachya</i>		Shrub	
Other	<i>Parsonsia</i> sp	Forbs and Other Species	
Other	Poaceae sp1	Grass	
Other	Mistletoe sp1	Shrub	
Other	<i>Maytenus</i> sp	Shrub	
Other	<i>Abutilon</i> sp	Forbs and Other Species	
<i>Cenchrus ciliaris</i>		Grass	Exotic
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>		Shrub	
<i>Eriochloa crebra</i>		Grass	
Other	<i>Eremophilla</i> sp	Shrub	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Aristida calycina</i> var. <i>calycina</i>		Grass	
<i>Salsola australis</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BI
Entered:.....	Date:	03/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	4.7
Canopy total (m):	45.2
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Acacia harpophylla</i>		Canopy	0	2	2
<i>Acacia harpophylla</i>		Canopy	3.1	14	10.9
<i>Acacia harpophylla</i>		Canopy	20.1	38	17.9
<i>Melaleuca trichostachya</i>		Canopy	39.6	54.3	14.7
<i>Acacia harpophylla</i>		Shrub	42.1	45	2.9
<i>Acacia harpophylla</i>		Canopy	49.9	53.7	3.8
<i>Melaleuca trichostachya</i>		Shrub	55.6	58.1	2.5
<i>Acacia harpophylla</i>		Shrub	58.3	59.3	1
<i>Acacia harpophylla</i>		Canopy	59.4	79.5	20.1
<i>Acacia harpophylla</i>		Canopy	84.1	95	10.9

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BJ
Entered:.....	Date:	04/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	330324.29581	Northing:	6912090.80206	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus populnea</i> open forest.					
Regional Ecosystem:	11.3.2	Median Tree Canopy ht:	20	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 32

Per ha Total (m): 320

Site Total (m): 160

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	20	20	30	20	30	24%
% Native annual grass						0%
% Native forbs and other species	10	30	30	30	20	24%
% Native shrubs (<1m in height)						0%
% Non-native grass	10		20	10		8%
% Non-native forbs & shrubs	40	30		10	40	24%
% Litter	20	20	20	30	10	20%
% Rock						0%
% Bare ground						0%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BJ
	Date:	04/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	14
Total No. Large Trees per ha:	28
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 14
	# of trees >= benchmark per ha: 28
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	12
Forbs and others spp. richness:	21
Non-native plant cover (%)	50%

100 x 50m area			
Species	EDL	Non-EDL	Recruitment
<i>Eucalyptus populnea</i>	Canopy		Yes
<i>Eucalyptus tereticornis</i>	Canopy		Yes
<i>Pittosporum angustifolium</i>		Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Bryophyllum delagoense</i>		Forbs and Other Species	Exotic
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Harrisia martinii</i>		Forbs and Other Species	Exotic
<i>Dichondra repens</i>		Forbs and Other Species	
<i>Sida hackettiana</i>		Forbs and Other Species	
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Nyssanthus diffusa</i>		Forbs and Other Species	
<i>Chrysocephalum apiculatum</i>		Forbs and Other Species	
<i>Cymbopogon refractus</i>		Grass	
<i>Panicum effusum</i>		Grass	
<i>Aristida calycina</i> var. <i>calycina</i>		Grass	
<i>Enteropogon ramosus</i>		Grass	
Other	<i>Aristida</i> sp	Grass	
<i>Portulaca pilosa</i>		Forbs and Other Species	Exotic
<i>Rytidosperma bipartitum</i>		Grass	
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Calotis cuneata</i>		Forbs and Other Species	
<i>Eriochloa crebra</i>		Grass	
Other	Cyperaceae sp1	Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Evolvulus alsinoides</i>		Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Forbs and Other Species	Exotic
<i>Pittosporum angustifolium</i>		Shrub	
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
<i>Maireana microphylla</i>		Forbs and Other Species	
Other	<i>Austrostipa</i> sp	Grass	
<i>Mentha satereioides</i>		Forbs and Other Species	
Other	Poaceae sp2	Grass	
<i>Swainsona galegifolia</i>		Forbs and Other Species	
<i>Dichanthium sericeum</i>		Grass	
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Commelina ensifolia</i>		Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Rostellularia adscendens</i>		Forbs and Other Species	
Other	<i>Euphoria</i> sp	Forbs and Other Species	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
<i>Sclerolaena birchii</i>		Forbs and Other Species	
Other	Poaceae sp3	Grass	
<i>Salvia reflexa</i>		Forbs and Other Species	Exotic
<i>Glycine tabacina</i>		Forbs and Other Species	
<i>Einadia nutans</i> subsp. <i>nutans</i>		Forbs and Other Species	
<i>Panicum decompositum</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BJ
Entered:.....	Date:	04/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	14
Canopy total (m):	27.8
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Eucalyptus populnea</i>		Canopy	0	4	4
<i>Eucalyptus populnea</i>		Canopy	5.5	14	8.5
<i>Eucalyptus populnea</i>		Subcanopy	21.2	26.7	5.5
<i>Eucalyptus populnea</i>		Canopy	33.7	37	3.3
<i>Eucalyptus populnea</i>		Canopy	40	47	7
<i>Eucalyptus populnea</i>		Subcanopy	49.1	56.6	7.5
<i>Eucalyptus populnea</i>		Canopy	76	81	5
<i>Eucalyptus tereticornis</i>		Subcanopy	99	100	1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BC
	Date:	04/03/2021
	Observers:	KR

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	331985.89536	Northing:	6912889.02745	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Dominant Canopy of <i>Eucalyptus populnea</i> , with patches of <i>Casuarina cristata</i> regrowth. Sub canopy consists of juvenile <i>E. populnea</i> and <i>Casuarina cristata</i> . Shrub layer consists of <i>Myoporum acuminatum</i> and <i>Pittosporum angustifolium</i> . Ground layer native grasses and forbs. Woody debris prevelant					
Regional Ecosystem:	11.3.2	Median Tree Canopy ht:	15	Emergent ht:		Subcanopy ht:	9

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	39.5
Per ha Total (m):	395
Site Total (m):	197.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	35	35		60	40	34%
% Native annual grass						0%
% Native forbs and other species	35	15	15	5	15	17%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	30	20	85	15	30	36%
% Rock						0%
% Bare ground		30		20	15	13%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BC
Entered:.....	Date:	04/03/2021
Checked:.....	Observers:	Brad and Kim
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	12
Total No. Large Trees per ha:	24
Native Tree Species Richness:	6
Eucalypts:	# of trees >= benchmark: 12
	# of trees >= benchmark per ha: 24
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	7
Grass spp. richness:	14
Forbs and others spp. richness:	18
Non-native plant cover (%)	2%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus populnea</i>		Canopy		Yes
<i>Casuarina cristata</i>			Subcanopy	
<i>Pittosporum angustifolium</i>			Subcanopy	
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>			Subcanopy	
<i>Geijera parviflora</i>			Subcanopy	
<i>Acacia salicina</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
Other	<i>Aristida</i> b90	Grass	
Other	<i>Aristida</i> b91	Grass	
Other	<i>Aristida</i> b92	Grass	
Other	<i>Solanum</i> b81	Forbs and Other Species	
<i>Myoporum acuminatum</i>		Shrub	
<i>Brunoniella australis</i>		Shrub	
<i>Acacia salicina</i>		Shrub	
<i>Jasminum didymum</i> subsp. <i>racemosum</i>		Forbs and Other Species	
<i>Harrisia tortuosa</i>		Shrub	Exotic
<i>Dichanthium sericeum</i>		Grass	
<i>Nyssanthus erecta</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Eriochloa crebra</i>		Grass	
<i>Megathyrsus maximus</i> var. <i>maximus</i>		Grass	Exotic
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Homopholis belsonii</i>		Grass	Endangered
<i>Enteropogon ramosus</i>		Grass	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Portulaca australis</i>		Forbs and Other Species	
<i>Einadia hastata</i>		Forbs and Other Species	
<i>Digitaria brownii</i>		Grass	
<i>Cymbopogon refractus</i>		Grass	
<i>Sporobolus caroli</i>		Grass	
Other	<i>Calotis</i> sp.collected	Forbs and Other Species	
Other	<i>Rutidosia</i> sp. collected	Forbs and Other Species	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Evolvulus alsinoides</i>		Forbs and Other Species	
Other	<i>Glycine</i> sp. infert	Forbs and Other Species	
Other	<i>Eriachne</i> sp. collected	Grass	
<i>Melhanian ovata</i>		Forbs and Other Species	
<i>Austrostipa verticillata</i>		Grass	
<i>Dichondra repens</i>		Forbs and Other Species	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
<i>Calotis hispidula</i>		Forbs and Other Species	
<i>Eucalyptus populnea</i>		Shrub	
<i>Portulaca oleracea</i>		Forbs and Other Species	Exotic
<i>Neptunia gracilis</i> forma <i>gracilis</i>		Forbs and Other Species	
<i>Sclerolaena birchii</i>		Shrub	
<i>Panicum decompositum</i>		Grass	
<i>Pittosporum angustifolium</i>		Shrub	
<i>Commelina lanceolata</i>		Forbs and Other Species	

<i>Acacia salicina</i>		Shrub	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Rostellularia adscendens</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BC
Entered:.....	Date:	04/03/2021
Checked:.....	Observers:	KR BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	15
Canopy total (m):	48.9
Emergent total (m):	0
Shrub total (m):	5.5

