Clearing Assessment Report – CPS 818

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Northam-Cranbrook (M031) Bridge Replacements – Bridges 0277 to 0289

May 2022

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Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Environment Officer	Draft v1	17/02/2022
Reviewer:	Senior Environment Officer	Rev 0	25/05/2022

1 PURPOSE

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

The CAR outlines the key activities associated with the project, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the project using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

2 SCOPE

2.1 Project Scope

Project Name: Northam-Cranbrook (M031) Bridge Replacements – Bridges 0277 to 0289

Project Purpose / Components: Main Roads is proposing to replace 13 bridges that have reached the end of their design life (over 80 years old). The existing timber bridges will be replaced with culverts. Works will include the establishment of a side-track at each bridge to maintain the safe flow of traffic during construction.

The replacement bridges will be wider to meet the current Main Roads design requirements and tie into the road seal widening works that have previously been undertaken, resulting in an overall larger final footprint.

The proposed clearing undertaking using CPS 818 is: 9.49 ha.

The proposed temporary clearing undertaking using CPS 818 is: 0 ha.

Project Location(s): The project area is located on the Northam Cranbrook Road (M031) between the towns of Northam and York, within the Shires of Northam and York as shown in Figure 2. Location of each bridge is detailed in Table 1.

Table 1: SLK and Coordinates of Bridge Replacements

Bridge	SLK	Coordinates (Lat/Long)
0277	5.95	-31.672321 / 116.727867
0278	10.51	-31.711390 / 116.740097
0279	12.77	-31.730335 / 116.748749
0280	14.35	-31.743025 / 116.756004
0281	18.10	-31.774843 / 116.768173
0282	19.90	-31.787033 / 116.778809
0283	22.56	-31.804121 / 116.798302
0284	23.13	-31.807795 / 116.802605
0285	25.15	-31.823374 / 116.812767
0286	25.69	-31.828354 / 116.812515
0287	28.99	-31.857346 / 116.812103
0288	29.74	-31.862642 / 116.807281
0289	30.53	-31.866110 / 116.800156

The location of the proposed works is at Figure 1A-M.

2.2 Assessment Report Scope

The assessment area, see Figure 2, is confined to a local area within a 20 km radius.