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Pittosporum angustifolium</i>	Shrub	2.7	3.6	0.9	
<i>Eucalyptus populnea</i>	Canopy	15	22.5	7.5	
<i>Acacia salicina</i>	Shrub	21.1	21.5	0.4	
<i>Acacia salicina</i>	Shrub	21.9	22.1	0.2	
<i>Eucalyptus populnea</i>	Shrub	25.8	25.9	0.1	
<i>Myoporum acuminatum</i>	Shrub	25.8	25.9	0.1	
<i>Eucalyptus populnea</i>	Subcanopy	14	17.8	3.8	
<i>Eucalyptus populnea</i>	Subcanopy	21.3	25	3.7	
<i>Acacia salicina</i>	Shrub	26.6	27.2	0.6	
<i>Eucalyptus populnea</i>	Canopy	26	30.4	4.4	
<i>Acacia salicina</i>	Shrub	30.5	30.8	0.3	
<i>Acacia salicina</i>	Shrub	31.3	31.8	0.5	
<i>Eucalyptus populnea</i>	Canopy	32.3	47.8	15.5	
<i>Myoporum acuminatum</i>	Shrub	31.5	34.3	2.8	
<i>Casuarina cristata</i>	Subcanopy	51.8	56.9	5.1	
<i>Eucalyptus populnea</i>	Canopy	58	66	8	
<i>Eucalyptus populnea</i>	Canopy	68.2	75.2	7	
<i>Eucalyptus populnea</i>	Subcanopy	69.6	70.6	1	
<i>Eucalyptus populnea</i>	Canopy	79	81.2	2.2	
<i>Pittosporum angustifolium</i>	Subcanopy	91	92.4	1.4	
<i>Eucalyptus populnea</i>	Canopy	95.7	100	4.3	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BK
	Date:	05/03/2021
	Observers:	KR/DRF

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	337873.62296	Northing:	6918765.95135	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Dominant canopy of <i>Eucalyptus populnea</i> and sub canopy of juvenile <i>E. populnea</i> . Shrub layer consists of <i>Acacia stenophylla</i> . Ground layer predominantly native grasses and forbs with scattered woody debris.					
Regional Ecosystem:	11.3.2	Median Tree Canopy ht:	17	Emergent ht:		Subcanopy ht:	4

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 106.5

Per ha Total (m): 1065

Site Total (m): 532.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	20	80	20	65	15	40%
% Native annual grass						0%
% Native forbs and other species	10	5			5	4%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs	30		35	20	25	22%
% Litter	20	15	10	10	50	21%
% Rock						0%
% Bare ground	20		35	5	5	13%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BK
	Date:	05/03/2021
	Observers:	DRF/KR

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	15
Total No. Large Trees per ha:	30
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 15
	# of trees >= benchmark per ha: 30
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	9
Forbs and others spp. richness:	10
Non-native plant cover (%)	10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus populnea</i>		Canopy		Yes
<i>Eucalyptus tereticornis</i>			Canopy	
<i>Acacia stenophylla</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Phyla canescens</i>		Forbs and Other Species	Exotic
<i>Enteropogon acicularis</i>		Grass	
<i>Panicum queenslandicum</i>		Grass	
<i>Eriochloa crebra</i>		Grass	
<i>Brunoniella australis</i>		Forbs and Other Species	
<i>Neptunia gracilis</i> forma <i>gracilis</i>		Forbs and Other Species	
<i>Sclerolaena tetracuspis</i>		Forbs and Other Species	
<i>Paspalidium constrictum</i>		Grass	
<i>Cyperus fulvus</i>		Forbs and Other Species	
<i>Dichanthium sericeum</i>		Grass	
<i>Acacia stenophylla</i>		Shrub	
<i>Bothriochloa ewartiana</i>		Grass	
Other	<i>Eragrostis</i> sp	Grass	
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Lepidium bonariense</i>		Forbs and Other Species	Exotic
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Marsilea hirsuta</i>		Forbs and Other Species	
<i>Vachellia farnesiana</i>		Shrub	Exotic
	<i>Eriochloa</i> sp		
<i>Calotis cuneata</i>		Forbs and Other Species	
<i>Sclerolaena bicornis</i>		Forbs and Other Species	
<i>Opuntia stricta</i>		Shrub	Exotic
<i>Opuntia aurantiaca</i>		Forbs and Other Species	Exotic
<i>Sporobolus elongatus</i>		Grass	
<i>Dinebra divaricatissima</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BK
Entered:.....	Date:	05/03/2021
Checked:.....	Observers:	KR/DRF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	7
Canopy total (m):	51.7
Emergent total (m):	0
Shrub total (m):	3.8

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Eucalyptus populnea</i>		Canopy	22.4	33.2	10.8
<i>Eucalyptus populnea</i>		Canopy	33.6	50	16.4
<i>Acacia stenophylla</i>		Shrub	35.2	39	3.8
<i>Eucalyptus populnea</i>		Canopy	56.8	81.3	24.5
<i>Eucalyptus populnea</i>		Subcanopy	68.5	71.4	2.9
<i>Eucalyptus populnea</i>		Subcanopy	91.6	95.7	4.1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BD
Entered:.....	Date:	05/03/2021
Checked:.....	Observers:	BJ/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	340531.89301	Northing:	6922147.07993	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus camaldulensis</i> open woodland					
Regional Ecosystem:	11.3.25	Median Tree Canopy ht:	16	Emergent ht:		Subcanopy ht:	10

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	16.5
Per ha Total (m):	165
Site Total (m):	82.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	65	70	90	15	35	55%
% Native annual grass						0%
% Native forbs and other species	15	20		10	15	12%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs				65	35	20%
% Litter	20	10	10	5	15	12%
% Rock						0%
% Bare ground						0%
% Cryptograms				5		1%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BD
Entered:.....	Date:	05/03/2021
Checked:.....	Observers:	Brad
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	0%
Total No. Large Trees:	11
Total No. Large Trees per ha:	22
Native Tree Species Richness:	2
Eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20
Non-eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	2
Grass spp. richness:	4
Forbs and others spp. richness:	8
Non-native plant cover (%)	2%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy		
<i>Acacia stenophylla</i>			Sub-Canopy	

50 x 10m area

Species		Life Form	Status
Other	<i>Panicum</i> sp. collected b100	Grass	
<i>Phyla canescens</i>		Forbs and Other Species	Exotic
<i>Acacia stenophylla</i>		Shrub	
<i>Solanum nigrum</i>		Forbs and Other Species	Exotic
<i>Bidens bipinnata</i>		Forbs and Other Species	Exotic
Other	<i>Paspalidium</i> sp. b100	Grass	
<i>Astrelba elymoides</i>		Grass	
<i>Einadia hastata</i>		Forbs and Other Species	
<i>Salsola australis</i>		Shrub	
<i>Erigeron canadensis</i>		Forbs and Other Species	Exotic
<i>Marsilea hirsuta</i>		Forbs and Other Species	
Other	<i>Eragrostis</i> sp. b100	Grass	
<i>Bidens pilosa</i>		Forbs and Other Species	Exotic
<i>Oxalis chnoodes</i>		Forbs and Other Species	
Other	Cyperaceae sp. b100	Forbs and Other Species	
<i>Rapistrum rugosum</i>		Forbs and Other Species	Exotic
<i>Commelina lanceolata</i>		Forbs and Other Species	
<i>Asparagus officinalis</i>		Shrub	Exotic
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Tribulus terrestris</i>		Forbs and Other Species	
<i>Cyperus bifax</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BD
Entered:.....	Date:	05/03/2021
Checked:.....	Observers:	BJ/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	9.4
Canopy total (m):	41.1
Emergent total (m):	0
Shrub total (m):	1.3

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy	8	16.8	8.8
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy	24.7	29.7	5
<i>Acacia stenophylla</i>		Subcanopy	36	45.4	9.4
<i>Acacia stenophylla</i>		Shrub	42.1	43.4	1.3
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy	63.7	86	22.3
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy	95	100	5

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BM
Entered:.....	Date:	07/03/2021
Checked:.....	Observers:	DRF/KR
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>							
Bioregion:		Brigalow belt					
Plot Origin:	Zone:	56	Easting:	358071.23505	Northing:	6933744.12188	Accuracy: +/-10m
Datum:	GDA94	Plot bearing:					
Locality description:							

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus orgadophila</i> and <i>Callitris glaucophylla</i> .					
Regional Ecosystem:	11.8.5	Median Tree Canopy ht:	16	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	45.5
Per ha Total (m):	455
Site Total (m):	227.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	25	20	45	10	25	25%
% Native annual grass						0%
% Native forbs and other species	15	25	10	10	15	15%
% Native shrubs (<1m in height)		1		35		7%
% Non-native grass						0%
% Non-native forbs & shrubs	5	1	5			2%
% Litter	20	38	20	20	40	28%
% Rock	25	15	20	25	20	21%
% Bare ground	10					2%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BM
	Date:	07/03/2021
	Observers:	DRF/KR

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	10
Total No. Large Trees per ha:	20
Native Tree Species Richness:	10
Eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	6
Grass spp. richness:	7
Forbs and others spp. richness:	22
Non-native plant cover (%)	5%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus orgadophila</i>		Canopy		Yes
<i>Callitris glaucophylla</i>		Canopy		Yes
<i>Psydrax odorata</i> forma <i>buxifolia</i>			Subcanopy	
<i>Elaeodendron australe</i> var. <i>australe</i>			Subcanopy	
<i>Auranticarpa rhombifolia</i>			Subcanopy	
<i>Acacia maidenii</i>			Subcanopy	
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>			Subcanopy	
<i>Notelaea microcarpa</i>			Subcanopy	
<i>Diospyros humilis</i>			Subcanopy	
<i>Alphitonia excelsa</i>			Subcanopy	
<i>Opuntia tomentosa</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Sida hackettiana</i>		Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	Exotic
Other	<i>Aristida</i> sp1	Grass	
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>		Forbs and Other Species	
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
<i>Cymbopogon refractus</i>		Grass	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Pandorea pandorana</i>		Forbs and Other Species	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Glycine tabacina</i>		Forbs and Other Species	
Other	Chenopodiaceae	Forbs and Other Species	
Other	<i>Abutilon</i>	Forbs and Other Species	
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Cyperus gracilis</i>		Forbs and Other Species	
Other	<i>Aristida</i> sp2	Grass	
<i>Carissa ovata</i>		Shrub	
<i>Paspalidium gracile</i>		Grass	
<i>Dichanthium sericeum</i>		Grass	
<i>Enteropogon ramosus</i>		Grass	
<i>Desmodium brachypodum</i>		Forbs and Other Species	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		Forbs and Other Species	
<i>Cirsium vulgare</i>		Forbs and Other Species	Exotic
<i>Sporobolus elongatus</i>		Grass	
<i>Nyssanthus erecta</i>		Forbs and Other Species	
<i>Solanum ellipticum</i>		Forbs and Other Species	
Other	<i>Hovea</i>	Forbs and Other Species	
<i>Gomphocarpus fruticosus</i>		Shrub	Exotic
<i>Sigesbeckia australiensis</i>		Forbs and Other Species	
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>		Shrub	
<i>Notelaea microcarpa</i>		Shrub	
<i>Callitris glaucophylla</i>		Shrub	
<i>Acacia decora</i>		Shrub	
<i>Geitonoplesium cymosum</i>		Forbs and Other Species	
<i>Brachychiton populneus</i> subsp. <i>populneus</i>		Forbs and Other Species	
<i>Einadia nutans</i>		Forbs and Other Species	
Other	<i>Lepidium</i>	Forbs and Other Species	
<i>Alectryon diversifolius</i>		Shrub	
<i>Calotis lappulacea</i>		Forbs and Other Species	
<i>Eucalyptus orgadophila</i>		Forbs and Other Species	
<i>Dichondra repens</i>		Forbs and Other Species	
<i>Psydrax odorata</i> forma <i>buxifolia</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BM
Entered:.....	Date:	07/03/2021
Checked:.....	Observers:	DRF/KR
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	14
Canopy total (m):	56
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Eucalyptus orgadophila</i>	Canopy	1	11	10
<i>Callitris glaucophylla</i>	Canopy	6	11	5
<i>Psyrax odorata</i> subsp. <i>australiana</i>	Subcanopy	8	12	4
<i>Eucalyptus orgadophila</i>	Canopy	14	19	5
<i>Psyrax odorata</i> subsp. <i>australiana</i>	Subcanopy	22	24	2
<i>Callitris glaucophylla</i>	Canopy	34	40	6
<i>Eucalyptus orgadophila</i>	Canopy	35	40	5
<i>Eucalyptus orgadophila</i>	Canopy	43	47	4
<i>Eucalyptus orgadophila</i>	Canopy	50	53	3
<i>Psyrax odorata</i> subsp. <i>australiana</i>	Subcanopy	50	51	1
<i>Callitris glaucophylla</i>	Canopy	51	56	5
<i>Eucalyptus orgadophila</i>	Canopy	57	61	4
<i>Eucalyptus orgadophila</i>	Canopy	63	70	7
<i>Eucalyptus orgadophila</i>	Canopy	73	79	6
<i>Callitris glaucophylla</i>	Subcanopy	78	81	3
<i>Eucalyptus orgadophila</i>	Canopy	92	98	6
<i>Callitris glaucophylla</i>	Subcanopy	93	95	2
<i>Eucalyptus orgadophila</i>	Canopy	93	100	7
<i>Psyrax odorata</i> subsp. <i>australiana</i>	Subcanopy	97	98	1
<i>Callitris glaucophylla</i>	Subcanopy	99	100	1

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BE
Entered:.....	Date:	07/03/2021
Checked:.....	Observers:	BJ/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	370275.1174	Northing:	6937263.76661	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus crebra</i> open woodland					
Regional Ecosystem:	11.8.4	Median Tree Canopy ht:	15	Emergent ht:		Subcanopy ht:	5.4

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	34.5
Per ha Total (m):	345
Site Total (m):	172.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass		25	10	10	10	11%
% Native annual grass						0%
% Native forbs and other species	20	15	20	10	10	15%
% Native shrubs (<1m in height)						0%
% Non-native grass	30	25	25	60	40	36%
% Non-native forbs & shrubs	10	15	20		10	11%
% Litter	40	20	25	10	15	22%
% Rock						0%
% Bare ground				10	15	5%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BE
	Date:	07/03/2021
	Observers:	Brad and Dane

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	5
Total No. Large Trees per ha:	10
Native Tree Species Richness:	6
Eucalypts:	# of trees >= benchmark: 5
	# of trees >= benchmark per ha: 10
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	5
Grass spp. richness:	8
Forbs and others spp. richness:	14
Non-native plant cover (%)	30%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus crebra</i>		Canopy		Yes
<i>Eucalyptus tereticornis</i>		Canopy		Yes
<i>Notelaea microcarpa</i>			Subcanopy	
<i>Acacia excelsa</i> subsp. <i>excelsa</i>			Canopy	
<i>Acacia crassa</i> subsp. <i>crassa</i>			Subcanopy	
<i>Brachychiton populneus</i> subsp. <i>populneus</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Eustrephus latifolius</i>		Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>maximus</i>		Grass	Exotic
<i>Eucalyptus crebra</i>		Shrub	
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>		Shrub	
<i>Brunoniella australis</i>		Forbs and Other Species	
Other	Yellow burr daisy	Forbs and Other Species	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Dianella longifolia</i> var. <i>longifolia</i>		Forbs and Other Species	
<i>Acacia crassa</i> subsp. <i>crassa</i>		Shrub	
<i>Pittosporum angustifolium</i>		Shrub	
<i>Enteropogon ramosus</i>		Grass	
<i>Eriochloa crebra</i>		Grass	
<i>Salsola australis</i>		Shrub	
Other	<i>Aristida</i> sp.	Grass	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Peripleura hispidula</i> var. <i>hispidula</i>		Forbs and Other Species	
<i>Lepidium africanum</i>		Forbs and Other Species	Exotic
<i>Glycine tomentella</i>		Forbs and Other Species	
Other	<i>Cyperus</i> sp.	Forbs and Other Species	
<i>Digitaria divaricatissima</i> var. <i>divaricatissima</i>		Grass	
<i>Cymbopogon refractus</i>		Grass	
<i>Dichanthium sericeum</i>		Grass	
<i>Eragrostis curvula</i>		Grass	Exotic
<i>Panicum queenslandicum</i>		Grass	
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Malvastrum americanum</i> var. <i>americanum</i>		Forbs and Other Species	Exotic
<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>		Forbs and Other Species	
<i>Dichondra repens</i>		Forbs and Other Species	
<i>Chloris gayana</i>		Grass	Exotic
Other	<i>Aristida</i> sp. 2	Grass	
<i>Jasminum dianthifolium</i>		Forbs and Other Species	
<i>Commelina lanceolata</i>		Forbs and Other Species	
<i>Einadia hastata</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BE
Entered:.....	Date:	07/03/2021
Checked:.....	Observers:	BJ/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	14.8
Canopy total (m):	23.1
Emergent total (m):	0
Shrub total (m):	2.3

100m Transect: Tree Shrub and Canopy Cover:					
Species	Type	Start	Finish	Total	
<i>Eucalyptus crebra</i>	Canopy	0	20.8	20.8	
<i>Eucalyptus crebra</i>	Shrub	25.2	26.2	1	
<i>Eucalyptus crebra</i>	Shrub	26.5	26.9	0.4	
<i>Eucalyptus crebra</i>	Canopy	27	29.3	2.3	
<i>Eucalyptus crebra</i>	Shrub	29.5	30	0.5	
<i>Eucalyptus crebra</i>	Shrub	32.3	32.7	0.4	
<i>Eucalyptus crebra</i>	Subcanopy	34.1	35.5	1.4	
<i>Eucalyptus crebra</i>	Subcanopy	37	39.7	2.7	
<i>Eucalyptus crebra</i>	Subcanopy	44.3	47.6	3.3	
<i>Pittosporum angustifolium</i>	Subcanopy	54	61.4	7.4	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BN
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	283759.1734	Northing:	6838638.18362	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus woolsiana</i> open forest					
Regional Ecosystem:	11.5.20	Median Tree Canopy ht:	16	Emergent ht:		Subcanopy ht:	8

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	53.5
Per ha Total (m):	535
Site Total (m):	267.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	50	5	30	25	40	30%
% Native annual grass						0%
% Native forbs and other species	10	5	5	10	10	8%
% Native shrubs (<1m in height)						0%
% Non-native grass			5			1%
% Non-native forbs & shrubs	20	20			10	10%
% Litter	20	40	20	15	10	21%
% Rock						0%
% Bare ground		30	40	50	30	30%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BN
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	50%
Total No. Large Trees:	0
Total No. Large Trees per ha:	0
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	10
Forbs and others spp. richness:	17
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus woollsiana</i>		Canopy		Yes
Other	<i>Acacia</i> sp	Subcanopy		
<i>Allocasuarina luehmannii</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Bryophyllum delagoense</i>		Forbs and Other Species	Exotic
<i>Cymbopogon refractus</i>		Grass	
<i>Paspalidium gracile</i>		Grass	
<i>Commelina ensifolia</i>		Forbs and Other Species	
Other	<i>Eragrostis sp1</i>	Grass	
Other	<i>Eragrostis sp2</i>	Grass	
Other	<i>Lomandra sp</i>	Forbs and Other Species	
<i>Dinebra ligulata</i>		Grass	
<i>Enteropogon acicularis</i>		Grass	
<i>Portulaca filifolia</i>		Forbs and Other Species	
Other	Cyperaceae sp1	Forbs and Other Species	
Other	<i>Aristida sp1</i>	Grass	
<i>Paspalidium gracile</i>		Grass	
<i>Dodonaea viscosa subsp. angustifolia</i>		Forbs and Other Species	
Other	<i>Solanum sp</i>	Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Calandrinia pickeringii</i>		Forbs and Other Species	
<i>Harrisia martinii</i>		Forbs and Other Species	Exotic
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic
Other	Poaceae sp2	Grass	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
Other	<i>Paspalidium sp</i>	Grass	
<i>Eragrostis cilianensis</i>		Grass	Exotic
Other	<i>Myoporum sp</i>	Forbs and Other Species	
<i>Murdannia graminea</i>		Forbs and Other Species	
Other	<i>Epaltes</i>	Forbs and Other Species	
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Pittosporum angustifolium</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BN
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	2
Canopy total (m):	76.6
Emergent total (m):	0
Shrub total (m):	2.4