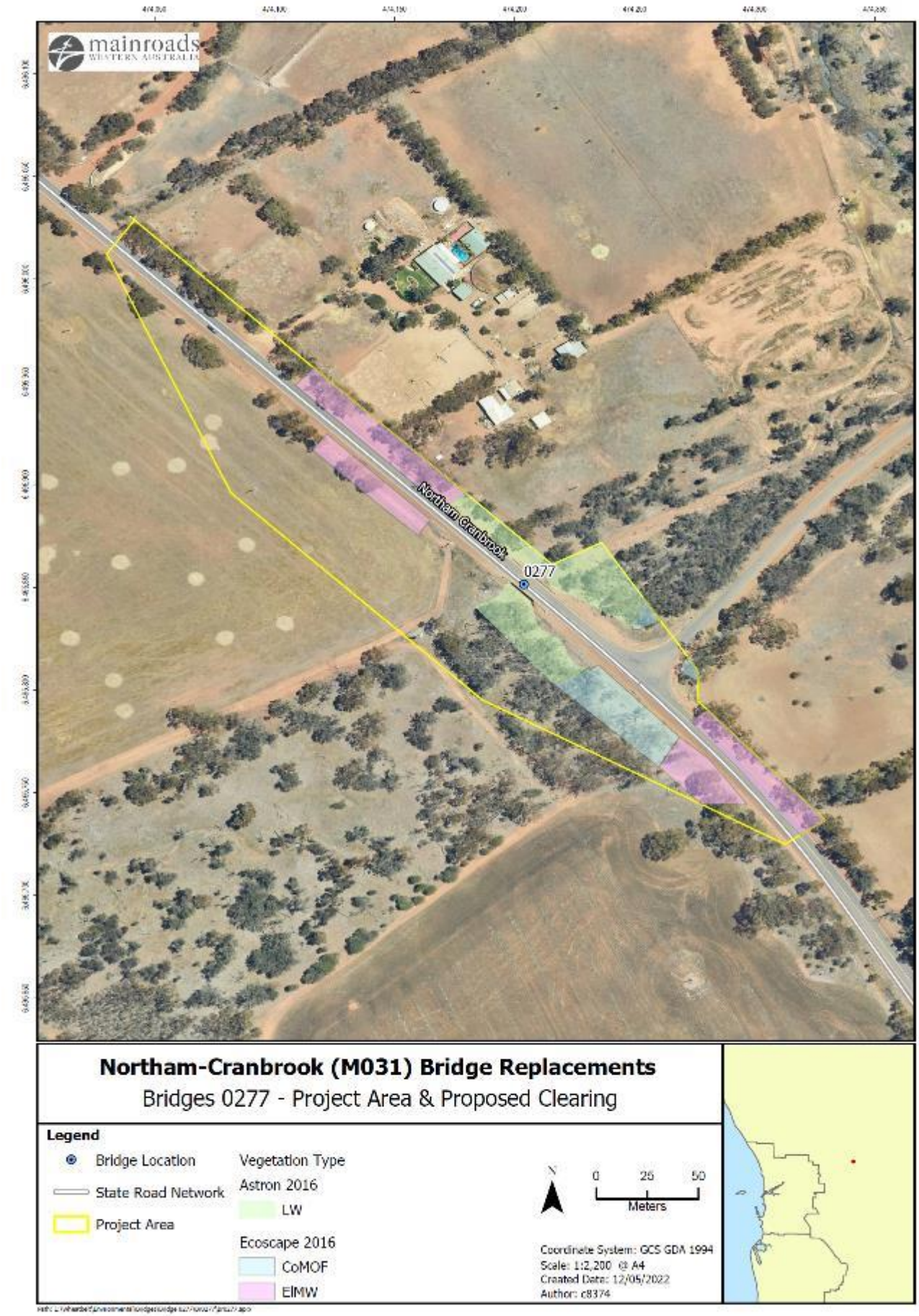

Figure 1A. Project Area – Bridge 0277

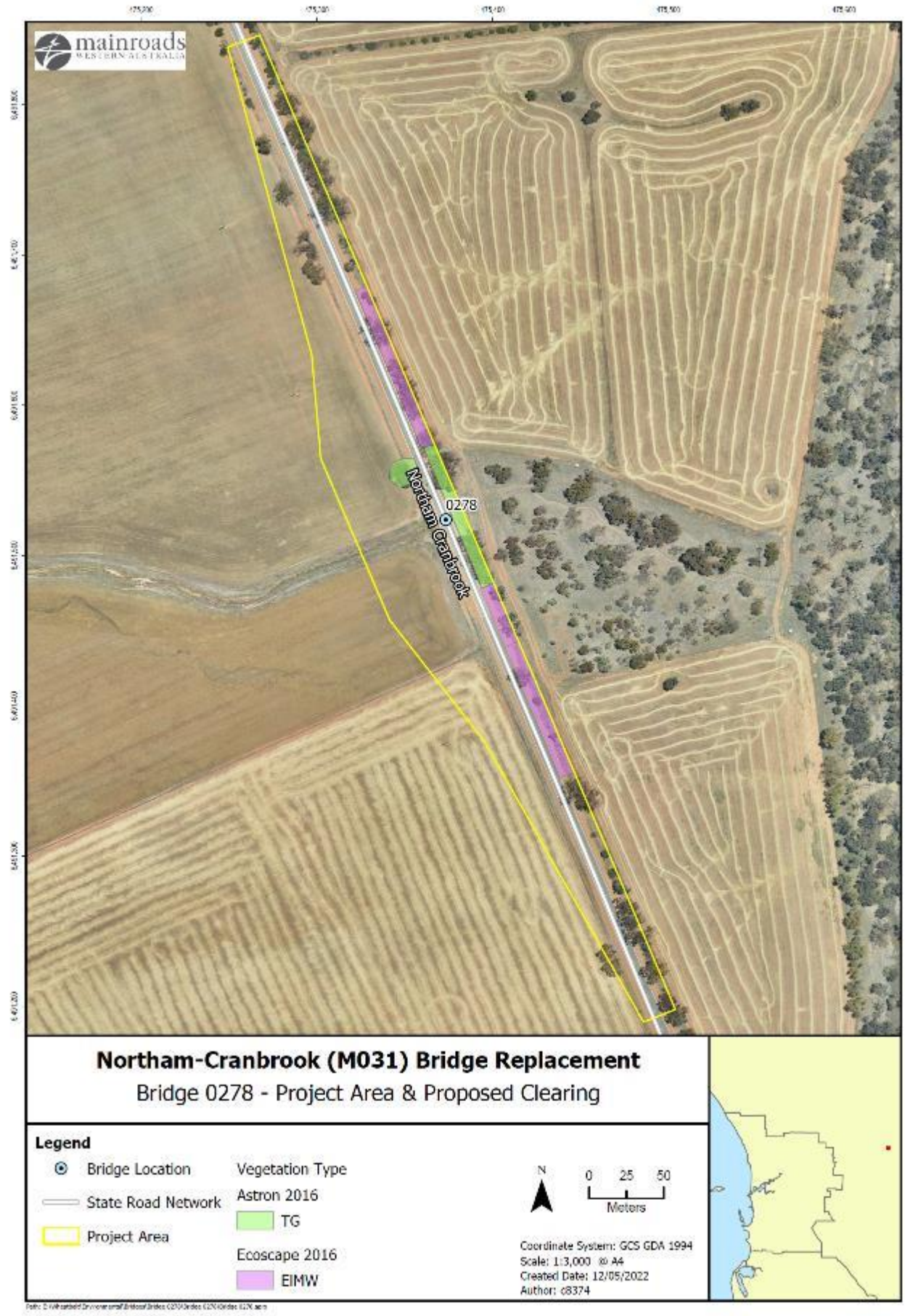

Figure 1B. Project Area – Bridge 0278

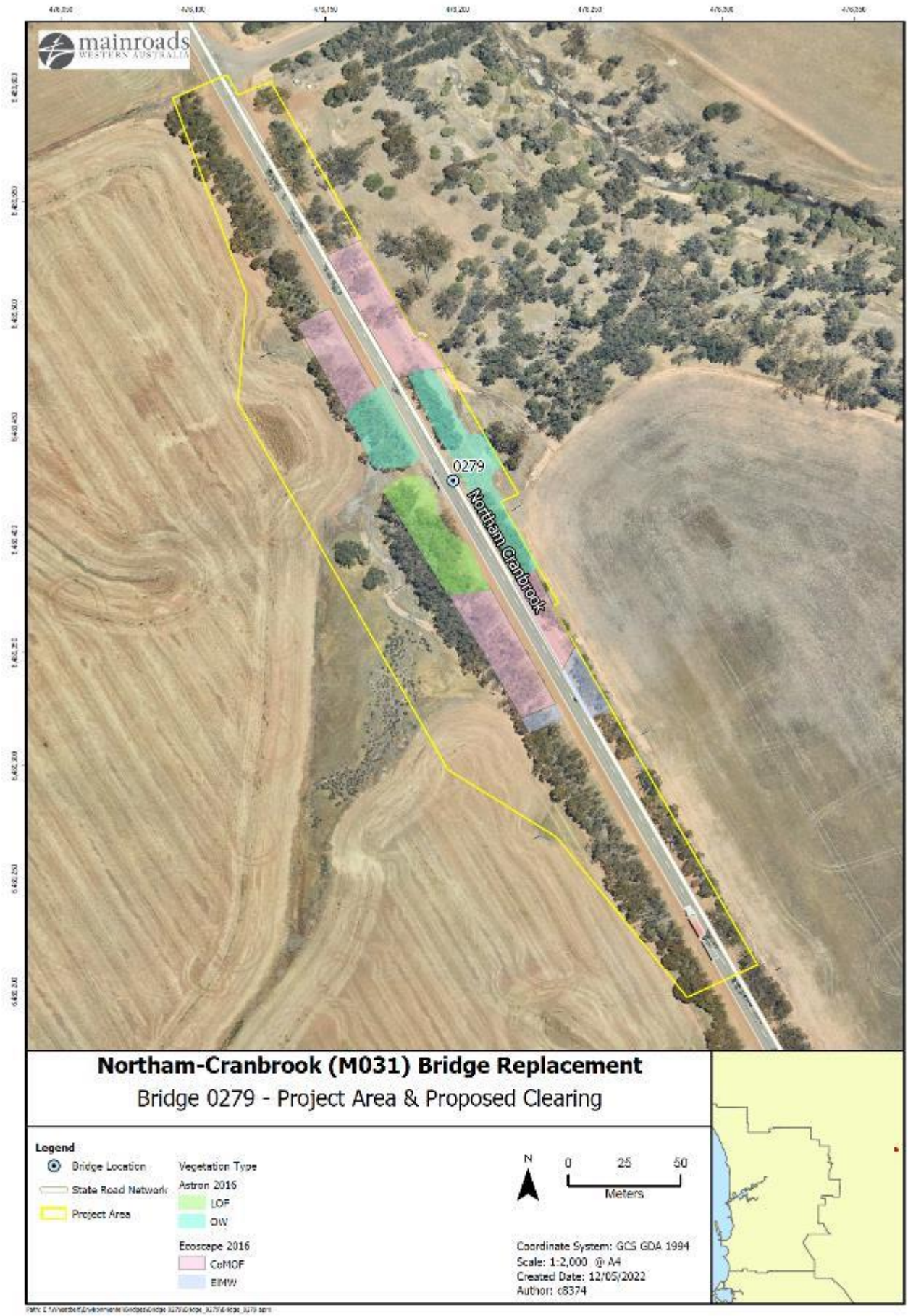

Figure 1C. Project Area – Bridge 0279

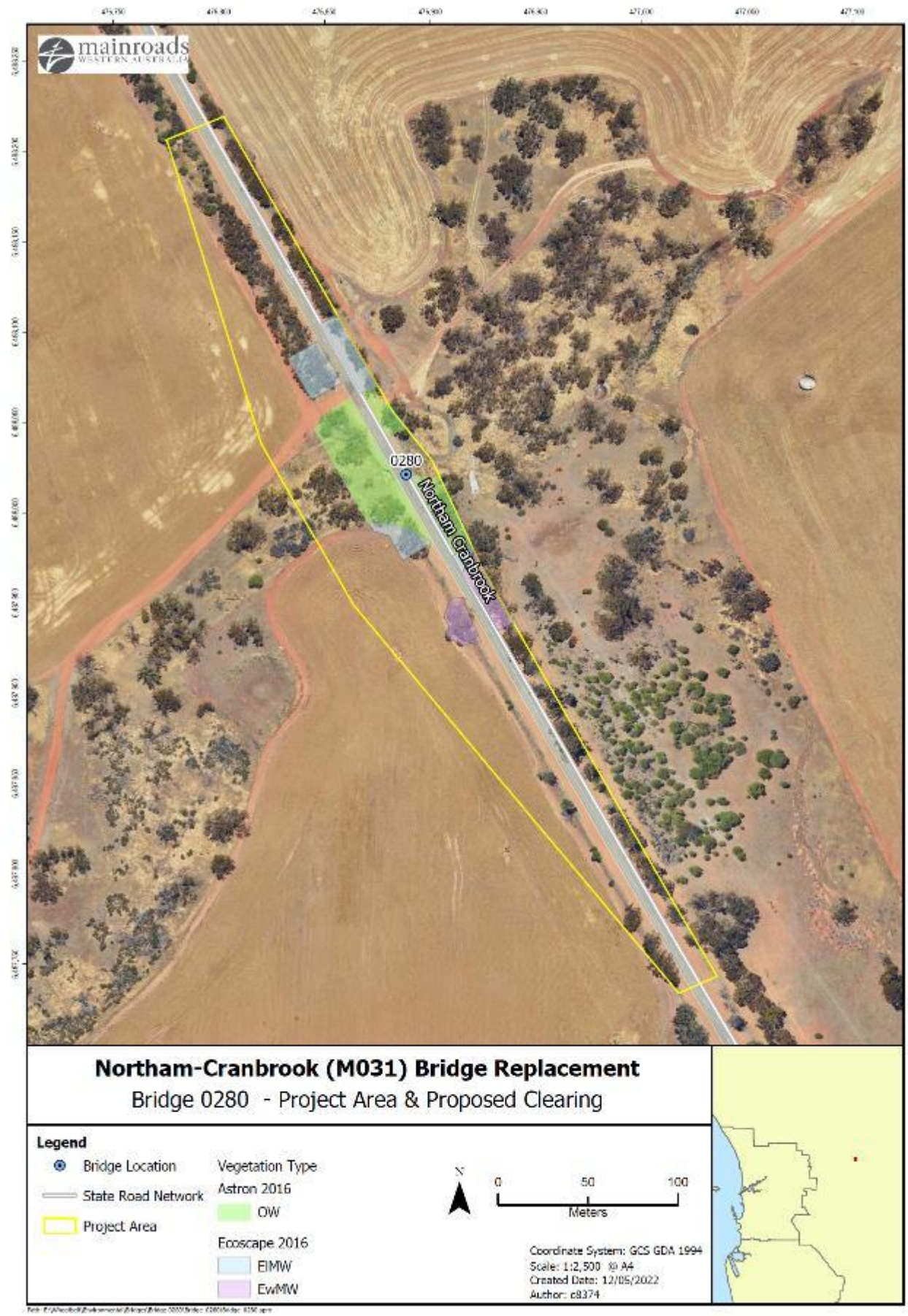

Figure 1D. Project Area – Bridge 0280

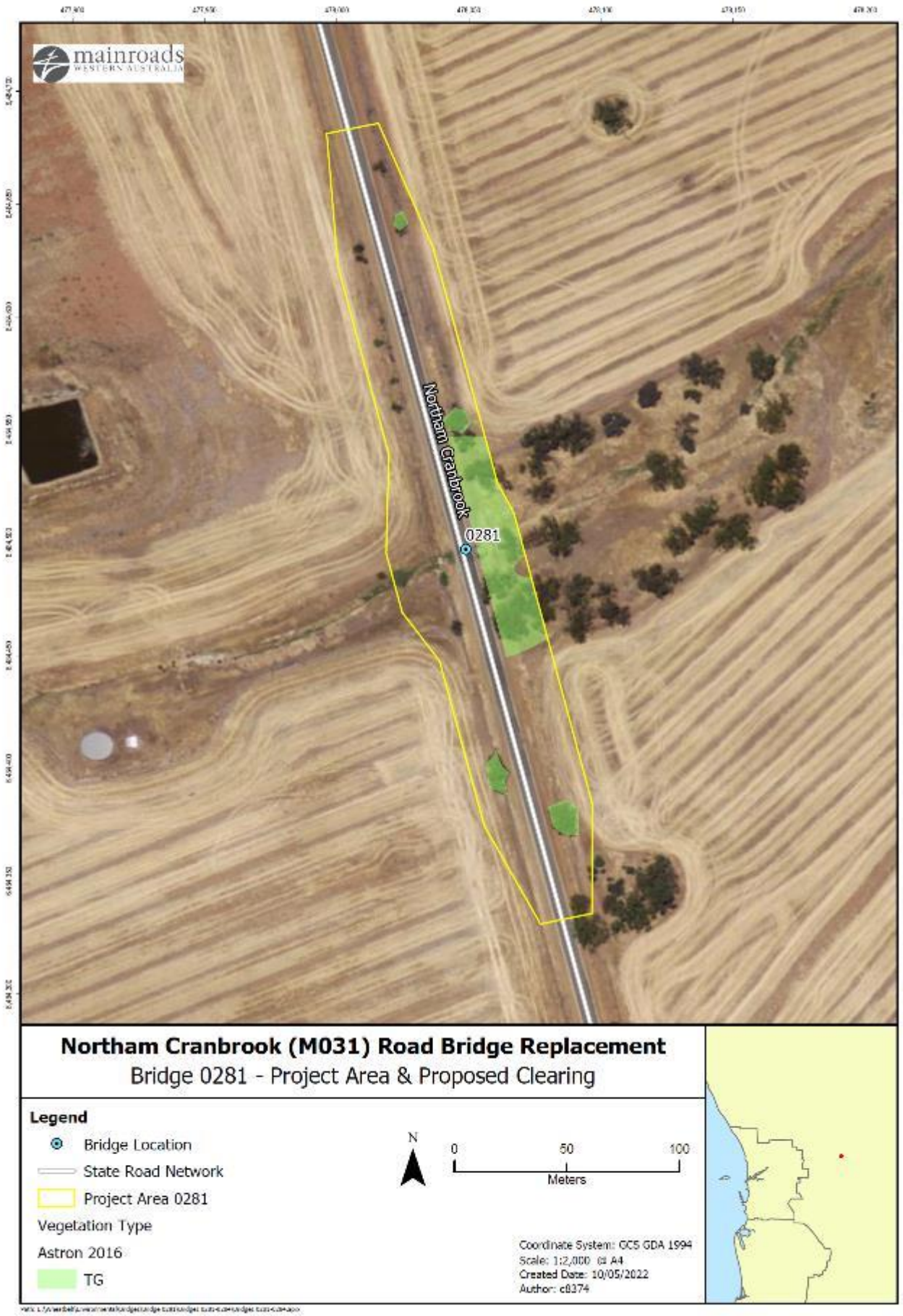

Figure 1E. Project Area – Bridge 0281

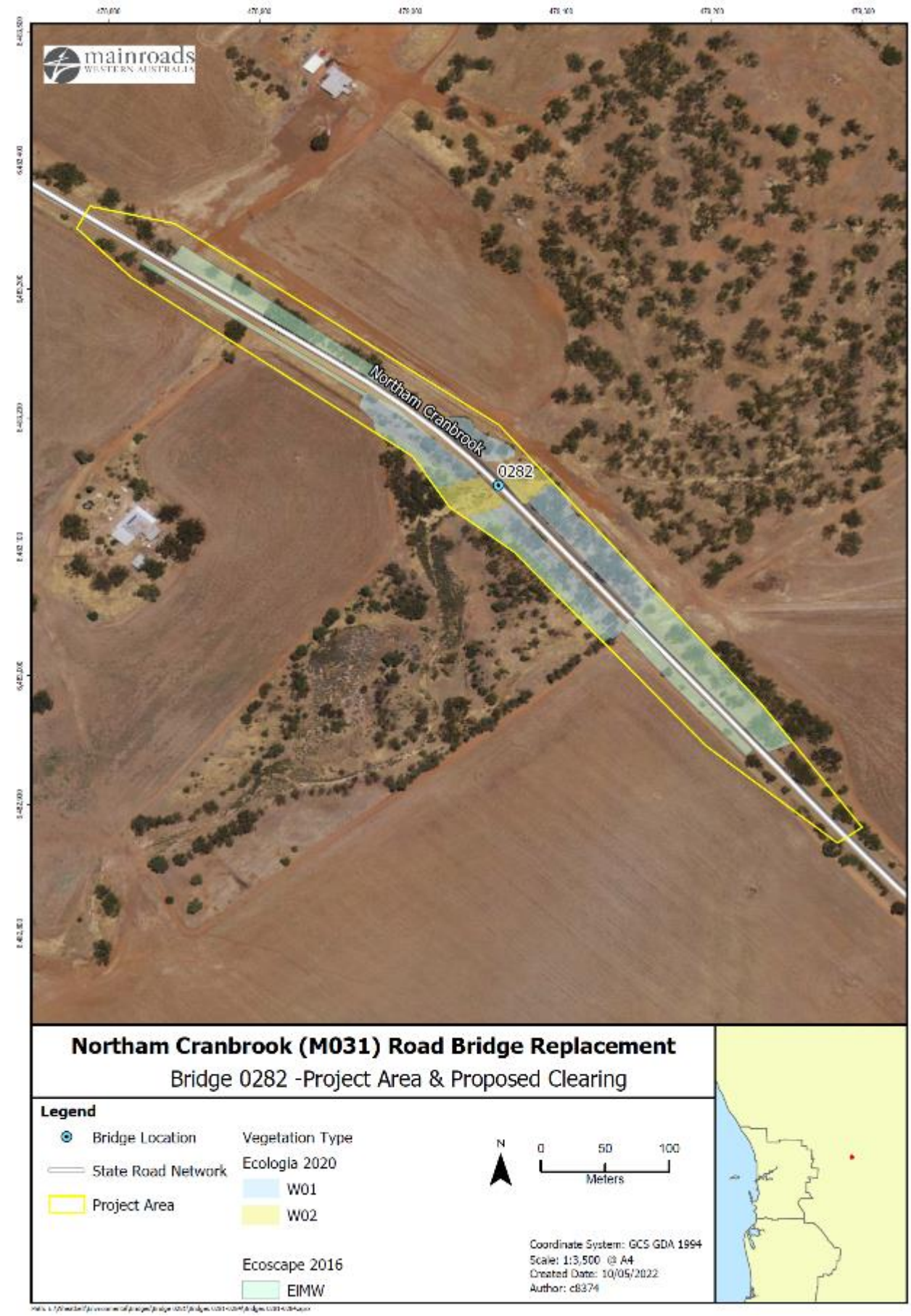

Figure 1F. Project Area – Bridge 0282

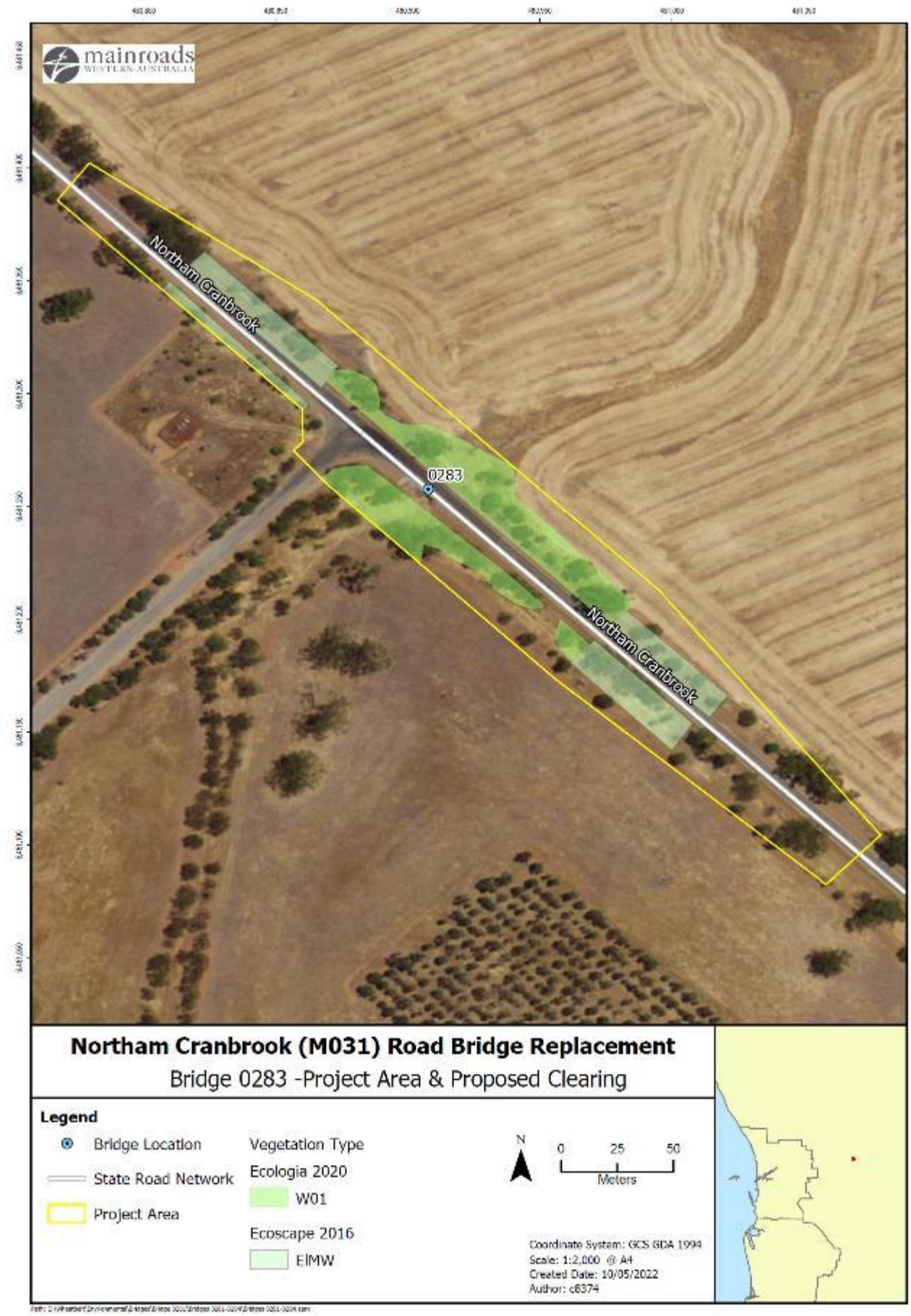

Figure 1G. Project Area – Bridge 0283

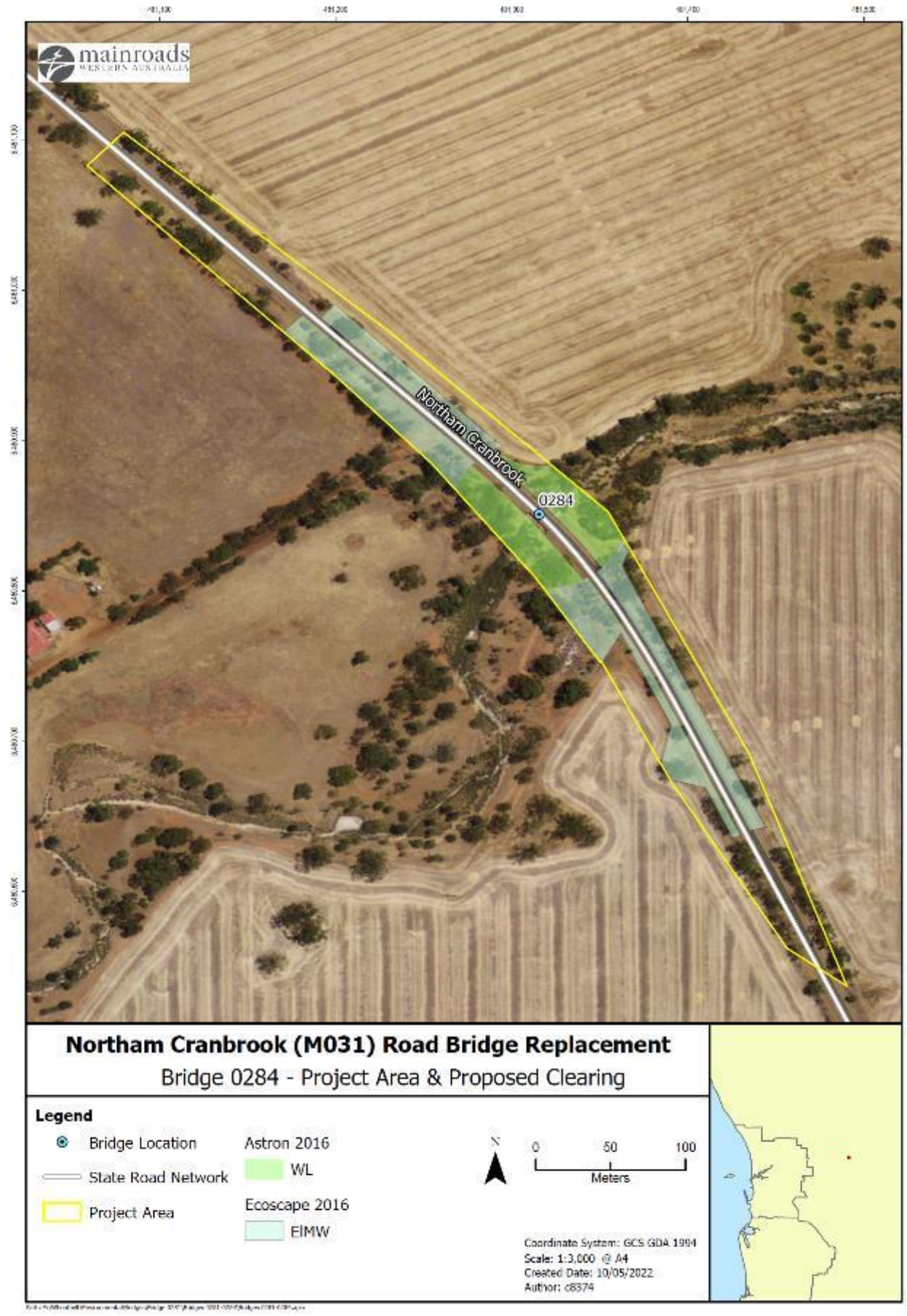

Figure 1H. Project Area – Bridge 0284

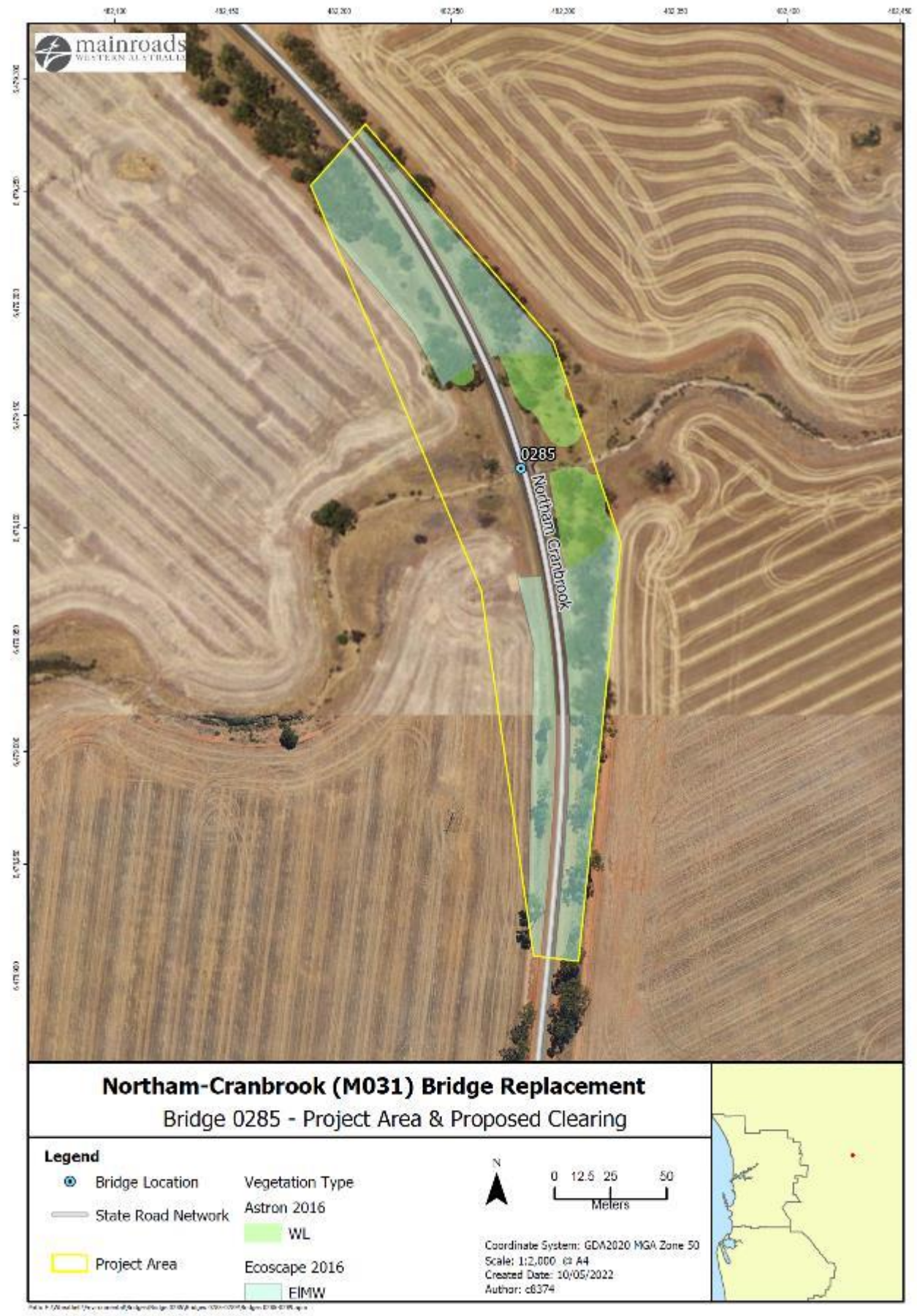

Figure 1I. Project Area – Bridge 0285

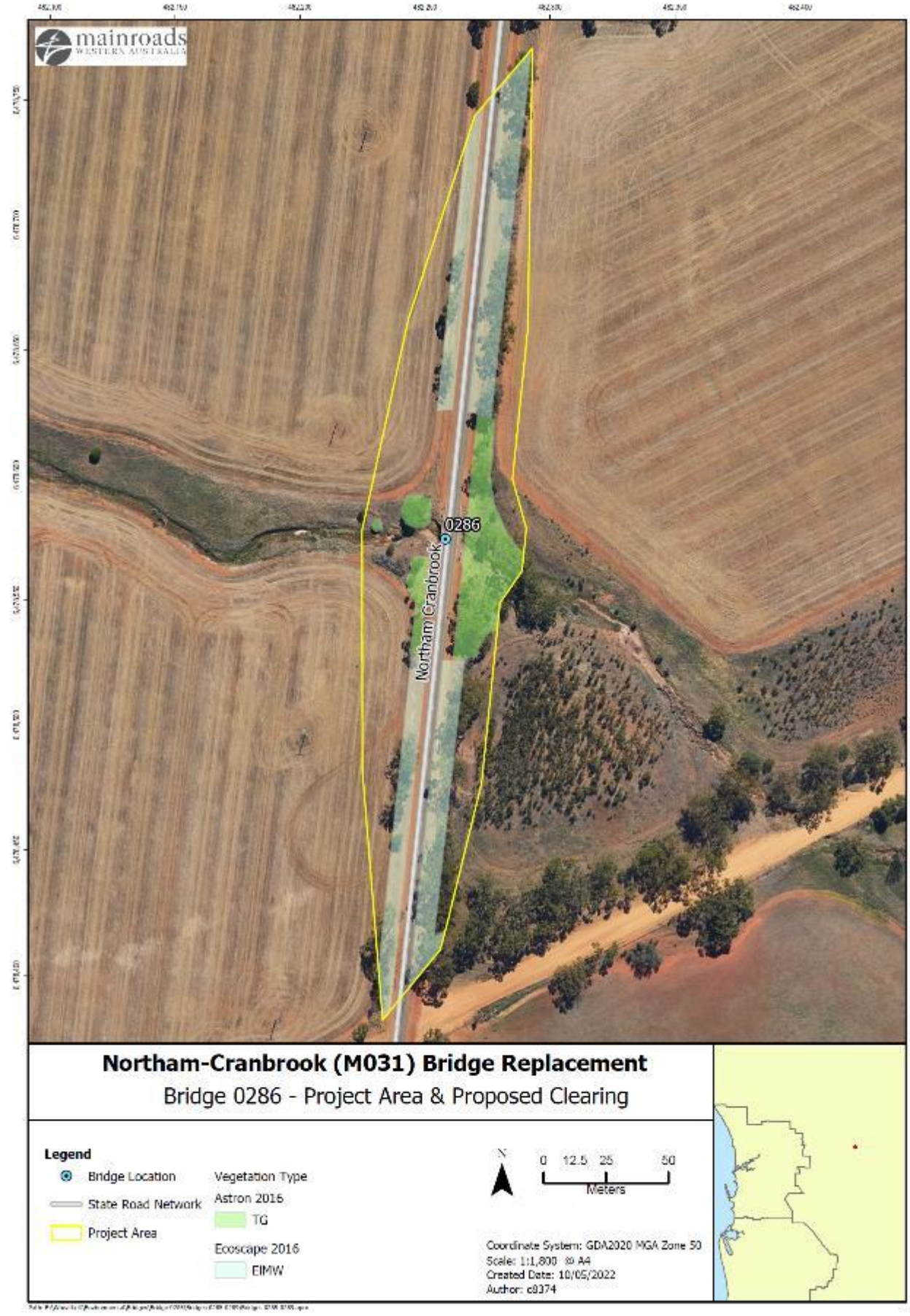

Figure 1J. Project Area – Bridge 0286

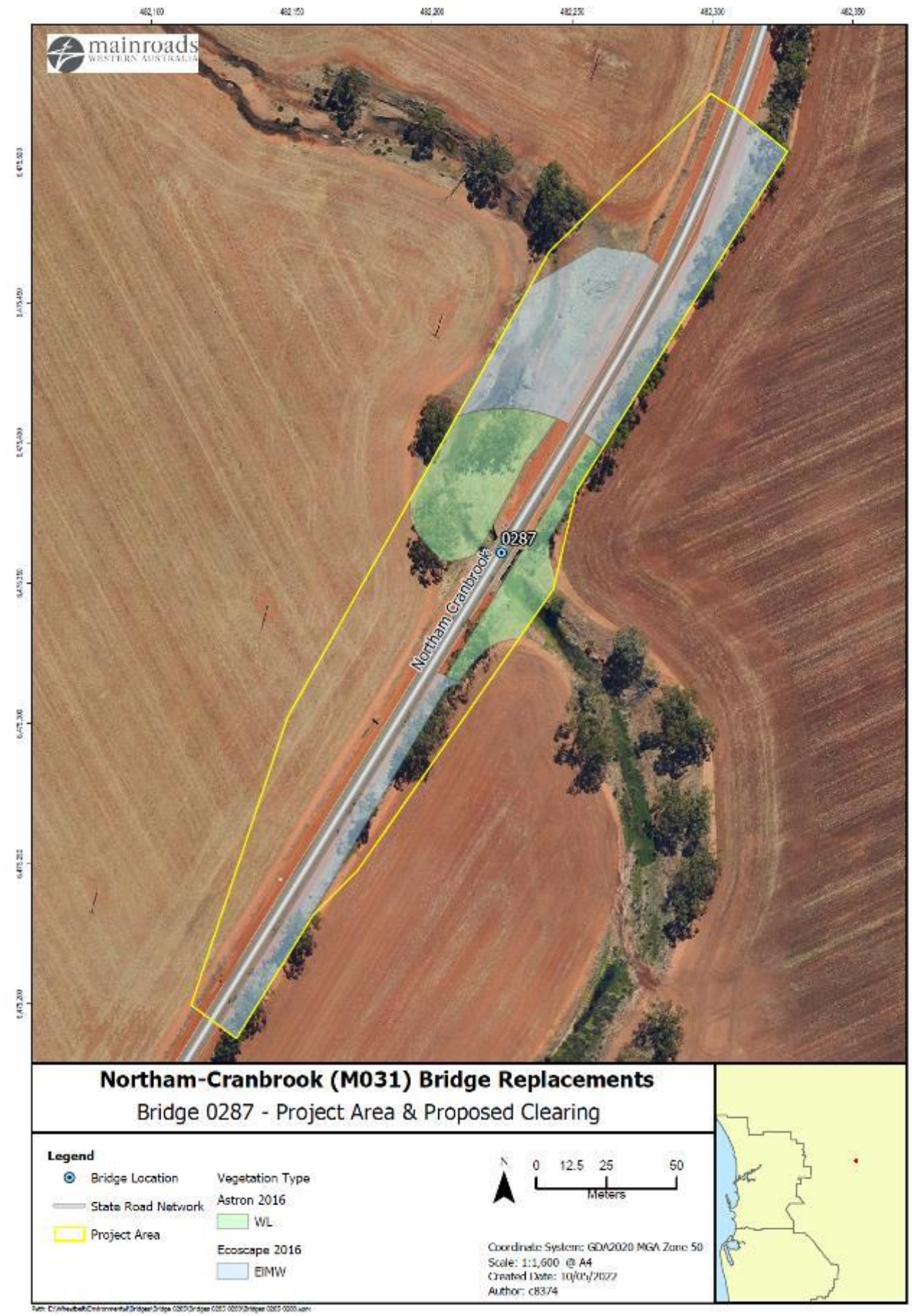

Figure 1K. Project Area – Bridge 0287

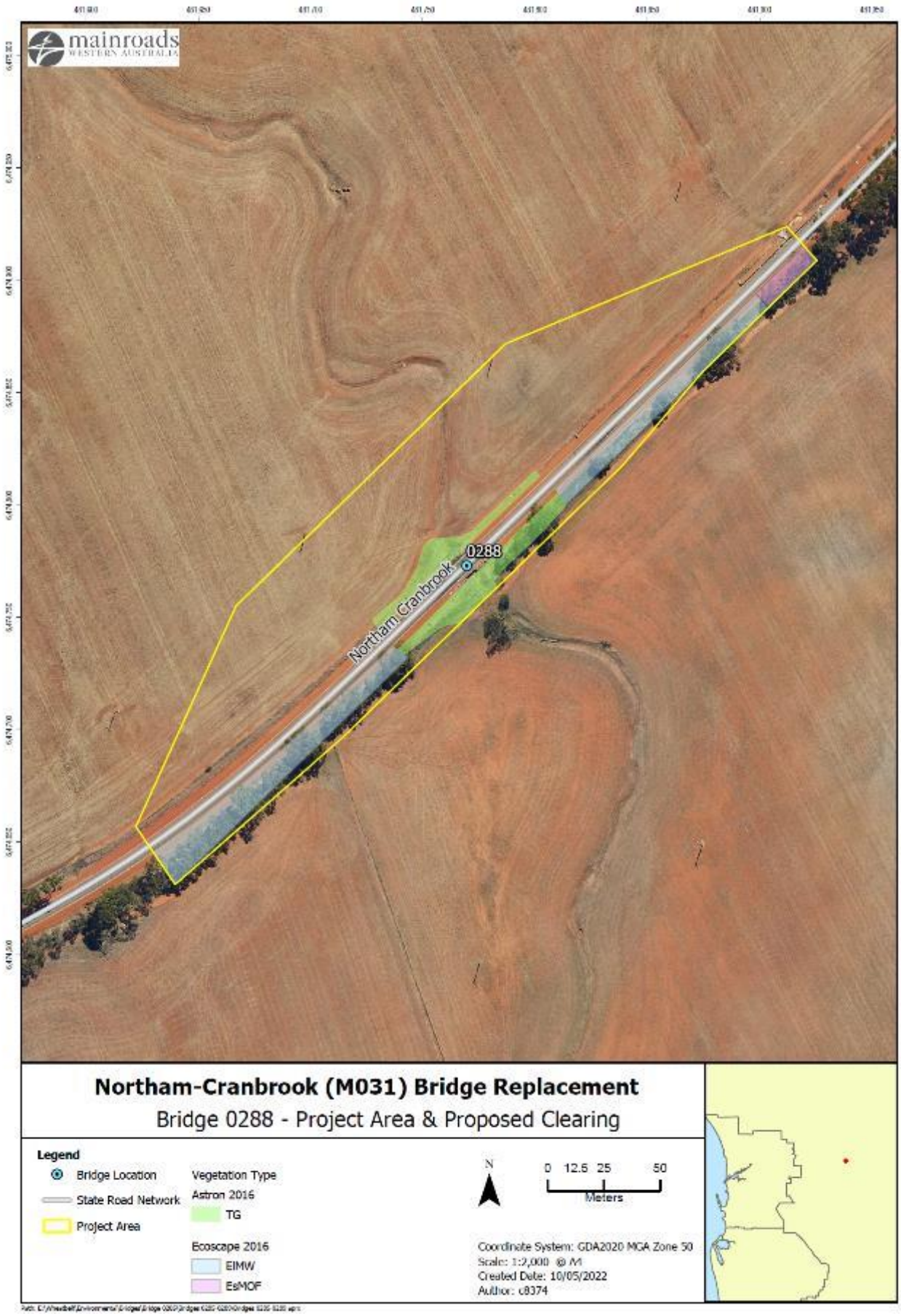

Figure 1L. Project Area – Bridge 0288

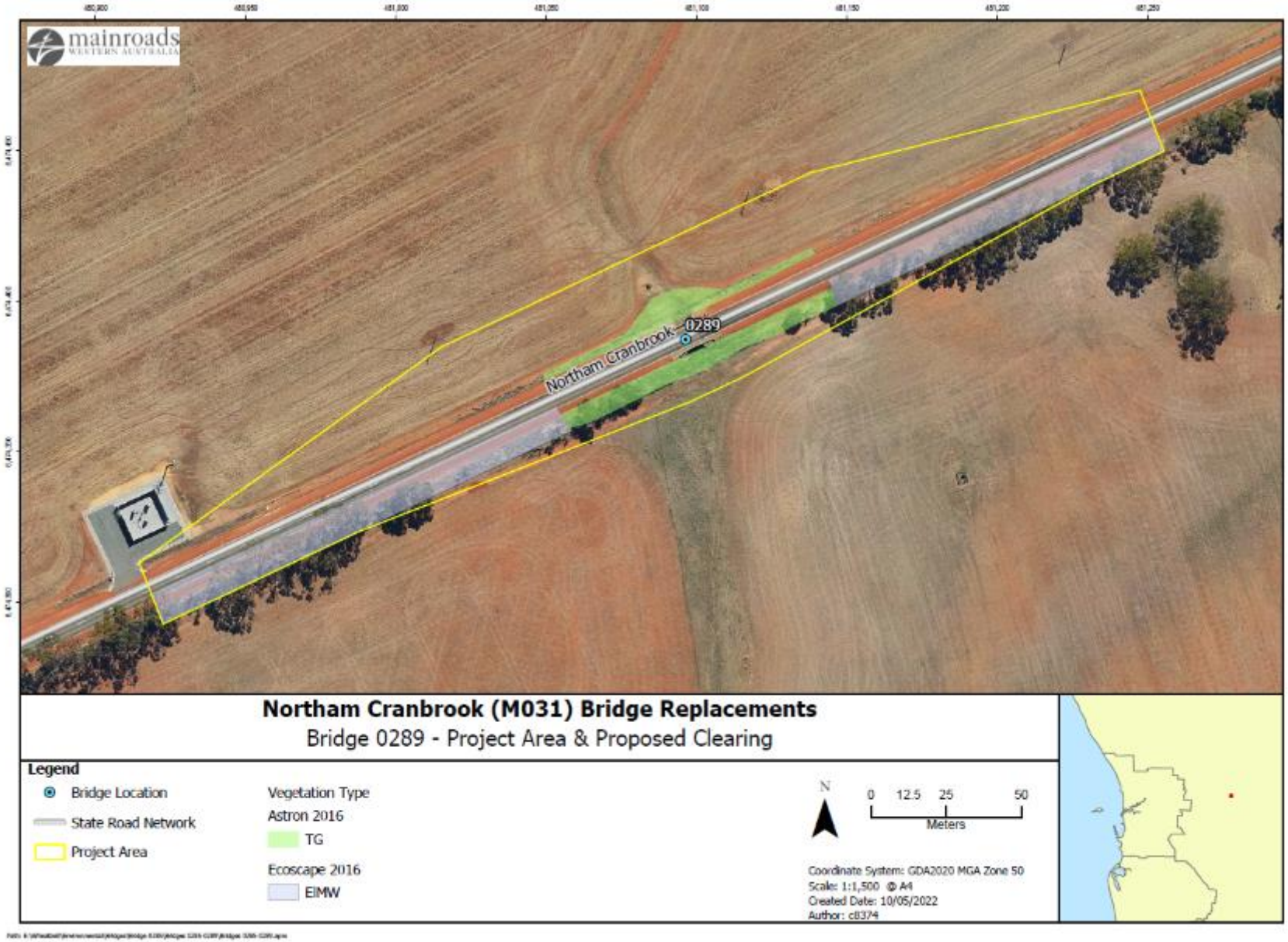

Figure 1M. Project Area – Bridge 0289

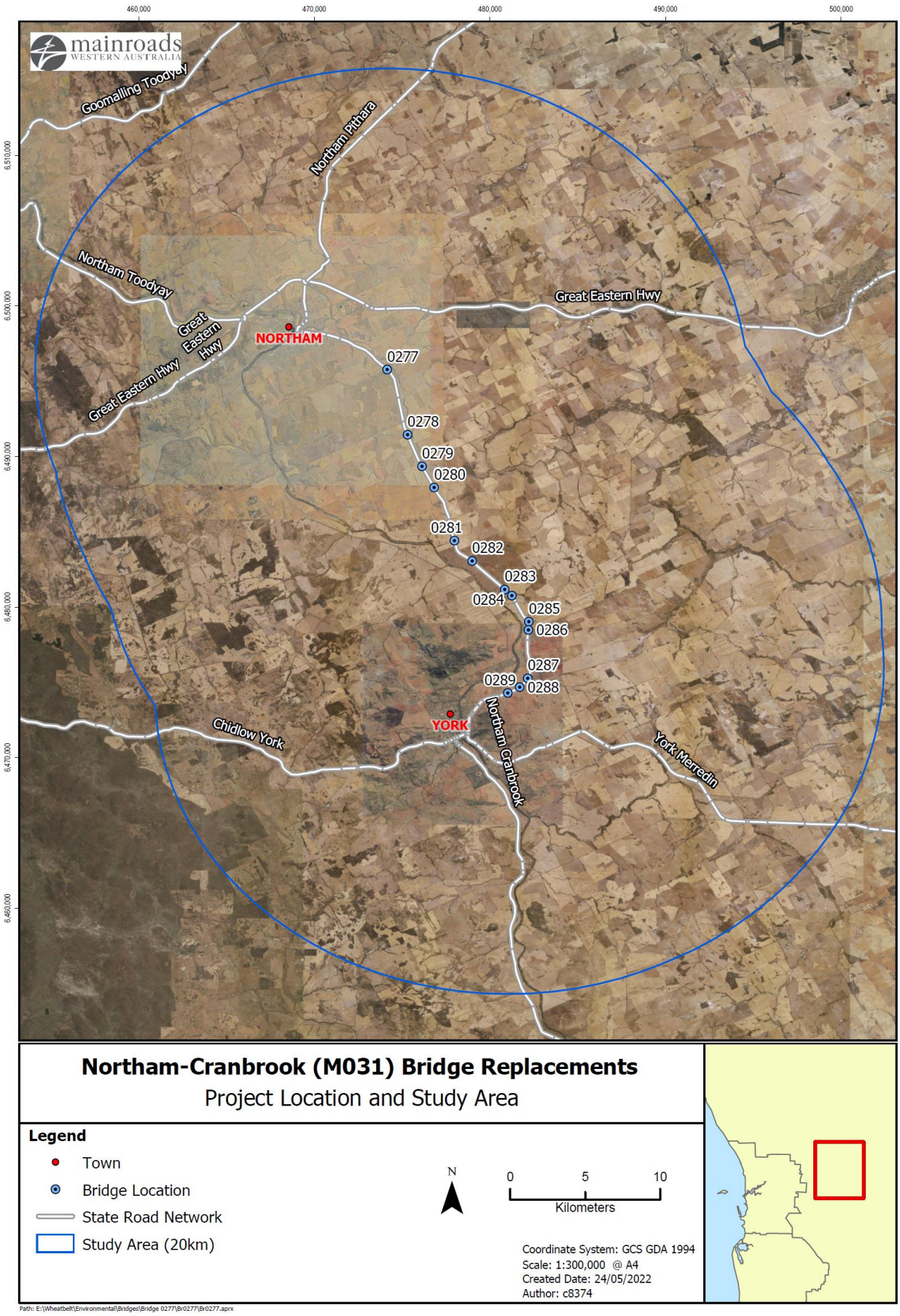

Figure 2. Assessment Area

2.3 Alternatives to clearing

As the bridges are being replaced along the same alignment, and a diversion track is required so that the road is open to traffic during the period of construction, there are no alternatives to the proposed clearing.

2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 2.

Table 2. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	The design has been optimized to implement steeper batter slopes where possible to reduce the clearing area, private land take and avoid clearance of significant Diameter at Breast Height (DBH) trees.
Placement of side-tracks and preferential use of existing cleared areas for access tracks, construction storage and stockpiling	MRWA amended the initial 15% design from using independent, temporary diversion tracks which took up a larger footprint. The updated design has diversion tracks directly adjacent to the existing bridge structure, which will remain in place as part of the future culvert infrastructure. This approach reduced the clearing, minimises land take from private landowners and reduced construction costs.

2.5 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance for assessment of clearing and planning/other matters

- Biodiversity Conservation Act 2016 (WA) (BC Act)
- Conservation and Land Management Act 1984 (WA) (CALM Act)
- Country Areas Water Supply Act 1947 (WA) (CAWS Act)
- Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)
- Planning and Development Act 2005 (WA) (P&D Act)
- Soil and Land Conservation Act 1945 (WA)
- Rights in Water and Irrigation Act 1914
- Aboriginal Heritage Act 1972 (WA)
- Town Planning and Development Act 1928

Environmental Protection Policies

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992;
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011