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Eucalyptus woollsiana</i>	Canopy	0	5	5
<i>Eucalyptus woollsiana</i>	Canopy	9.8	20.9	11.1
<i>Eucalyptus woollsiana</i>	Canopy	25.9	29.2	3.3
<i>Eucalyptus woollsiana</i>	Canopy	33.1	40.2	7.1
<i>Eucalyptus woollsiana</i>	Canopy	42.1	54	11.9
<i>Eucalyptus woollsiana</i>	Canopy	56.4	67.4	11
<i>Eucalyptus woollsiana</i>	Canopy	69	77.2	8.2
<i>Geijera parviflora</i>	Shrub	77.5	79.9	2.4
<i>Eucalyptus woollsiana</i>	Canopy	79.9	96.1	16.2
<i>Eucalyptus woollsiana</i>	Canopy	97.2	100	2.8
<i>Allocasuarina luehmannii</i>	Subcanopy	98	100	2

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BO
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	279002.83031	Northing:	6837013.96646	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>								
Habitat Description:		<i>Melaleuca densispicata</i> open forest with <i>Eucalyptus camaldulensis</i> emergent						
Regional Ecosystem:		11.5.14	Median Tree Canopy ht:	8	Emergent ht:	18	Subcanopy ht:	3

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	8.5
Per ha Total (m):	85
Site Total (m):	42.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	45	40	60	40	20	41%
% Native annual grass						0%
% Native forbs and other species	15	10	10	25	10	14%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	15	10	10	5	15	11%
% Rock						0%
% Bare ground	25	40	20	30	15	26%
% Cryptograms					40	8%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BO
	Date:	08/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	5
Total No. Large Trees per ha:	10
Native Tree Species Richness:	3
Eucalypts:	# of trees >= benchmark: 4
	# of trees >= benchmark per ha: 8
Non-eucalypts:	# of trees >= benchmark: 1
	# of trees >= benchmark per ha: 2

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	3
Forbs and others spp. richness:	12
Non-native plant cover (%)	1%

100 x 50m area			
Species	EDL	Non-EDL	Recruitment
<i>Melaleuca densispicata</i>	Canopy		Yes
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Emergent	
<i>Geijera parviflora</i>		Canopy	
<i>Eremophila deserti</i>		Canopy	

50 x 10m area

Species		Life Form	Status
Other	<i>Amyema</i>	Forbs and Other Species	
<i>Marsilea hirsuta</i>		Forbs and Other Species	
Other	<i>Eragrostis sp1</i>	Grass	
Other	<i>Dinebra</i>	Grass	
Other	<i>Eriochloa</i>	Grass	
Other	Cyperaceae sp1	Forbs and Other Species	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Alternanthera denticulata</i>		Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	
<i>Eclipta platyglossa</i>		Forbs and Other Species	
<i>Chloris gayana</i>		Grass	Exotic
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
Other	<i>Eremophila</i>	Shrub	
Other	Chenopodiaceae	Forbs and Other Species	
Other	Cyperaceae sp2	Forbs and Other Species	
<i>Eryngium paludosum</i>		Forbs and Other Species	
Other	<i>Juncus sp</i>	Forbs and Other Species	
Other	<i>Epaltes</i>	Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BO
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	0
Canopy total (m):	7.2
Emergent total (m):	13.6
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Melaleuca densispicata</i>		Canopy	0	1.9	1.9
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy	38.1	40	1.9
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Emergent	44.5	56.2	11.7
<i>Melaleuca densispicata</i>		Canopy	45.9	49.3	3.4
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Emergent	61.2	63.1	1.9

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BF
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	KR/BJ
Corrected:.....		

100 x 50m Area

SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	370921.90924	Northing:	6937926.90532	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Canopy dominated by <i>Eucalyptus crebra</i> with a sub canopy of <i>Eucalyptus crebra</i> , <i>Brachychiton populneus</i> , <i>Acacia decora</i> and <i>Pittosporum angustifolium</i> . Shrub layer consists of juvenile sub canopy species. Ground layer consists of native grasses and forbs with scattered <i>Opuntia tomentosa</i> .					
Regional Ecosystem:	11.8.4	Median Tree Canopy ht:	20	Emergent ht:		Subcanopy ht:	11

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 79

Per ha Total (m): 790

Site Total (m): 395

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	50	5	70	35	30	38%
% Native annual grass						0%
% Native forbs and other species	15	20	5	15	5	12%
% Native shrubs (<1m in height)				15	25	8%
% Non-native grass	5	35				8%
% Non-native forbs & shrubs	5				5	2%
% Litter	20	15	10	5	10	12%
% Rock	5	25	15	30	25	20%
% Bare ground						0%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BF
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	10
Total No. Large Trees per ha:	20
Native Tree Species Richness:	8
Eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	5
Grass spp. richness:	7
Forbs and others spp. richness:	11
Non-native plant cover (%)	5%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus crebra</i>		Canopy		Yes
<i>Brachychiton populneus</i> subsp. <i>populneus</i>			Subcanopy	
<i>Pittosporum angustifolium</i>			Subcanopy	
<i>Geijera parviflora</i>			Subcanopy	
<i>Acacia crassa</i> subsp. <i>crassa</i>			Subcanopy	
<i>Acacia decora</i>			Subcanopy	
<i>Psydrax odorata</i> forma <i>australiana</i>			Subcanopy	
<i>Notelaea microcarpa</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
<i>Jasminum didymum</i> subsp. <i>lineare</i>		Forbs and Other Species	
Other	Aristida sp. 1	Grass	
<i>Dichanthium sericeum</i>		Grass	
<i>Einadia hastata</i>		Forbs and Other Species	
<i>Eriochloa crebra</i>		Grass	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Enteropogon ramosus</i>		Grass	
<i>Lepidium africanum</i>		Forbs and Other Species	Exotic
<i>Themeda triandra</i>		Grass	
<i>Eustrephus latifolius</i>		Forbs and Other Species	
<i>Geijera parviflora</i>		Shrub	
<i>Bursaria spinosa</i> subsp. <i>spinosa</i>		Shrub	
<i>Glycine tabacina</i>		Forbs and Other Species	
<i>Notelaea microcarpa</i>		Shrub	
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Acacia decora</i>		Shrub	
<i>Acacia crassa</i> subsp. <i>crassa</i>		Shrub	
<i>Coleus australis</i>		Forbs and Other Species	
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Lomandra longifolia</i>		Forbs and Other Species	
<i>Peripleura hispidula</i> var. <i>hispidula</i>		Forbs and Other Species	
<i>Verbena bonariensis</i>		Forbs and Other Species	Exotic
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Bothriochloa pertusa</i>		Grass	Exotic
<i>Panicum effusum</i>		Grass	
<i>Eremophila debilis</i>		Forbs and Other Species	
<i>Jasminum dianthifolium</i>		Forbs and Other Species	
<i>Bidens pilosa</i>		Forbs and Other Species	Exotic

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BF
Entered:.....	Date:	08/03/2021
Checked:.....	Observers:	KR / BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	8.8
Canopy total (m):	43.1
Emergent total (m):	13.6
Shrub total (m):	8.2

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Eucalyptus crebra</i>	Canopy	0	12.2	12.2
<i>Brachychiton populneus</i> subsp. <i>populneus</i>	Subcanopy	21.6	30.4	8.8
<i>Eucalyptus crebra</i>	Canopy	27	38.8	11.8
<i>Acacia decora</i>	Shrub	44.1	48	3.9
<i>Eucalyptus crebra</i>	Canopy	46.5	54.5	8
<i>Eucalyptus crebra</i>	Shrub	51.6	52.5	0.9
<i>Eucalyptus crebra</i>	Canopy	58	62.1	4.1
<i>Acacia crassa</i> subsp. <i>crassa</i>	Shrub	72.4	73	0.6
<i>Acacia crassa</i> subsp. <i>crassa</i>	Shrub	75.3	76	0.7
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>	Shrub	82	83	1
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>	Shrub	86.5	87.6	1.1
<i>Eucalyptus crebra</i>	Canopy	93	100	7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BG
Entered:.....	Date:	09/03/2021
Checked:.....	Observers:	BJ/KR
Corrected:.....		

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	377836.59244	Northing:	6945609.64854	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Canopy dominated by <i>Eucalyptus orgadophila</i> with scattered <i>Eucalyptus crebra</i> . Sub canopy and shrub layer absent, with a predominantly exotic ground layer					
Regional Ecosystem:	11.8.5	Median Tree Canopy ht:	14	Emergent ht:		Subcanopy ht:	0

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	7
Per ha Total (m):	70
Site Total (m):	35

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	5	5	5	5	10	6%
% Native annual grass						0%
% Native forbs and other species	10	3	5	5	10	7%
% Native shrubs (<1m in height)						0%
% Non-native grass	75	67	75	65	60	68%
% Non-native forbs & shrubs		5	5	5	10	5%
% Litter	10	10	10	15	10	11%
% Rock		10				2%
% Bare ground				5		1%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



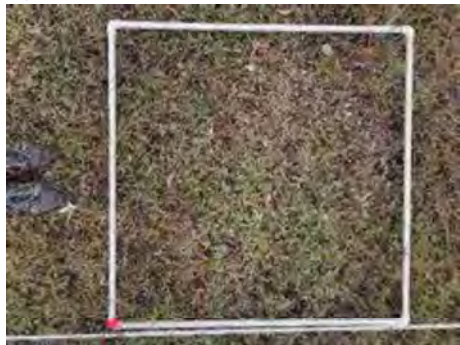
Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BG
	Date:	09/03/2021
	Observers:	KR / BJ

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	0%
Total No. Large Trees:	9
Total No. Large Trees per ha:	18
Native Tree Species Richness:	2
Eucalypts:	# of trees >= benchmark: 9
	# of trees >= benchmark per ha: 18
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	5
Forbs and others spp. richness:	5
Non-native plant cover (%)	70%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus orgadophila</i>		Canopy		
<i>Eucalyptus crebra</i>		Canopy		