Other Relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)

- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

3 SUMMARY OF SURVEYS

3.1 Summary of Biological Survey – Ecologia Environment (2021)

The Wheatbelt Bridges Package 2 Biological Survey Biological Survey was conducted between 2nd and 5th November 2020 by Ecologia Environment (*ecologia*), covering 6 bridges (0282, 0283, 0291, 0311, 0752 and 03197) in the Wheatbelt region. The survey included a desktop assessment, a detailed flora and vegetation survey, a basic fauna and fauna habitat assessment, and a black cockatoo habitat assessment. It is noted that the survey covered bridges not included in this current proposal.

The key findings of the biological field survey are detailed below.

Flora:

- A total of 82 vascular plant taxa were recorded from 10 quadrates, 18 sample sites and additional opportunistic records.
- 36 introduced plants were recorded, one of which *Asparagus asparagoides* is a Weeds of National Significance (WONS) and Declared Pest, *Echium plantagineum* is a Declared Pest and *Acacia iteaphylla* and *Juncus acutus* subsp. *acutus* are 'Priority Alert Weeds'.
- No EPBC Act, BC Act-listed Threatened or Priority-listed species were recorded within the survey areas.

Vegetation:

- Two native vegetation types:
  - **W01** – *Eucalyptus* mid open woodlands: *Eucalyptus loxophleba* subsp. *loxophleba* and *Eucalyptus rudis subsp. rudis*
  - **W02** – *Casuarina* low to mid open woodland: mid dense *Casuarina obesa* overstorey interspersed with *Melaleuca rhaphiophylla* and *Eucalyptus rudis* subsp. *rudis* trees. The lower understorey is largely infested by introduced grasses dominated by **Lolium rigidum* (rigid ryegrass), **Cynodon dactylon* (couch) and **Ehrharta longiflora* (annual veldt grass) and, to a lesser extent, introduced herbs.
- W02 was recorded from drainage lines and channels within the survey areas.
- None of the eucalypt woodland patches within the survey area represented *Eucalypt Woodlands the Western Australian Wheatbelt* Threatened Ecological Community.
- Vegetation conditions ranged from degraded to completely degraded with little or no remaining native understorey.

Fauna:

- Four broad habitat types were identified across the survey areas: Open Eucalypt Woodland, Drainage Line, Scattered Eucalypts over Cleared Land and Revegetated.
- No Threatened or Priority fauna species were recorded during the survey.

- The post-survey likelihood of occurrence assessment identified four species considered 'Likely' to occur and nine species considered 'Possible' to occur within at least one of the six bridge survey areas:
  - The peregrine falcon (*Falco peregrinus* [OS BC Act]) was assessed as 'Likely' to occur at Bridges 282, 283, 291 and 752 and 'Possible' to occur at Bridge 311.
  - The blue-billed duck (*Oxyura australis* [P4 BC Act]) was assessed as 'Likely' to occur at Bridge 752 and 'Possible' to occur at Bridges 311 and 3197.