50 x 10m area

Species		Life Form	Status
<i>Megathyrsus maximus</i> var. <i>maximus</i>		Grass	Exotic
<i>Heliotropium amplexicaule</i>		Forbs and Other Species	Exotic
<i>Sisymbrium irio</i>		Forbs and Other Species	Exotic
<i>Cynodon dactylon</i> var. <i>dactylon</i>		Grass	Exotic
<i>Amaranthus viridis</i>		Forbs and Other Species	Exotic
<i>Malvastrum americanum</i> var. <i>americanum</i>		Forbs and Other Species	Exotic
<i>Portulaca oleracea</i>		Forbs and Other Species	Exotic
<i>Chloris truncata</i>		Grass	
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
<i>Lepidium africanum</i>		Forbs and Other Species	Exotic
Other	<i>Aristida</i> sp.1	Grass	
<i>Dysphania carinata</i>		Forbs and Other Species	
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Sporobolus africanus</i>		Grass	Exotic
<i>Austrostipa verticillata</i>		Grass	
<i>Urochloa mosambicensis</i>		Grass	Exotic
<i>Sida hackettiana</i>		Forbs and Other Species	
<i>Jasminum dianthifolium</i>		Forbs and Other Species	
<i>Paspalidium caespitosum</i>		Grass	
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Alternanthera nana</i>		Forbs and Other Species	
Other	Asteraceae sp.1	Forbs and Other Species	Exotic
<i>Bothriochloa biloba</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BG
Entered:.....	Date:	09/03/2021
Checked:.....	Observers:	BJ/KR
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	0
Canopy total (m):	50.9
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Eucalyptus orgadophila</i>	Canopy	1	7	6
<i>Eucalyptus crebra</i>	Canopy	3.2	7.9	4.7
<i>Eucalyptus orgadophila</i>	Canopy	15.6	36.9	21.3
<i>Eucalyptus orgadophila</i>	Canopy	51.4	55	3.6
<i>Eucalyptus orgadophila</i>	Canopy	68.6	85	16.4
<i>Eucalyptus orgadophila</i>	Canopy	86	88.7	2.7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BH
	Date:	10/03/2021
	Observers:	KR/BJ

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	378467.67227	Northing:	6948520.60374	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Canopy consists of <i>Eucalyptus orgadophila</i> with no subcanopy or shrub layer present. Ground cover dominated by native grasses and forbs. Low grazing level with threatened species <i>Digitaria porrecta</i> present.					
Regional Ecosystem:	11.8.5	Median Tree Canopy ht:	14	Emergent ht:		Subcanopy ht:	0

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	14.5
Per ha Total (m):	145
Site Total (m):	72.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	15	50	55	25	80	45%
% Native annual grass						0%
% Native forbs and other species	50	5	10	10	5	16%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs	10	15		15	5	9%
% Litter	20	25	35	45	10	27%
% Rock						0%
% Bare ground	5	5		5		3%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BH
	Date:	10/03/2021
	Observers:	Brad

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	100%
Total No. Large Trees:	5
Total No. Large Trees per ha:	10
Native Tree Species Richness:	1
Eucalypts:	# of trees >= benchmark: 5
	# of trees >= benchmark per ha: 10
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	2
Grass spp. richness:	18
Forbs and others spp. richness:	11
Non-native plant cover (%)	15%

100 x 50m area			
Species	EDL	Non-EDL	Recruitment
<i>Eucalyptus orgadophila</i>	Canopy		Yes

50 x 10m area

Species		Life Form	Status
<i>Eriochloa crebra</i>		Grass	
<i>Digitaria porrecta</i>		Grass	Near Threatened
<i>Malvastrum americanum</i> var. <i>americanum</i>		Forbs and Other Species	Exotic
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Rhynchosia minima</i>		Forbs and Other Species	
<i>Chloris truncata</i>		Grass	
<i>Glycine tomentella</i>		Forbs and Other Species	
<i>Panicum queenslandicum</i>		Grass	
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Aristida leptopoda</i>		Grass	
<i>Salvia reflexa</i>		Forbs and Other Species	Exotic
<i>Cyperus gracilis</i>		Forbs and Other Species	
Other	<i>Oxalis</i> sp.	Forbs and Other Species	
<i>Megathyrsus maximus</i> var. <i>maximus</i>		Grass	Exotic
<i>Sida rhombifolia</i>		Forbs and Other Species	Exotic
<i>Enteropogon ramosus</i>		Grass	
<i>Bidens pilosa</i>		Forbs and Other Species	Exotic
<i>Astrebla elymoides</i>		Grass	
<i>Themeda triandra</i>		Grass	
<i>Dichanthium sericeum</i>		Grass	
Other	<i>Walwalleya</i> sp.	Grass	
<i>Bothriochloa biloba</i>		Grass	
<i>Erigeron canadensis</i>		Forbs and Other Species	Exotic
<i>Themeda avenacea</i>		Grass	
<i>Austrostipa verticillata</i>		Grass	
Other	<i>Aristida</i> sp. 1	Grass	
<i>Paspalidium caespitosum</i>		Grass	
<i>Acacia salicina</i>		Shrub	
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>		Shrub	
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Eremophila debilis</i>		Forbs and Other Species	
<i>Lepidium africanum</i>		Forbs and Other Species	Exotic
<i>Bidens bipinnata</i>		Forbs and Other Species	Exotic
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
<i>Panicum decompositum</i>		Grass	
<i>Paspalidium globoideum</i>		Grass	
<i>Digitaria divaricatissima</i>		Grass	
<i>Portulaca oleracea</i>		Forbs and Other Species	Exotic
<i>Zinnia peruviana</i>		Forbs and Other Species	Exotic
<i>Cyperus bifax</i>		Forbs and Other Species	
<i>Neptunia gracilis</i> forma <i>gracilis</i>		Forbs and Other Species	
<i>Urochloa mosambicensis</i>		Grass	Exotic
<i>Peripleura hispidula</i> var. <i>hispidula</i>		Forbs and Other Species	
Other	<i>Amaranthus</i> sp.	Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BH
Entered:.....	Date:	10/03/2021
Checked:.....	Observers:	KR/BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	0
Canopy total (m):	52.2
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Eucalyptus orgadophila</i>		Canopy	0	14.3	14.3
<i>Eucalyptus orgadophila</i>		Canopy	16.6	27.3	10.7
<i>Eucalyptus orgadophila</i>		Canopy	29.5	47.1	17.6
<i>Eucalyptus orgadophila</i>		Canopy	60.3	65.4	5.1
<i>Eucalyptus orgadophila</i>		Canopy	94.2	95	0.8
<i>Eucalyptus orgadophila</i>		Canopy	96.3	100	3.7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BI
	Date:	10/03/2021
	Observers:	KR/BJ

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	378824.38707	Northing:	6951936.10021	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Dominated by <i>Dichanthium sericeum</i> and <i>Aristida leptopoda</i> with scattered native forbs and exotic species <i>Salvia reflexa</i> and <i>Sorghum halapense</i> .					
Regional Ecosystem:	Non-rem 11.3.21	Median Tree Canopy ht:	0	Emergent ht:		Subcanopy ht:	0

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 0

Per ha Total (m): 0

Site Total (m): 0

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	55	75	70	75	75	70%
% Native annual grass						0%
% Native forbs and other species		2	5	5	5	3%
% Native shrubs (<1m in height)						0%
% Non-native grass						0%
% Non-native forbs & shrubs	5					1%
% Litter	5		5	10	10	6%
% Rock						0%
% Bare ground	35	23	20	10	10	20%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BI
	Date:	10/03/2021
	Observers:	KR / BJ

100 x 50m Area

SITE INFORMATION

<u>100 x 50m area</u>	
% EDL Recruitment:	N/A
Total No. Large Trees:	0
Total No. Large Trees per ha:	0
Native Tree Species Richness:	0
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

<u>50 x 10m area</u> Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	3
Forbs and others spp. richness:	7
Non-native plant cover (%)	3%

[illegible]

50 x 10m area

Species		Life Form	Status
<i>Dichanthium sericeum</i>		Grass	
<i>Aristida leptopoda</i>		Grass	
<i>Salvia reflexa</i>		Forbs and Other Species	Exotic
<i>Sorghum halepense</i>		Grass	Exotic
<i>Boerhavia dominii</i>		Forbs and Other Species	
<i>Rhynchosia minima</i>		Forbs and Other Species	
Other	<i>Callotis</i> sp.1 B9T2	Forbs and Other Species	
<i>Euphorbia drummondii</i>		Forbs and Other Species	
<i>Convolvulus arvensis</i>		Forbs and Other Species	
<i>Anoda cristata</i>		Forbs and Other Species	Exotic
<i>Panicum decompositum</i>		Grass	
Other	<i>Senecio</i> sp.1 B9T2	Forbs and Other Species	
<i>Euphorbia heterophylla</i>		Forbs and Other Species	Exotic
<i>Tribulus terrestris</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BJ
Entered:.....	Date:	10/03/2021
Checked:.....	Observers:	KR/BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	379063.71061	Northing:	6953519.9104	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Native grass and forbs within TEC grassland on basaltic and alluvial soils. Highly diverse with little weed cover. No canopy, sub canopy or shrub layer present.					
Regional Ecosystem:	Non-rem 11.3.21	Median Tree Canopy ht:	0	Emergent ht:		Subcanopy ht:	0

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 0

Per ha Total (m): 0

Site Total (m): 0

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	60	50	60	35	50	51%
% Native annual grass						0%
% Native forbs and other species		5	5	10	5	5%
% Native shrubs (<1m in height)						0%
% Non-native grass	2					0%
% Non-native forbs & shrubs		1				0%
% Litter	18	24	15	10	20	17%
% Rock						0%
% Bare ground	20	20	20	45	25	26%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BJ
	Date:	10/03/2021
	Observers:	Brad and Kim

100 x 50m Area

SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	N/A
Total No. Large Trees:	0
Total No. Large Trees per ha:	0
Native Tree Species Richness:	0
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	1
Grass spp. richness:	6
Forbs and others spp. richness:	7
Non-native plant cover (%)	1%