  - The red-tailed phascogale (*Phascogale calura* [VU EPBC Act and CD BC Act]) and south-western brushtailed phascogale (*Phascogale tapoatafa wambenger* [CD BC Act]) were deemed 'Possible' to occur due to recent records and small areas of suitable habitat within two and four survey areas respectively.
  - The water-rat (*Hydromys chrysogaster* [P4 BC Act]) was assessed as 'Possible' to occur within the Bridge 291 survey area based on the proximity of a record to the survey area.
  - Four migratory birds (fork-tailed swift, common greenshank, red-necked stint and wood sandpiper) have been assessed as 'Possible' to occur at one survey area each except for the fork-tailed swift which was deemed 'Possible' to occur at three survey areas.
  - The Mortlock River shield-backed trapdoor spider (*Idiosoma schoknechtorum* [P3 BC Act]) has been deemed 'Possible' to occur within the Bridge 291 survey area.

Black Cockatoo Assessment:

- A combined total of 58 potentially suitable breeding and roosting habitat trees (>500mm DBH) were recorded with the survey areas. Of these, none possessed known (Category 1), probable (Category 2) or potentially suitable (Category 3) nesting hollows. Twenty-four trees meeting DBH criteria did not support hollows of a suitable size, height, depth or aspect to support black cockatoos and the remaining 34 trees lacked visible hollows.
- Black Cockatoo foraging habitat within the survey areas was assessed as low quality and was generally restricted to isolated trees and small stands of trees subjected to clearing and other disturbances.
- No primary or secondary evidence of black cockatoos were recorded during the current survey.

3.2 Summary of Biological Survey – Astron (2016a-m)

Astron Environment undertook biological assessments and survey of remnant vegetation within a 50m radius of 59 road bridges (covering bridges 0277 to 0289) within the Western Australian Wheatbelt, with the survey including a desktop assessment and field inspection. The site inspections were undertaken on the 28th and 29th October 2016. It is noted that the survey covered bridges not included in this current proposal.

Astron produced individual field inspection reports for each bridge, with the combined findings of the 13 bridges associated with this proposal summarised below:

Flora and Vegetation:

- No conservation significant flora species were identified at any of the 13 sites.
- No Weeds of National Significance (WoNS) were recorded within the survey areas, with one declared Pest weed species, *Echium plantagineum, identified at* two survey sites (Bridges 0282 and 0283).
- Across the 13 sites six (6) vegetation types were identified:
  - **TG** - *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over **Avena barbata* tussock grassland

- **WL** - *Eucalyptus loxophleba* subsp. *loxophleba* woodland over *Acacia acuminata* scattered tall shrubs over **Avena barbata, *Ehrharta longiflora* and **Bromus diandrus* closed tussock grassland
- **OW** - *Eucalyptus loxophleba* subsp. *loxophleba* open woodland over **Avena barbata, *Bromus diandrus* and **Lolium rigidum* closed tussock grassland
- **LOF** - *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over *Allocasuarina huegeliana* low open forest over **Ehrharta longiflora* closed tussock grassland
- **LW** - *Allocasuarina huegeliana* low woodland over **Ehrharta longiflora, *Hordeum glaucum* and **Avena barbata* closed tussock grassland
- **TOS** - *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over *Acacia acuminata* tall open shrubland over **Ehrharta longiflora* and **Avena barbata* closed tussock grassland

Vegetation condition ranged from degraded to completely degraded at the 13 sites.
None of the survey sites were considered to represent the critically Endangered TEC '*Eucalypt Woodlands of the Western Australian Wheatbelt*'.

Fauna:

- Five (5) broad habitat types were identified across the survey areas: Grassland, Woodland, Riparian Forest, Shrubland and Riparian Woodland.
- No conservation significant fauna species were identified at any of the bridge sites.
- A combined total of 26 potential back cockatoo breeding habitat trees were identified across the survey areas.

3.3 Summary of Biological Survey – Ecoscape (Australia) Pty Ltd (2016)

The Northam Cranbrook Road Widening Biological Survey was conducted during September 2016 by Ecoscape (Australia) Pty Ltd, covering a 97.5km length of the Northam Cranbrook Road between Northam and Brookton. The study included a desktop study and field study comprising a Level 2 flora and vegetation assessment and Level 1 fauna assessment. The survey width was 50m either side of the road centreline. It is noted that the survey covered areas not included in this current proposal.

The key findings of the biological field survey are detailed below.

Flora and Vegetation:

- 285 vascular flora species within the study area.
- One was a Threatened Flora species (*Acacia brachypoda* that had previously been recorded from the location)
- Six were Priority listed species (*Eremophila sp. Beverley* (K. Kershaw KK 2438) (P1), *Anigozanthos bicolor* subsp. *exstans (*P3), *Cryptandra beverleyensis* (P3), *Eutaxia rubricarina* (P3), *Lepidosperma sp. Meckering* (R. Davis WW 27-32) (P3) and *Thysanotus tenuis* (P3)
- 67 (23.5%) were introduced, including **Asparagus asparagoides, *Opuntia* sp. and **Tamarix aphylla* that are WONS and C3 Declared Pest plants over the entire study area. There were two additional C3 Declared Pest plants recorded in the Brookton Shire (**Echium plantagineum* and **Moraea miniata*); these species were also recorded in other Shires but are not Declared Pest plants in these. There is no requirement for control of either of these.