[illegible]

50 x 10m area

Species		Life Form	Status
<i>Dichanthium sericeum</i>		Grass	
<i>Sclerolaena muricata</i>		Shrub	
<i>Austrostipa aristiglumis</i>		Grass	
<i>Aristida leptopoda</i>		Grass	
<i>Panicum decompositum</i>		Grass	
Other	<i>Senecio</i> sp.	Forbs and Other Species	
Other	<i>Callotis</i> sp.	Forbs and Other Species	
<i>Sorghum halepense</i>		Grass	Exotic
<i>Walwhalleya proluta</i>		Grass	
<i>Chloris gayana</i>		Grass	Exotic
<i>Salvia reflexa</i>		Forbs and Other Species	Exotic
<i>Bulbine bulbosa</i>		Forbs and Other Species	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Erigeron canadensis</i>		Forbs and Other Species	Exotic
<i>Panicum queenslandicum</i>		Grass	
<i>Convolvulus arvensis</i>		Forbs and Other Species	
<i>Tribulus terrestris</i>		Forbs and Other Species	
<i>Rhynchosia minima</i>		Forbs and Other Species	
<i>Chenopodium album</i>		Forbs and Other Species	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BR
Entered:.....	Date:	11/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	251192.58395	Northing:	6826556.36248	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		<i>Eucalyptus camaldulensis</i> open forest					
Regional Ecosystem:	11.3.25	Median Tree Canopy ht:	25	Emergent ht:		Subcanopy ht:	12

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	67.5
Per ha Total (m):	675
Site Total (m):	337.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass						0%
% Native annual grass						0%
% Native forbs and other species	10	10	10	5	10	9%
% Native shrubs (<1m in height)						0%
% Non-native grass	25	50	60	40	40	43%
% Non-native forbs & shrubs						0%
% Litter	50	30	20	40	30	34%
% Rock						0%
% Bare ground	15	10	10	15	20	14%
% Cryptogams						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BR
	Date:	11/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	75%
Total No. Large Trees:	17
Total No. Large Trees per ha:	34
Native Tree Species Richness:	9
Eucalypts:	# of trees >= benchmark: 7
	# of trees >= benchmark per ha: 14
Non-eucalypts:	# of trees >= benchmark: 10
	# of trees >= benchmark per ha: 20

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	2
Forbs and others spp. richness:	5
Non-native plant cover (%)	95%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>		Canopy		Yes
<i>Corymbia tessellaris</i>		Canopy		Yes
<i>Acacia salicina</i>		Canopy		Yes
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>			Subcanopy	
<i>Geijera parviflora</i>			Subcanopy	
<i>Melaleuca trichostachya</i>		Subcanopy		
<i>Eucalyptus melanophloia</i>			Canopy	
<i>Acacia salicina</i>			Subcanopy	
<i>Opuntia tomentosa</i>			Exotic	

50 x 10m area

Species		Life Form	Status
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Grass	Exotic
Other	Asteraceae sp1	Forbs and Other Species	Exotic
<i>Tribulus micrococcus</i>		Forbs and Other Species	
<i>Cenchrus ciliaris</i>		Grass	Exotic
Other	Chenopodiaceae	Forbs and Other Species	
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Cynodon dactylon</i> var. <i>dactylon</i>		Grass	Exotic
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Tetragonia tetragonoides</i>		Forbs and Other Species	
<i>Austrostipa scabra</i>		Grass	
<i>Enteropogon ramosus</i>		Grass	
<i>Opuntia tomentosa</i>		Forbs and Other Species	Exotic

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BR
Entered:.....	Date:	11/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	20.3
Canopy total (m):	57.4
Emergent total (m):	0
Shrub total (m):	0

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Acacia salicina</i>	Canopy	0	9.1	9.1
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	Canopy	3.1	10.1	7
<i>Corymbia tessellaris</i>	Canopy	11	13.1	2.1
<i>Acacia salicina</i>	Subcanopy	15.1	17.9	2.8
<i>Corymbia tessellaris</i>	Canopy	23.2	26	2.8
<i>Acacia salicina</i>	Subcanopy	27.1	29.2	2.1
<i>Acacia salicina</i>	Canopy	31.7	43.2	11.5
<i>Corymbia tessellaris</i>	Canopy	36.4	48.1	11.7
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	Canopy	51.5	54.2	2.7
<i>Acacia salicina</i>	Canopy	54.3	58.2	3.9
<i>Acacia salicina</i>	Subcanopy	61.6	77	15.4
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	Canopy	65.6	72.1	6.5
<i>Acacia salicina</i>	Canopy	81.1	88.3	7.2
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	Canopy	94.3	100	5.7

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BS
Entered:.....	Date:	11/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area

SITE INFORMATION

<u>Location</u>								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	269454.07286	Northing:	6833747.45864	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

<u>Regional Ecosystem and Tree Heights</u>							
Habitat Description:		Acacia harpophylla and Casuarina cristata open forest					
Regional Ecosystem:	11.4.3	Median Tree Canopy ht:	18	Emergent ht:		Subcanopy ht:	6

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m):	11.5
Per ha Total (m):	115
Site Total (m):	57.5

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass	15	45	55	35	25	35%
% Native annual grass						0%
% Native forbs and other species	20	10		10	20	12%
% Native shrubs (<1m in height)						0%
% Non-native grass		10	15	20		9%
% Non-native forbs & shrubs	10	15			5	6%
% Litter	10		30	20	15	15%
% Rock						0%
% Bare ground	45	20		25	35	25%
% Cryptograms						0%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	1BS
	Date:	11/03/2021
	Observers:	DRF/DAF

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	0%
Total No. Large Trees:	2
Total No. Large Trees per ha:	4
Native Tree Species Richness:	5
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 2
	# of trees >= benchmark per ha: 4

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	8
Grass spp. richness:	6
Forbs and others spp. richness:	19
Non-native plant cover (%)	10%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Acacia harpophylla</i>		Canopy		
<i>Casuarina cristata</i>		Canopy		
<i>Atalaya hemiglauc</i>			Subcanopy	
<i>Citrus glauca</i>			Subcanopy	
<i>Capparis mitchellii</i>			Subcanopy	

50 x 10m area

Species		Life Form	Status
Other	Mistletoe	Forbs and Other Species	
<i>Tetragonia tetragonoides</i>		Forbs and Other Species	
<i>Sclerolaena tetracuspis</i>		Forbs and Other Species	
<i>Einadia nutans</i>		Forbs and Other Species	
<i>Einadia nutans</i> subsp. <i>linifolia</i>		Forbs and Other Species	
<i>Enchylaena tomentosa</i>		Forbs and Other Species	
<i>Sporobolus caroli</i>		Grass	
Other	<i>Paspalidium</i>	Grass	
Other	Malvaceae	Forbs and Other Species	
<i>Rhagodia spinescens</i>		Forbs and Other Species	
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>		Shrub	
<i>Eremophila mitchellii</i>		Shrub	
<i>Citrus glauca</i>		Shrub	
<i>Casuarina cristata</i>		Shrub	
<i>Harrisia martinii</i>		Forbs and Other Species	Exotic
<i>Cenchrus ciliaris</i>		Grass	Exotic
<i>Portulaca oleracea</i>		Forbs and Other Species	
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i>		Forbs and Other Species	Exotic
Other	Mistletoe sp2	Forbs and Other Species	
Other	<i>Calotis</i>	Forbs and Other Species	
<i>Glandularia aristigera</i>		Forbs and Other Species	Exotic
<i>Opuntia tomentosa</i>		Shrub	Exotic
<i>Panicum decompositum</i>		Grass	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Capparis lasiantha</i>		Shrub	
Other	<i>Eragrostis</i> sp	Grass	
<i>Sclerolaena birchii</i>		Forbs and Other Species	
<i>Alternanthera denticulata</i>		Forbs and Other Species	
<i>Enteropogon ramosus</i>		Grass	
Other	<i>Vitadinia</i> sp		
<i>Brunoniella australis</i>		Forbs and Other Species	
<i>Polygonum plebeium</i>		Forbs and Other Species	
<i>Cheilanthes distans</i>		Forbs and Other Species	
Other	<i>Panicum</i> sp	Grass	
<i>Solanum stelligerum</i>		Forbs and Other Species	
<i>Abutilon fraseri</i> subsp. <i>fraseri</i>		Forbs and Other Species	
<i>Scaevola spinescens</i>		Shrub	
<i>Rhagodia spinescens</i>		Shrub	
<i>Geijera parviflora</i>		Shrub	
<i>Enteropogon acicularis</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	1BS
Entered:.....	Date:	11/03/2021
Checked:.....	Observers:	DRF/DAF
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary	
Subcanopy total (m):	0
Canopy total (m):	46.9
Emergent total (m):	0
Shrub total (m):	24.3

100m Transect: Tree Shrub and Canopy Cover:					
Species		Type	Start	Finish	Total
<i>Acacia harpophylla</i>		Canopy	0	7.4	7.4
<i>Opuntia tomentosa</i>		Exotic	2	5	3
<i>Acacia harpophylla</i>		Shrub	17.4	18.4	1
<i>Geijera parviflora</i>		Shrub	18.3	19.7	1.4
<i>Citrus glauca</i>		Shrub	18.4	29.7	11.3
<i>Casuarina cristata</i>		Canopy	22.3	28.7	6.4
<i>Citrus glauca</i>		Shrub	33.6	38	4.4
<i>Casuarina cristata</i>		Canopy	36.1	41	4.9
<i>Citrus glauca</i>		Shrub	36.4	39.4	3
<i>Casuarina cristata</i>		Canopy	44.1	54	9.9
<i>Geijera parviflora</i>		Shrub	45.8	49.6	3.8
<i>Opuntia tomentosa</i>		Exotic	59.2	63	3.8
<i>Casuarina cristata</i>		Canopy	67.7	79	11.3
<i>Citrus glauca</i>		Shrub	88.6	91	2.4
<i>Casuarina cristata</i>		Canopy	91	98	7
<i>Opuntia tomentosa</i>		Exotic	97	100	3