- There were nine native vegetation types:
  - **ElMW** *Eucalyptus loxophleba* subsp. *loxophleba* mid woodland
  - **ErMW** *Eucalyptus rudis* subsp. *rudis* mid woodland
  - **EsMOF** *Eucalyptus salmonophloia* mid open forest an
  - **EwMW** *Eucalyptus wandoo* subsp. *wandoo* mid woodland

- **AcTS** *Allocasuarina campestris* tall shrubland
- **AhAcLOF** *Allocasuarina huegeliana* and *Acacia acuminata* low open forest
- **AhBpMOF** *Allocasuarina huegeliana* and *Banksia prionotes* mid open forest
- **CoMOF** *Casuarina obesa* mid open forest
- **TpLSS** *Tecticornia pergranulata* low samphire shrubland

- Using the criteria in the Approved Conservation Advice for the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC, Ecoscape considers three segments of the study area to represent the TEC, occupying 7.09 ha (0.32% of the total study area) and consisting of 5.15 ha in vegetation type **ElMW**, 1.3 ha in vegetation type **ErMW** and 1.47 ha in vegetation type **EsMOF**
- Most (98.89%) of the study area was in Degraded or Completely Degraded condition due largely to weed cover and lack of native understorey species.

Fauna:
- 33 terrestrial fauna species, none of which were of conservation significance
- One fauna habitat type, open woodland, that is considered to represent foraging habitat for Black Cockatoos
- 648 potential Black Cockatoo nesting trees, 44 of which possess the necessary characteristics preferred for nesting although no evidence of use was recorded.

3.4 Summary of Potential Black Cockatoo Breeding Hollow Survey

Tony Kirkby completed a field survey on 20th October 2021 (D21#1116349) to assess the potential Carnaby's Cockatoo breeding trees identified during surveys by Astron (2016) and Ecologia (2021). 13 trees of suitable diameter at breast height (DBH) were noted to contain hollows.

Hollows were inspected from ground level using binoculars for signs of chewing and wear at the entrance, followed by inspection using a pole camera to assess entrance and internal size.

13 trees containing hollows were inspected and assessed for the presence/suitability of breeding by Carnaby's Cockatoos.

The key findings of the survey were as follows (Kirkby. A, 2021):
- 10 of the trees had hollows that were noted as being either too small at the entrance for use by black cockatoos or blocked internally
- 1 tree at Bridge 286 has lost the limb containing the hollow recorded by Astron (2016)
- 1 tree at Bridge 277 contains a small hollow which may be of suitable size to accommodate a black cockatoo but given no signs of previous use and the size of the hollow being borderline in terms of size, it is unlikely to be used as a breeding hollow. This hollow also contained duck eggs.
- 1 tree at Bridge 287 though showing no signs of recent use contained two hollows of suitable entrance sizes of approximately 300mm and 200mm. They were unable to be inspected with a pole camera. Given that Salmon Gum is a major provider of Carnaby's Cockatoo breeding hollows these hollows should be considered as potential breeding hollows.

3.5 Summary of Dieback Review

Glevan Consulting (2021) undertook an assessment of Phytophthora Dieback occurrence at the thirteen (13) bridge sites on Monday 16th May 2022. No Phytophthora Dieback infestations were observed during the assessment and the entire survey area was excluded from assessment due to being degraded and devoid of vegetation. Additionally, no reliable indicator species were observed and no protectable areas were identified during the assessment.

4 VEGETATION DETAILS

4.1.1 Project Site Vegetation Description

The proposal is located within the Avon Wheatbelt bioregion within the shires of Northam and York. Cleared agricultural land and patches of remnant vegetation surround the proposal area.

The vegetation of the local area is highly disturbed, with little or no remnant understory and infestations of introduced pastoral grasses and weeds.

Three (3) biological surveys have been conducted over the proposal areas with 10 native vegetation associations noted between the surveys, as described in Table 3.

The condition of the native vegetation within the proposal areas ranges from degraded to completely degraded as detailed in Table 4.

A breakdown of native vegetation associations and condition for each of the individual bridges is provided in Appendix 1.

Table 3. Native Vegetation Types to be cleared under CPS818-15

Vegetation Type	Description	Proposed Clearing Area (ha)
Ecologia (2021)		
W01	*Eucalyptus loxophleba, E. rudis, Acacia acuminata* mid woodland/tall open shrubland; *Avena barbata, Ehrharta longiflora, Bromus diandrus* closed tussock grassland	0.91
W02	*Casuarina obesa,Eucalyptus rudis, Melaleuca rhaphiophylla* low to mid woodland/tall sparse shrubland; *Lolium rigidum, Cynadon dactylon, Ehrharta longiflora* tussock grassland/open forbland	0.14
Astron (2016)		
TG	*Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over **Avena barbata* tussock grassland	0.68
WL	*Eucalyptus loxophleba* subsp. *loxophleba* woodland over *Acacia acuminata* scattered tall shrubs over **Avena barbata*, **Ehrharta longiflora* and **Bromus diandrus* closed tussock grassland	0.79
OW	*Eucalyptus loxophleba* subsp. *loxophleba* open woodland over **Avena barbata, *Bromus diandrus* and *Lolium rigidum* closed tussock grassland	0.38
LOF	*Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over *Allocasuarina huegeliana* low open forest over **Ehrharta longiflora* closed tussock grassland	0.08
LW	*Allocasuarina huegeliana* low woodland over **Ehrharta longiflora*, **Hordeum glaucum* and **Avena barbata* closed tussock grassland	0.21
Ecoscape (2016)		

EIMW	*Eucalyptus loxophleba* subsp. *loxophleba* mid woodland over *Acacia acuminata* tall open shrubland over *Neurachne alopecuroidea*, **Avena barbata* and **Ehrharta longiflora* low grassland (majority of the mapped vegetation lacks any understorey)	5.81
EsMOF	*Eucalyptus salmonophloia* mid open forest over *Daviesia benthamii* subsp. *acanthoclona, Templetonia smithiana* and *Olearia elaeophila* mid open shrubland over *Acacia erinacea, Austrostipa elegantissima* and *Gahnia australis* low open shrubland/grassland/sedgeland (majority of the mapped vegetation lacks any understorey)	0.03
CoMOF	*Casuarina obesa* mid open forest over **Ehrharta longiflora, *Avena barbata* and **Oxalis pes-caprae* closed grassland/forbland	0.39
EwMW	*Eucalyptus wandoo* subsp. *wandoo* mid woodland over **Ehrharta longiflora, Austrostipa elegantissima* and **Avena barbata* low grassland	0.06
Total		**9.49**

Table 4. Native Vegetation Conditions to be cleared under CPS818-15

Vegetation Condition (EPA, 2019)	Proposed Clearing Area (ha)
Degraded	7.98
Completely Degraded	1.5
Total	**9.49**

Tables 5 and 6 provide details of the Pre-European Vegetation Associations with the project area and the remaining extents of these associations. Vegetation association 352 has less than 30% of its pre-European extent remaining in State, bioregion, subregion and Local Government Shire (Table 6).

According to the current mapped remnant vegetation (Geographic Information Services, D. 2016), 13% of the study area, 20 km radius, is remnant vegetation.

Table 5. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 352 described as a Medium woodland; York gum (Government of Western Australia, 2019)	Clearing of up to 9.49 ha for replacement of 13 bridges on the Northam-Cranbrook Road between Northam and York.	Degraded to Completely Degraded (EPA 2016)	Vegetation description and condition determined from biological survey (Ecologia Environment, 2021) (Astron, 2016a-k) (Ecoscape, 2016)

Table 6. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 352	**Statewide** *352 (York)*	724,268.73	142,012.22	19.61	1.75
	IBRA Bioregion *Avon Wheatbelt*	630,577.61	108,887.52	17.27	1.62
	IBRA Sub-region *Katanning*	337,871.73	36,295.58	10.74	0.23

	Local Government Authority *Shire of Northam*	66,825.54	7,623.24	11.41	0.45
	Local Government Authority *Shire of York*	89,947.53	8,583.13	9.54	0.06

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is at variance with one of the 10 Clearing Principles.

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Proposed clearing is not at variance to this Principle

Comment

The project requires the clearing of up to 9.49 ha of native vegetation across thirteen (13) bridge replacement sites. Condition of the vegetation proposed to be cleared ranges between degraded and completely degraded, with majority of the vegetation (84%) in degraded condition.

The project areas comprise the following vegetation types, which are considered typical of those occurring in the local area.

Ecologia (2021)

W01 - *Eucalyptus* mid open woodlands:
W02 - *Casuarina* low to mid open woodland

Astron (2016)

TG - *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over **Avena barbata* tussock grassland
WL - *Eucalyptus loxophleba* subsp. *loxophleba* woodland over *Acacia acuminata* scattered tall shrubs over **Avena barbata, *Ehrharta longiflora* and **Bromus diandrus* closed tussock grassland
OW - *Eucalyptus loxophleba* subsp. *loxophleba* open woodland over **Avena barbata, *Bromus diandrus* and **Lolium rigidum* closed tussock grassland
LOF - *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees over *Allocasuarina huegeliana* low open forest over **Ehrharta longiflora* closed tussock grassland
LW - *Allocasuarina huegeliana* low woodland over **Ehrharta longiflora, *Hordeum glaucum* and **Avena barbata* closed tussock grassland

Ecoscape (2016)

EIMW - *Eucalyptus loxophleba* subsp. *loxophleba* mid woodland
EsMOF - *Eucalyptus salmonophloia* mid open forest an
CoMOF - *Casuarina obesa* mid open forest
EwMW - *Eucalyptus wandoo* subsp. *wandoo* mid woodland

Database searches by Ecoscape (2016) and Ecologia (2021) indicated that 15 and 49 flora species respectively are possible or likely to occur within the project areas.

Field searches by Ecoscape (2016) and Ecologia (2021) recorded a total of 285 and 82 vascular plant taxa respectively. None of the flora species recorded at the project areas were considered to be Threatened or Priority Species. Furthermore, the post-survey assessment by Ecoscape (2016) and Ecologia (2021) considered that all significant flora species were either unlikely to highly unlikely to occur within the project area.

Declared Weed (*Echium plantagineum – Paterson's Curse*) was identified by Ecologia (2021) at Bridges 0282 and 0283. No other declared weeds were identified by either Astron (2016) and Ecologia (2016) within the remaining project areas. Paterson's Curse is classified as Keeping Category: Exempt where no permit or conditions are required for keeping.

No weeds of National Significance were identified within the project.

A desktop study indicated that the project area intersects potential occurrences of, or the buffer of, the *Eucalypt Woodlands of the Western Australian Wheatbelt* federal Threatened Ecological Community (TEC) / state Priority Ecological Community (PEC) (Wheatbelt TEC/PEC). The biological surveys did not identify any TEC or PECs within or adjacent to the Proposal Areas.

The proposal area comprises the following fauna habitats as described by the three biological surveys:

- Ecologia (2021) - Open Eucalypt Woodland, Drainage Line, Scattered Eucalypts over Cleared Land, and Revegetated.
- Astron (2016) - Woodland, Grassland, Shrubland, Riparian Forest and Riparian Woodland.
- Ecoscape (2016) - Open woodland.

Based on desktop likelihood assessments, Ecoscape (2016) identified the following fauna species as having a high or medium likelihood of occurrence within the project area (prior to field survey).

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) - High
- Baudin's Cockatoo (*Calyptorhynchus baudinii*) – Medium
- Red-tailed Phascogale (*Phascogale calura*) - Medium
- Southern Brush-Tailed Phascogale (*Phascogale tapoatafa subsp. tapoatafa*) - Medium
- Southern Carpet Python (*Morelia spilota imbricata*) - Medium

The following additional species were identified by Ecologia (2021) as likely or possibly occurring in the area:

- Peregrine Falcon (*Falco peregrinus*) - Likely
- Fork Tailed Swift (*Apus pacificus*) - Possible
- Water Rat (*Hydromys chrysogaster*) - Possible

No species of conservation significance were recorded during the three biological surveys.

As assessed under Principle (b), the proposed clearing comprises 27 DBH trees, with no hollows suitable for black cockatoo breeding (Kirkby, 2021) and whilst the majority of the vegetation is known foraging species, Ecologia (2021) have assessed this a low-quality due to the high levels of clearing and no evidence of foraging noted during the field surveys.

The native vegetation proposed to be cleared is not considered to comprise a high level of biological diversity due to its largely degraded condition, lack of native understory and lack of significant flora and fauna species. The proposed clearing is not at variance to this principle.

Methodology

Biological Survey (Ecologia Environment, 2021)
Biological Survey (Ecoscape, 2016)
Black Cockatoo Habitat Assessment (Kirkby, 2021)
DBCA shapefiles
EPA (2016, 2020)
Main Roads GIS Shapefiles

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Proposed clearing is not likely to be at **variance to this Principle**

Comment

The proposed 9.49 ha clearing area comprises the following fauna habitats as described by the three biological surveys:

Ecologia (2021)

- Open Eucalypt Woodland, Drainage Line, Scattered Eucalypts over Cleared Land, and Revegetated.