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BK
	Date:	11/03/2021
	Observers:	KR/BJ

100 x 50m Area SITE INFORMATION

Location								
Bioregion:		Brigalow belt						
Plot Origin:	Zone:	56	Easting:	320053.05724	Northing:	6879984.49667	Accuracy:	+/-10m
Datum:		GDA94	Plot bearing:					
Locality description:								

Regional Ecosystem and Tree Heights							
Habitat Description:		Canopy dominated by scattered <i>Eucalyptus chloroclada</i> and <i>Eucalyptus populnea</i> with a sub canopy of regenerating eucalyptus canopy species, <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> . Shrub layer consists of scattered <i>Geijera parviflora</i> . Weeds present consist of <i>Opuntia tomentosa</i> . Ground layer dominated by native <i>Arigrotis sp.</i> , and other native forbs.					
Regional Ecosystem:	11.5.4	Median Tree Canopy ht:	23	Emergent ht:		Subcanopy ht:	12

Site Photos:

North:



South:



East:



West:



50 x 20m area

Coarse woody debris

record length of all debris >10cm diam and >0.5m long

Length (m): 143

Per ha Total (m): 1430

Site Total (m): 715

1 x 1m Plots Ground Cover

Ground Cover Type	1	2	3	4	5	Mean
% Native perennial grass		15	6	10	20	10%
% Native annual grass						0%
% Native forbs and other species	15	10	5		5	7%
% Native shrubs (<1m in height)					1	0%
% Non-native grass						0%
% Non-native forbs & shrubs						0%
% Litter	85	74	85	70	40	71%
% Rock						0%
% Bare ground		1	4		5	2%
% Cryptogams				20	29	10%
Total	100%	100%	100%	100%	100%	

Quadrat 1:



Quadrat 2:



Quadrat 3:



Quadrat 4:



Quadrat 5:



BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID:	2BK
	Date:	11/03/2021
	Observers:	KR / BJ

100 x 50m Area SITE INFORMATION

100 x 50m area	
% EDL Recruitment:	50%
Total No. Large Trees:	3
Total No. Large Trees per ha:	6
Native Tree Species Richness:	5
Eucalypts:	# of trees >= benchmark: 0
	# of trees >= benchmark per ha: 0
Non-eucalypts:	# of trees >= benchmark: 3
	# of trees >= benchmark per ha: 6

50 x 10m area Native Plant Species Richness	
Shrub spp. richness:	0
Grass spp. richness:	6
Forbs and others spp. richness:	14
Non-native plant cover (%)	1%

100 x 50m area				
Species		EDL	Non-EDL	Recruitment
<i>Allocasuarina luehmannii</i>			Subcanopy	
<i>Callitris glaucophylla</i>			Subcanopy	
<i>Eucalyptus chloroclada</i>		Canopy		
<i>Eucalyptus populnea</i>		Canopy		Yes
<i>Eucalyptus woollsiana</i>			Canopy	

50 x 10m area

Species		Life Form	Status
<i>Aristida queenslandica</i> var. <i>queenslandica</i>		Grass	
<i>Eragrostis brownii</i>		Grass	
<i>Cyperus gracilis</i>		Forbs and Other Species	
<i>Commelina lanceolata</i>		Forbs and Other Species	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		Forbs and Other Species	
<i>Evolvulus alsinoides</i>		Forbs and Other Species	
<i>Gomphrena celosioides</i>		Forbs and Other Species	Exotic
<i>Oldenlandia mitrasacmoides</i> subsp. <i>trachymenoides</i>		Forbs and Other Species	
<i>Fimbristylis dichotoma</i>		Forbs and Other Species	
Other	<i>Cyperus</i> sp.1	Forbs and Other Species	
<i>Panicum effusum</i>		Grass	
<i>Lomandra multiflora</i>		Forbs and Other Species	
<i>Dianella longifolia</i>		Forbs and Other Species	
<i>Calandrinia pickeringii</i>		Forbs and Other Species	
Other	Ghost plant, invisible plant	Forbs and Other Species	
Other	<i>Aristida</i> sp.1	Grass	
<i>Solanum ellipticum</i>		Forbs and Other Species	
<i>Sporobolus creber</i>		Grass	
<i>Nyssanthus erecta</i>		Forbs and Other Species	
<i>Portulaca australis</i>		Forbs and Other Species	
<i>Perotis rara</i>		Grass	

BIOCONDITION REFERENCE DATASHEET

OFFICE USE ONLY	Site ID:	2BK
Entered:.....	Date:	11/03/2021
Checked:.....	Observers:	KR/BJ
Corrected:.....		

100 x 50m Area SITE INFORMATION

100m Transect Summary

Subcanopy total (m):	64.8m
Canopy total (m):	13.3m
Emergent total (m):	0m
Shrub total (m):	7.6m

100m Transect: Tree Shrub and Canopy Cover:

Species	Type	Start	Finish	Total
<i>Allocasuarina luehmannii</i>	Subcanopy	1	6.4	5.4
<i>Allocasuarina luehmannii</i>	Shrub	1.5	2.3	0.8
<i>Callitris glaucophylla</i>	Subcanopy	6.2	9.4	3.2
<i>Allocasuarina luehmannii</i>	Shrub	9.8	10.3	0.5
<i>Allocasuarina luehmannii</i>	Subcanopy	10	13	3
<i>Eucalyptus chloroclada</i>	Subcanopy	13.2	15.6	2.4
<i>Allocasuarina luehmannii</i>	Shrub	21.2	22.2	1
<i>Allocasuarina luehmannii</i>	Subcanopy	21.4	24.2	2.8
<i>Allocasuarina luehmannii</i>	Shrub	21.4	25.3	3.9
<i>Eucalyptus populnea</i>	Subcanopy	25.1	26	0.9
<i>Callitris glaucophylla</i>	Subcanopy	28.2	30	1.8
<i>Allocasuarina luehmannii</i>	Subcanopy	31.2	32.4	1.2
<i>Callitris glaucophylla</i>	Subcanopy	32.6	35.8	3.2
<i>Eucalyptus chloroclada</i>	Canopy	34	43	9
<i>Allocasuarina luehmannii</i>	Subcanopy	40	42.4	2.4
<i>Callitris glaucophylla</i>	Subcanopy	43.6	48.5	4.9
<i>Allocasuarina luehmannii</i>	Shrub	48	48.4	0.4
<i>Callitris glaucophylla</i>	Subcanopy	50.9	53.3	2.4
<i>Allocasuarina luehmannii</i>	Subcanopy	54.8	62	7.2
<i>Allocasuarina luehmannii</i>	Shrub	59.4	59.7	0.3
<i>Allocasuarina luehmannii</i>	Subcanopy	63.3	70.8	7.5
<i>Eucalyptus woollsiana</i>	Canopy	70.3	74.6	4.3
<i>Allocasuarina luehmannii</i>	Shrub	75.6	76.8	1.2
<i>Allocasuarina luehmannii</i>	Subcanopy	74	79	5
<i>Allocasuarina luehmannii</i>	Subcanopy	82	86.7	4.7
<i>Callitris glaucophylla</i>	Subcanopy	86.4	88.5	2.1
<i>Allocasuarina luehmannii</i>	Subcanopy	91.4	93	1.6
<i>Allocasuarina luehmannii</i>	Shrub	94.9	95.2	0.3
<i>Allocasuarina luehmannii</i>	Subcanopy	96.4	100	3.6

APPENDIX

D

TEC GRASSLAND TRANSECTS

Geo

Species	Diagnostic species	Exotic?	Quadrat 1 (0m)	Quadrat 2 (20m)	Quadrat 3 (40m)	Quadrat 4 (60m)	Quadrat 5 (80m)	Quadrat 6 (100m)						
Bare ground/leaf litter			4	14	32	18	5	23						
Bulbine semibarbata														
Chloris truncata				2	1	1								
Cyclosperrum leptophyllum		Y	1	1	1			1						
Dactyloctenium radulans						1	1							
Dichanthium aristatum		Y		25	50									
Dichanthium sericeum	Y		100	90	15	20	30	60	80	80	80	90	75	75
Einadia nutans								1						
Eragrostis curvula		Y												
Eriochloa crebra	Y				6	10								
Glandularia aristigera		Y				1	1							
Leontodon rhagadioloides		Y												1
Medicago minima		Y										5		
Oxalis perennans			1											
Phalaris paradoxa		Y												
Plantago lanceolata		Y		2		1								
Sonchus asper		Y		2				5						
Vicia sativa		Y				1								
Indeterminate					1									
Totals			100	100	48	100	30	100	81	100	80	100	75	100
Number of diagnostic species		4 species												
Average exotic perennial cover		12%												
Total native clumps in quadrats		389												
Total native clumps per hectare		648333												
Not in plot, but within patch														
Themeda avenacea	Y													
Anthosachne plurinervis	Y													
Summary for 'Geo'														
Minimum number of tussocks	Y													
Number of diagnostic species	4													
Percent cover introduced species	12													
Size of patch	~1ha													
Quality assessment	Good quality Grassland TEC													

Spring 1BG

Species	Diagnostic species	Exotic?	Quadrat 1 Tussock count	(0m) Percent cover	Quadrat 2 Tussock count	(20m) Percent cover	Quadrat 3 Tussock count	(40m) Percent cover	Quadrat 4 Tussock count	(60m) Percent cover	Quadrat 5 Tussock count	(80m) Percent cover	Quadrat 6 Tussock count	(100m)
Bare ground/leaf litter				40		61		17		64		74		58
<i>Anθοςachne pluinervis</i>	Y		1	1										
<i>Asperula conferta</i>				1										
<i>Boerhavia dominii</i>				1				1						
<i>Brachyscome dentata</i>														
<i>Chloris truncata</i>												3	5	
<i>Convolvulus graminetinus</i>				1						1				
<i>Cyclospermum leptophyllum</i>		Y				1		1						1
<i>Cynodon dactylon</i>		Y											1	
<i>Dicanthium sericeum</i>	Y											6	5	
<i>Einadia nutans</i>				1		1							1	30
<i>Eriocloa crebra</i>	Y		4	5			29	80	1	3				
<i>Erodium crinitum</i>						1							10	
<i>Glycine clandestina</i>				1										
<i>Heliotropium amplexicaule</i>		Y											1	1
<i>Lobelia concolor</i>				1										
<i>Neptunia gracilis</i>										1				
<i>Panicum decompositum</i>	Y									5	5			4
<i>Phyla canescens</i>		Y									25			5
<i>Phyllanthus virgatus</i>														
<i>Rhynchosia minima</i>													1	
<i>Sisymbrium erysimoides</i>		Y						1					1	
<i>Sonchus asper</i>		Y				1				1				
<i>Themeda triandra</i>	Y		7	10	5	30								
<i>Wahlenbergia capillaris</i>				1		5								1
Indeterminate				37									1	
Totals			12	100	5	100	29	100	6	100	9	100	4	100
Number of diagnostic species		7 species												
Average exotic perennial cover		7%												
Total native clumps in quadrats		65												
Total native clumps per hectare		108333												
Not in plot, but within patch														
<i>Themeda avenacea</i>	Y													
<i>Austrostipa aristiglumis</i>	Y													
Summary for 'Spring - 1BG'														
Minimum number of tussocks	Y													
Number of diagnostic species	7													
Percent cover introduced species	7													
Size of patch	~4.5ha													
Quality assessment	Best quality Grassland TEC (NB 5% weed cover is the threshold. Outside of the plot weed cover was observed to be <5% in much of the patch)													

Spring 2BG

Species	Diagnostic species	Exotic?	Measured across 1,000m2 plot										
Bare ground/leaf litter													
<i>Asperula conferta</i>													
<i>Bothriochloa biloba</i>	Y												
<i>Chloris ventricosa</i>													
<i>Cymbopogon refractus</i>													
<i>Dichanthium sericeum</i>	Y												
<i>Eragrostis parviflora</i>													
<i>Eriochloa crebra</i>	Y												
<i>Eulalia aurea</i>	Y												
<i>Haloragis aspera</i>													
<i>Mentha satureioides</i>													
<i>Neptunia gracilis</i>													
<i>Cullen sp. indeter.</i>													
<i>Cyperus sp. indeter</i>													
<i>Glycine sp.</i>													
<i>Plantago sp. indeter.</i>													
<i>Polymeria sp. indeter.</i>													
<i>Phyllanthus virgatus</i>													
<i>Themeda triandra</i>	Y												
Indeterminate													
Totals													
Number of diagnostic species		5 species											
Average exotic perenial cover		4%											
Total native clumps in quadrats		0											
Total native clumps per hectare		90900											
Summary for 'Spring - 2BG'													
Minimum number of tussocks	Y												
Number of diagnostic species	5												
Percent cover introduced species	4												
Size of patch	~0.75ha												
Quality assessment	Best quality Grassland	TEC											

Post-wet 1BG

[illegible]

Post-wet 1BP

Species	Diagnostic species	Exotic?	Quadrat 1 Tussock count	(0m) Percent cover	Quadrat 2 Tussock count	(20m) Percent cover	Quadrat 3 Tussock count	(40m) Percent cover	Quadrat 4 Tussock count	(60m) Percent cover	Quadrat 5 Tussock count	(80m) Percent cover	Quadrat 6 Tussock count	(100m) Percent cover
Bare ground/leaf litter				10		15		10				10		25
<i>Boerhavia domini</i>				0.1										0.1
<i>Chloris gayana</i>		Y		0.1										
<i>Commelina sp.</i>										0.1				
<i>Erigeron sp.</i>		Y		0.1		5					10			
<i>Dicanthium sericeum</i>	Y													
<i>Digitaria divaricatissima</i>			2	5										
<i>Dinebra decipiens</i>						0.1						0.1		
<i>Elymus plurinervis</i>	Y		1											
<i>Erichloa crebra</i>	Y		5	15			1	0.1						
<i>Panicum queenslandicum</i>	Y		6	65	1	25	3	25	20	100	3	80	5	75
<i>Phylla canescens</i>		Y		0.1										
<i>Phyllanthus sp.</i>						5								
<i>Poaceae indeterminate</i>						50		65						
<i>Solanum nigrum</i>						0.1								
<i>Themeda triandra</i>	Y													
Indeterminate				5										
Totals			14	100.4	1	100.2	4	100.1	20	100.1	3	100.1	5	100.1
Number of diagnostic species		5 species												
Average exotic perenial cover		3%												
Total native clumps in quadrats		47												
Total native clumps per hectare		78333												
Summary for 'Post-wet 1BP'														
Minimum number of tussocks	Y													
Number of diagnostic species	5													
Percent cover introduced species	3													
Size of patch	~1ha													
Quality assessment	Not Grassland TEC - entirely on rail batter made of fill and ballast													

Post-wet 1BQ

Species	Diagnostic species	Exotic?	Quadrat 1 (0m)		Quadrat 2 (20m)		Quadrat 3 (40m)		Quadrat 4 (60m)		Quadrat 5 (80m)		Quadrat 6 (100m)	
			Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover
Bare ground/leaf litter				64.4		15		69.9		50		45		60
<i>Commelina sp.</i>				5								0.1		0.1
<i>Cullen tenax</i>												0.1		
<i>Dichanthium sericeum</i>	Y						1	3						
<i>Dinebra decipiens</i>					3	10								
<i>Elymus plurinervis</i>	Y		5	30	1	5					6	50	1	0.1
<i>Enteropogon acicularis</i>														
<i>Erigeron sp.</i>		Y				0.1								
<i>Eriochloa crebra</i>	Y				5	69.7	2	5	1	5			1	5
<i>Glandularia aristigera</i>		Y		0.1		0.1						0.1		
<i>Neptunia gracilis</i>				0.1				0.1						
<i>Oxalis sp.</i>				0.1										
<i>Panicum decompositum</i>	Y						1	2	5	25			5	30
<i>Phyla canescens</i>		Y		0.1				20		20		5		5
<i>Plantago lanceolata</i>		Y		0.1										
<i>Polymeria sp.</i>				0.1		0.1								
<i>Rhynchosia minima</i>														0.1
<i>Themeda triandra</i>	Y													
Indeterminate												0.1		
Totals			5	100	9	100	4	100	6	100	6	100	7	100
Number of diagnostic species		5 species												
Average exotic perennial cover		8%												
Total native clumps in quadrats		37												
Total native clumps per hectare		61667												
Summary for 'Post-wet 1-BQ'														
Minimum number of tussocks	Y													
Number of diagnostic species	5													
Percent cover introduced species	8													
Size of patch	~1ha													
Quality assessment	Good quality Grassland TEC													

Post-wet 2BI

Species			Quadrat 1 (0m)		Quadrat 2 (20m)		Quadrat 3 (40m)		Quadrat 4 (60m)		Quadrat 5 (80m)		Quadrat 6 (100m)	
	Diagnostic species	Exotic?	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover
Bare ground/leaf litter				36		40		48		34		32		61
<i>Aristida leptopoda</i>	Y		1	1					1	1	1	1	1	1
<i>Boerhavia dominii</i>			3	2	1	1					3	2	2	5
<i>Convulvulus arvensis</i>							1	1						
<i>Dichanthium sericeum</i>	Y		30	60	38	55	37	50	45	65	26	60	9	15
<i>Neptunia gracilis</i>													1	2
<i>Rhynchosia minima</i>					3	4					4	5	1	2
<i>Salvia reflexa</i>													11	12
<i>Sorghum halipense</i>			2	1			1	1					2	2
Indeterminate														
Total			36	100	42	100	39	100	46	100	34	100	27	100
Number of diagnostic species		4 species												
Average exotic perennial cover		0%												
Total native clumps in quadrats		224												
Total native clumps per hectare		373333												
Not in plot, but within patch														
<i>Austrostipa aristiglumis</i>	Y													
<i>Walwalleya prolata</i>	Y													
Summary for 'Post-wet - 2BI'														
Minimum number of tussocks		Y												
Number of diagnostic species		4												
Percent cover introduced species		0												
Size of patch		~13.5ha												
Quality assessment		Best quality Grassland TEC												

Post-wet 2BJ

Species			Quadrat 1 (0m)		Quadrat 2 (20m)		Quadrat 3 (40m)		Quadrat 4 (60m)		Quadrat 5 (80m)		Quadrat 6 (100m)	
	Diagnostic species	Exotic?	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover	Tussock count	Percent cover
Bare ground/leaf litter				51		60		37		63		59		53
<i>Aristida leptopoda</i>	Y						1	1	2	12				
<i>Austrostipa aristiglumis</i>	Y										1	1		
<i>Boerhavia dominii</i>														
<i>Bulbine bulbosa</i>					4	3								
<i>Calotis</i> sp.					3	2	1	1	1	1				
<i>Convolvulus arvensis</i>														
<i>Dichanthium sericeum</i>	Y		30	45	20	30	28	55	7	15	19	40	18	35
<i>Neptunia gracilis</i>														
<i>Panicum decompositum</i>	Y				1	1								
<i>Rhynchosia minima</i>									1	1				
<i>Salsola australis</i>							1	1						
<i>Salvia reflexa</i>		Y												
<i>Schleralena muricata</i>													1	6
<i>Senecio</i> sp.			2	2	1	1							1	1
<i>Sorghum halipense</i>		Y					2	1						
<i>Tribolis trestris</i>							1	1						
<i>Walwalleya prolata</i>	Y		5	2	4	3	2	3	2	8			4	5
Indeterminate														
Total			37	100	33	100	36	100	13	100	20	100	24	100
Number of diagnostic species		5 species												
Average exotic perennial cover		0%												
Total native clumps in quadrats		28												
Total native clumps per hectare		46667												
Summary for Post-wet - 2BJ														
Minimum number of tussocks		Y												
Number of diagnostic species		5												
Percent cover introduced species		1												
Size of patch		~3.5ha												
Quality assessment		Best quality Grassland TEC												