Astron (2016)

- Woodland, Grassland, Shrubland, Riparian Forest and Riparian Woodland.

Ecoscape (2016)

- Open woodland,

Ecoscape (2016) concluded that the open woodland habitat has limited value as fauna habitat and at best may provide some feeding resources and shelter for birds and small reptile species. The proximity of the Great Southern highway reduces the likelihood of larger species to maintain residency.

Based on desktop likelihood assessments, Ecoscape (2016) identified the following fauna species as having a high or medium likelihood of occurrence within the project areas (prior to field survey).

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) - High
- Baudin's Cockatoo (*Calyptorhynchus baudinii*) – Medium
- Red-tailed Phascogale (*Phascogale calura*) - Medium
- Southern Brush-Tailed Phascogale (*Phascogale tapoatafa subsp. tapoatafa*) - Medium
- Southern Carpet Python (*Morelia spilota imbricata*) - Medium

The following additional species were identified by Ecologia (2021) as likely or possibly occurring in the area:

- Peregrine Falcon (*Falco peregrinus*) - Likely
- Fork Tailed Swift (*Apus pacificus*) - Possible
- Water Rat (*Hydromys chrysogaster*) - Possible

No species of conservation significance were sighted during the three surveys.

<u>Black Cockatoo Habitat Assessment</u>

The project occurs within the mapped distribution of the Carnaby's Cockatoo (EPA, 2019), and the whole of the clearing area includes potentially suitable, although low quality, foraging habitat for Carnaby's Cockatoo.

Whilst *Eucalyptus loxophelba* subsp. *Locophelba* is listed as a known foraging resource of Carnaby's Black Cockatoo, no evidence of foraging was noted during the three biological surveys with trees at majority of the sites limited to roadside strips or scattered individuals within paddocks. The proposal areas does not represent high quality foraging resources for Carnaby Cockatoos and was assessed as 'low-quality' due to high levels of clearing and other disturbances. (Ecologia, 2021)

No roosting sites or evidence of roosting were identified during the survey.

41 trees with Diameter Breast Hight (DBH) suitable for future nesting hollow development were recorded within or adjacent to the project area. Proposed clearing will result in the removal of up to 27 DBH trees. An assessment of 13 trees containing hollows, within or adjacent to the proposal area found two hollows suitable for breeding by Black Cockatoos (Kirkby, 2021). These two trees, located at Bridges 0277 and 0287 will be retained.

No Carnaby's Cockatoo were sighted during the three biological surveys.

Overall the species may overfly the area and utilise the vegetation for occasional foraging, but is unlikely to utilise any of the identified trees or habitat within the project area for breeding or roosting. The species is unlikely to be impacted by the proposed clearing.

Assessment of other Conservation Significant Fauna

Ecoscape (2016) following the biological survey concluded that the species identified as having potential to occur are unlikely to be dependant on the habitat within the project area.

Baudin's Cockatoo – the vegetation and habitat type of the project area does not represent the preferred habitat for Baudin's Cockatoo which include dense Jarrah, Mari and Karri forests of the south-west (DBCA 2017). It is unlikely that this species would occur within this area.

Red-tailed Phascogale – Ecologia (2021) assessed the Red-tailed Phascogale as unlikely to occur within the area with a search of the DBCA ArcGIS data shows only one record of the Red-tailed Phascogale within 20km of the project area (13km from bridge 0289). The main fauna habitat of the project area does not represent the preferred habitat of this species, which according to DEC (2012) consist of Wandoo (*Eucalyptus wandoo*) and Sheoak (*Allocasuarina huegeliana*) woodland associations, with populations being most dense in the latter vegetation type. They show a preference for long unburnt habitat with a continuous canopy, to assist their arboreal habits.

Southern Brush-Tailed Phascogale – Ecologia (2021) assessed the Southern Brush-tailed Phascogale as unlikely to occur within the area with a search of the DBCA ArcGIS data shows only three records of the Southern Brush-tailed Phascogale within 20km of the project area with the nearest being 4km south of Bridge 0289.

Southern Carpet Python – whilst this species is listed as having a medium likelihood of occurrence, the habitat of the project area is not representative of the preferred habitat for the southern carpet python which the absence of rock crevices, hollow tree limbs and burrows made by other animals. A recent search of DBCA data did not show any records of the Southern Carpet Python within 20km of the project area, deeming the species unlikely to occur.

Peregrine Falcon – Ecologia (2021) concluded that whilst the survey area is unlikely to present suitable breeding habitat, the Peregrine Falcon may overfly the areas intermittently due to its widespread movements. The peregrine Falcon requires cliffs, rocky outcrops or large tree hollows to breed, none of which are present within the project area. Whilst the proposed clearing areas do not represent suitable breeding habitat the Peregrine Falcon was deemed post survey to be likely to occur due to proximity to recent records and the capacity of the species to overfly all habitat types.

Fork-tailed Swift – Ecologia (2021) concluded that the Fork-tailed Swift is deemed possible to occur due to proximity of records and the capacity of the species to overfly all habitat types; however the impacts from clearing are likely to be negligible due to the aerial nature of the species which live almost exclusively in the air and feed entirely on aerials insects. The species are nomadic in response to broad-scale weather pattern changes. As such the proposed clearing is unlikely to impact on this species.

Water Rat – Post survey, Ecologia (2021) deemed the water rat to be unlikely to occur within the project area. The species occurs in the vicinity of permanent waterbodies with fresh or brackish water, a habitat which is not represented by the non-perennial watercourses that occur within the project areas.

Ecoscape (2016) concluded that the proposal areas have little or no significance as fauna habitat at either a local or regional levels of scale, due to the degraded nature of the study areas, lacking sufficient understory vegetation or good quality and bisected by a State Highway. The presence of invasive predators further reduces the quality of this habitat.

Based on the above assessment the native vegetation proposed to be cleared does not represent significant habitat for fauna indigenous to Western Australia and is therefore is not likely to be at variance to this principle.

Methodology
Biological Survey (Ecologia Environment, 2021)
Biological Survey (Ecoscape, 2016)
Black Cockatoo Habitat Assessment (Kirkby, 2021)
DBCA ArcGIS Shapefile
EPA (2016, 2020)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Proposal is not at **variance to this Principle**

Comment
Ecoscape (2016) identified 73 conservation significant species, through desktop searches, that are known to occur within the study area (20km radius). A pre-survey likelihood of occurrence assessment of conservation significant flora and identified the following 15 species as having the potential of occur in the project area.

- *Acacia aphylla*
- *Acacia brachypoda*
- *Acacia campylophylla*
- *Acacia lirellata* subsp. *lirellata*
- *Acacia sclerophylla var. teretiuscula*
- *Acacia vittata*
- *Anigozanthos bicolor* subsp. *exstans*
- *Austrostipa blackii*
- *Cryptandra beverleyensis*
- *Eremophila glabra* subsp. *Kokeby (R. Davis 5080)*
- *Eremophila sp. Beverley (K. Kershaw KK 2438)*
- *Eutaxia rubricarina*
- *Grevillea roycei*
- *Lepidosperma sp. Meckering (R. Davis WW 27-32)*
- *Schoenus capillifolius*
- *Stylidium uniflorum* subsp. *extensum*
- *Thomasia montana*
- *Thysanotus tenuis*

No species of conservation significance were located within the proposal areas.

Ecologia (2021) identified, though database searches, the following conservation significant species with the study area:

- Bridge 282: Eight Threatened species, four Priority 1 taxa, two Priority 2 taxa, 24 Priority 3 taxa and 11 Priority 4 taxa
- Bridge 283: six Threatened species, six Priority 1 taxa, two Priority 2 taxa, 19 Priority 3 taxa and eight Priority 4 taxa

A pre-survey likelihood of occurrence assessment identified the following additional species as likely or possible occur.

- *Allocasuarina fibrosa*
- *Frankenia conferta*
- *Gastrolobium hamulosum*
- *Hemiandra rutilans*

- *Lechenaultia laricina*
- *Thomasia glabripetala*
- *Androcalva fragifolia*
- *Androcalva* sp. York (C.F. Wilkins & A. Sole CW 2527)
- *Senecio gilbertii*
- *Amperea micrantha*
- *Drosera albonotata*
- *Austrostipa* sp. Cairn Hill (M.E. Trudgen 21176)
- *Beaufortia eriocephala*
- *Beaufortia purpurea*
- *Chamelaucium* sp. Wongan Hills (B.H. Smith 1140)
- *Daviesia nudiflora* subsp. *Drummondii*
- *Dicrastylis reticulata*
- *Gastrolobium rotundifolium*
- *Hopkinsia anoectocolea*
- *Levenhookia pulcherrima*
- *Melaleuca sclerophylla*
- *Pterostylis echinulata*
- *Scholtzia halophila* subsp. *mortlockensis*
- *Stackhousia* sp. Red-blotched corolla (A. Markey 911)
- *Stylidium asteroideum*
- *Stylidium exappendiculatum*
- *Stylidium periscelianthum*
- *Thysanotus cymosus*
- *Tribonanthes minor*
- *Acacia cuneifolia*
- *Asterolasia grandiflora*
- *Caladenia integra*
- *Cyanicula ixioides* subsp. *ixioides*
- *Darwinia thymoides* subsp. St Ronans (J.J. Alford & G.J. Keighery 64)
- *Eremaea blackwelliana*
- *Eucalyptus loxophleba* x *wandoo*
- *Frankenia glomerata*
- *Hemigenia platyphylla*
- *Stylidium scabridum*

No threatened or priority flora were recorded during the project biological surveys, with Ecologia (2021) concluding that after targeted searches the taxa are considered unlikely to occur in any of the survey area.

On this basis the proposed native vegetation clearing is not at variance to this principle.

Methodology
Biological Survey (Ecologia Environment, 2021)
Biological Survey (Ecoscape, 2016)
EPA (2016)

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is not at variance to this Principle

Comment
No TECs were recorded within the survey area

Based on the above, the proposed native vegetation clearing is not at variance to this principle.

Methodology
Biological Survey (Ecologia Environment, 2021)

Biological Survey (Astron, 2016a-m) Biological Survey (Ecoscape, 2016)

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is not likely to be at variance to this Principle

Comment

According to a broad scale mapping undertaken by Beard (Shepherd et al 2001), the project area lies within vegetation association 352 (see Table 5).

The project area occurs within the Avon Wheatbelt IBRA region, of which approximately 19% of the pre-European vegetation extent remains (Government of Western Australia, 2019). Within the 20km study area there is approximately 13% of native vegetation remaining.

The vegetation of the project area has been broadly mapped as the following pre-European vegetation association.

Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 352 described as a Medium woodland; York gum (Government of Western Australia, 2019)	Clearing of up to 9.49 ha for replacement of 13 bridges on the Northam-Cranbrook Road between Northam and York.	Degraded to Completely Degraded (EPA 2016)	Vegetation description and condition determined from biological survey (Ecologia Environment, 2021) (Astron, 2016a-m) (Ecoscape, 2016)

The remaining extent of the vegetation association is summarised in the below table.

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 352	**Statewide** *352 (York)*	724,268.73	142,012.22	19.61	1.75
	IBRA Bioregion *Avon Wheatbelt*	630,577.61	108,887.52	17.27	1.62
	IBRA Sub-region *Katanning*	337,871.73	36,295.58	10.74	0.23
	Local Government Authority *Shire of Northam*	66,825.54	7,623.24	11.41	0.45
	Local Government Authority *Shire of York*	89,947.53	8,583.13	9.54	0.06

The National Objectives and Targets for Biodiversity Conservation in Australia has a target to prevent clearance of ecological communities within an extent below 30 percent of that present pre-1975, below which species loss appears to accelerate exponentially to an ecosystem level (Commonwealth of Australia, 2001). Vegetation unit 352 has less than 30% of its pre-European extent reaming at all scales.

The proposed clearing of a narrow, linear area of native vegetation over thirteen (13) project sites that does not contain any conservation significant flora, communities or fauna habitat, is not likely to represent a significant remnant of native vegetation.

Previous granted clearing permits where the application area supported vegetation that retained less than 30% of its extent but was not considered to be a significant remnant by DWER area as follows:

- CPS 7978 – Approximately 10ha of vegetation in Good to Degraded condition was not considered to be a significant remnant as the majority of the application area was in a degraded condition.
- CPS 6851 – Approximately 5ha of vegetation in Degraded to Completed Degraded condition in a linear shape was not considered to be a significant remnant.
- CPS 8025 – clearing area does not include flora or communities of significance or comprise significant habitat for fauna, then the application area is unlikely to be significant as a remnant of native vegetation in an areas that has been extensively cleared.

Based on the above, the proposed clearing within the proposal areas does not likely represented a significant remnant of native vegetation given that it is predominantly in a degraded (84%) and completely degraded (16%) state, with little to no native understory. The proposed clearing is not likely to be at variance to Principle (e).

Methodology

Biological Survey (Ecologia Environment, 2021)
Biological Survey (Astron, 2016a-m)
Biological Survey (Ecoscape, 2016)
EPA (2016)
Government of Western Australia (2017)
Perth Biodiversity Project (2013)
Shepherd (2009)
Main Roads GIS Database:

- Aerial Imagery
- DAFWA remnant Vegetation
- Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is at variance to this Principle

Comment

No wetlands have been recorded within the proposal area.

The thirteen (13) bridges cross over minor non-perennial watercourses that feed into either the Mortlock River (Bridges 0277-0280) or Avon River (Bridges 0281 - 0289).

At their closest points, the Mortlock River lies approximately 170m east of Bridge 0279 and the Avon River lies approximately 400m west of Bridge 0286.

Bridges 0278, 0285, 0288 and 0289 do not have any native vegetation associated with the watercourse with the area mapped as cleared. A review of aerial imagery and the Main Roads WA IRSI Reporting Centre indicates that there is no native vegetation within the water course and only introduced pastoral grasses present.

Bridges 0280, 0281, 0283 and 0287 – vegetation at these sites is mapped as Woodlands and consists of *Eucalyptus loxophleba*, which is common throughout the wheatbelt and extends beyond the watercourses. This vegetation is not considered to constitute riparian vegetation in association with the watercourse as it remains adjacent to the watercourse as a result of farm clearing practices.

Bridges 0277, 0279, 0282, 0284 and 0286 have mapped vegetation associated with the watercourse, however the area of mapped vegetation is 0.09 ha, within a minor non-perennial watercourse, therefore under condition 6 (f) of the CPS818/15 permit, due to no other clearing principles being at variance an Assessment Report is not required to be submitted to DWER.

The proposal is at variance to Principle (f).

Methodology

Biological Survey (Ecologia Environment, 2021)
Biological Survey (Astron, 2016a-m)
Biological Survey (Ecoscape, 2016)
DWER and DBCA shapefiles
Main Roads GIS Databases:
Aerial Imagery
Main Roads IRIS Reporting Centre

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance to this Principle

Comment

The proposed clearing intersects the following Land Systems:

- Avon Flats System - Alluvial flats, in the northern Zone of Rejuvenated Drainage, with brown loamy earth, grey non-cracking clay and brown deep sand. York gum-salmon gum-flooded gum-sheoak woodland.
- Jelcobine System - Isolated steep low hills with undulating low granite hills and isolated lateritic remnants in the Zone of Rejuvenated Drainage. Gravels, and grey shallow to deep sandy duplexes. Wandoo, york gum, Jam and Casuarina woodland predominate.

Natural Resources Management and CSIRO risk mapping indicates that whilst the area has a higher risk of flooding and waterlogging, being associated with the drainage lines, the risk of water and wind erosion is lower.

In addition, it is unlikely that acid sulphate soils will be an issue as the area is classified as low and extremely low risk.

Given the degraded to completed degraded nature of the vegetation, which is bordered by agricultural paddock, the proposed clearing is not likely to lead to an appreciable increase in land degradation. Standard erosion and dust management control measures will be implemented during construction to reduce the incidents to soil erosion. The culvert design will maintain flows similar to those currently in place for the bridges with flow maintained during construction.

Aspect	Risk
Flood Risk	>70% has a moderate to high flood risk (majority of the project area)
Salinity	10-30% has a moderate to high risk or is presently saline (majority of the project area)
Waterlogging	>70% has a moderate to very high waterlogging risk (majority of the project area)
Water Erosion	10-30% has a high to extreme water erosion risk (majority of the project area)
Wind Erosion	Moderate - 10-30% has a high to extreme wind erosion risk (majority of the project area)

Acid Sulphate Soils (ASS)	Low probability (5 bridges) and Extremality Low probability (8 bridges) of occurrence.

Based on the above, the proposed clearing of native vegetation is not likely to be at variance with this principle.

Methodology
DAFWA Risk Mapping shapefiles
DAFWA/DPIRD Soil Landscape Systems shapefiles
CSIRO Acid Sulphate Soils shapefiles

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Proposed clearing is not at **variance to this Principle**

Comment
A search of ArcGIS shapefiles indicates that no A Class Reserves, DBCA Managed Lands or Environmentally Sensitive Areas (as declared under the EP Act) located in or near the proposal areas.

The closest DBCA managed reserves include Mokine Nature Reserve, Mortlock Nature Reserve and Wallaby Hills Nature Reserve, which are all ~16km from the proposal area.

The closest ESA is located ~8km west of Bridge 0279.

Given the distance of the proposal to the reserves the conservation areas will not be impacted by clearing activities.

The proposed clearing of native vegetation is not at variance to this principle.

Methodology
DWER and DBCA shapefiles
EPA (2016)

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Proposed clearing is not at variance to this Principle

Comment
The proposal area lies within a proclaimed surface water area (Avon River Catchment Area). Two major non-perennial water courses (Avon River and Mortlock River) run adjacent to the proposal areas with the bridges crossing minor non-perennial watercourses flowing into these rivers.

At the closest point, the Mortlock River is 170 m east of Bridge 0279 and the Avon River is 400 m west of Bridge 0286.

There is no Public Drinking Water Source Areas within or in close proximity to the proposal areas (GIS Database). The proposed native vegetation clearing of 9.49 ha across the 13 bridges is not likely to alter groundwater quality in the area.

The proposed native vegetation clearing associated with the project is not likely to impact surface or underground water flows or quality. Drainage design will maintain flows similar to those currently in place

for the bridges. The minor scale and linear nature of clearing at each bridge site is unlikely to result in excessive levels of surface runoff that adversely alter surface and underground water quality.

The proposed clearing of native vegetation is not at variance to this principle.

Methodology
Main Roads and DWER ArcGIS Databases

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not at variance to this Principle

Comment
The study area receives an average rainfall between 427.3 mm (Northam) and 451.3 mm (York) per year (BOM, 2022). Natural Resource Management risk mapping for the proposal areas (see Principle (g) above), identified moderate to very high waterlogging and flooding risks, due to the proximity of the bridges to the Mortlock and Avon Rivers.

The relatively minor and linear nature of the clearing at each of the bridge sites is unlikely to result in excessive surface runoff levels that would increase the intensity or incidence of flooding above the current risk level.

Drainage design will maintain existing water flow pathways and flows, similar to those currently in place for the bridges to prevent localised flooding. Water flows will also be maintained during construction to prevent localised flooding.

The proposed clearing of native vegetation is not at variance to this principle.

Methodology
BOM (2020)
BOM (2020a)
GIS Databases

- DoW Catchmens
- Hydrology South
- Natural Resource Management Soil systems Risk Mapping

6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 5. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles. Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 hectares in size and the Clearing Principle (f) impacts only relate to: (i) a minor non-perennial watercourse(s); (ii) a wetland(s) classed as a multiple use management category wetland(s); and/or (iii) a wetland that is not a defined wetland; the preparation of an Assessment Report, as required by condition 6(e), is not required.	**Yes**	No further action required. While Principle (f) is considered to be at variance, with the 13 bridges crossing over minor non-perennial watercourses, not all vegetation is considered to constitute riparian vegetation. Clearing of vegetation associated with the watercourses is less than 0.5 ha.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.	**No**	No further action required.
3. The project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
4 a. Project is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted	**No**	Refer to Section 3.5 Proceed with standard vehicle and plant management actions from PREMR's and Vehicle and Plant Hygiene Checklist.

Impact of Clearing	Yes/No or NA	*Further Action Required*
4b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	**No**	No further action required.
5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback	**No**	No further action required.
6. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition	**No**	No further action required.

7 STAKEHOLDER CONSULTATION

Main Roads will undertake stakeholder consultation in accordance with CPS 818/15 Condition 8.

8 REFERENCES

Astron Environmental Services (Astron 2016a). Site Inspection Report – Site 0277 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016b). Site Inspection Report – Site 0278 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016c). Site Inspection Report – Site 0279 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016d). Site Inspection Report – Site 0280 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016e). Site Inspection Report – Site 0281 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016f). Site Inspection Report – Site 0282 Northam Cranbrook unpublished report prepared for main roads 29/10/2016

Astron Environmental Services (Astron 2016g). Site Inspection Report – Site 0283 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016h). Site Inspection Report – Site 0284 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016i). Site Inspection Report – Site 0285 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016j). Site Inspection Report – Site 0286 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016k). Site Inspection Report – Site 0287 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016l). Site Inspection Report – Site 0288 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Astron Environmental Services (Astron 2016m). Site Inspection Report – Site 0289 Northam Cranbrook unpublished report prepared for main roads 28/10/2016

Australian Government. EPBC Act referral guidelines for three threatened black cockatoo species (2012). Department of Sustainability, Environment, Water, Population and Communities.

Beeston, G.R., Hopkins, A.J.M. and Shepherd, D.P. (2002). Land-use and vegetation in Western Australia. Department of Agriculture, Western Australia, Resource Management Technical Report 250.

Bureau of Meteorology Australia. (2022). Climate Averages for Australian Sites – Northam – Available online from http://www.bom.gov.au/climate/averages/tables/cw_010111.shtml Accessed 17 February 2021.

Bureau of Meteorology Australia. (2022a). Climate Averages for Australian Sites – York – Available online from http://www.bom.gov.au/climate/averages/tables/cw_010144.shtml Accessed 17 February 2021.

Department of Biodiversity, Conservation and Attractions. (2017). Fauna Profile - Baudin's cockatoo Calyptorhynchus baudinii. Retrieved from http://www.dbca.wa.gov.au/ on 16th May 2022

Department of Environment and Conservation (2012). Fauna Profile – Red-tailed Phascogale *Phascogale calura* (Gould, 1844), Retrieved from https://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/red-tailed-phascogale_2012.pdf on 16th May 2022.

Ecologia Environment (2021). Wheatbelt Bridges Package 2 Biological Survey, prepared for Main Roads Western Australia

Ecoscape (Australia) Pty Ltd (2016). M031 Northam Cranbrook Road Widening Biological Survey, prepared for Main Roads Western Australia.

Environmental Protection Authority (2020). Technical Guidance – Terrestrial vertebrate fauna surveys for Environmental Impact Assessment. Perth, Western Australia.

Environmental Protection Authority (2016). *Technical Guide – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (eds. K Freeman, G Stack, S Thomas and N Woolfrey). Perth, Western Australia.

Geographic Information Services, D. (2016), Remnant native vegetation extent in the south west Western Australian agricultural area. Department of Agriculture and Food, Western Australia, Perth. Map.

Glevan Consulting (2022). *13 Bridges – Northam Cranbrook Road, Phytophthora Dieback Occurrence Assessment*, Prepared for Main Roads Western Australia.

Government of Western Australia. (2019). 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2017. WA Department of Biodiversity, Conservation and Attractions, Perth. Available online from: https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

Government of Western Australia (2019). Native Vegetation Clearing Permits. Application, assessment, and management requirements under Part V Division 2 of the Environmental Protection Act 1986. Department of Water and Environmental Regulation.

Government of Western Australia (2014). A guide to the assessment of applications to clear native vegetation Under Part V Division 2 of the Environmental Protection Act 1986. Department of Environmental Regulation.

Government of Western Australia (2014). WA Environmental Offset Guidelines. Perth, Western Australia.

Government of Western Australia (2011). WA Environmental Offset Policy. Perth Western Australia.

Kirkby, Anthony (2021). Detailed Inspection of Possible Carnaby's Cockatoo Breeding Hollows at Northam to Cranbrook Bridge Replacements. Unpublished report prepared for Main Roads Western Australia.

9 APPENDICES

Appendix	Title
Appendix 1	Vegetation Association and Condition for Individual Bridges

Appendix 1: Vegetation Association and Condition for Individual Bridges (figures in hectares)

Vegetation Condition	Bridge Number												
	0277	0278	0279	0280	0281	0282	0283	0284	0285	0286	0287	0288	0289
Degraded	0.58	0.20	0.40	0.18		1.44	0.85	1.70	1.00	0.42	0.65	0.30	0.26
Completely Degraded	0.04	0.09	0.16	0.23	0.18	0.14	0.06	0.07	0.04	0.17	0.09	0.13	0.10
Total	0.62	0.30	0.56	0.41	0.18	1.58	0.92	1.77	1.04	0.59	0.75	0.43	0.36
Total of all Bridges	9.49												

Vegetation Units		Bridge Number												
		0277	0278	0279	0280	0281	0282	0283	0284	0285	0286	0287	0288	0289
Ecologia (2021)	W01						0.57	0.34						
	W02						0.14							
Astron (2016)	TG		0.09			0.18					0.17		0.13	0.10
	WL								0.36	0.18		0.25		
	OW			0.16	0.23									
	LOF			0.0888										
	LW	0.21												
Ecoscape (2016)	ElMW	0.29	0.20	0.03	0.12		0.87	0.57	1.41	0.87	0.42	0.49	0.27	0.26
	EsMOF												0.03	
	CoMOF	0.11		0.28										
	EwMW				0.06									
Total		0.62	0.30	0.56	0.41	0.18	1.58	0.92	1.77	1.04	0.59	0.75	0.43	0.36
Total of all Bridges		9.49												