APPENDIX J

Matters of National Environmental Significance

Part 3 of 3

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT

IR_1536

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

APPENDIX

J

INLAND RAIL

Matters of National Environmental Significance

Appendix G Predicted habitat mapping

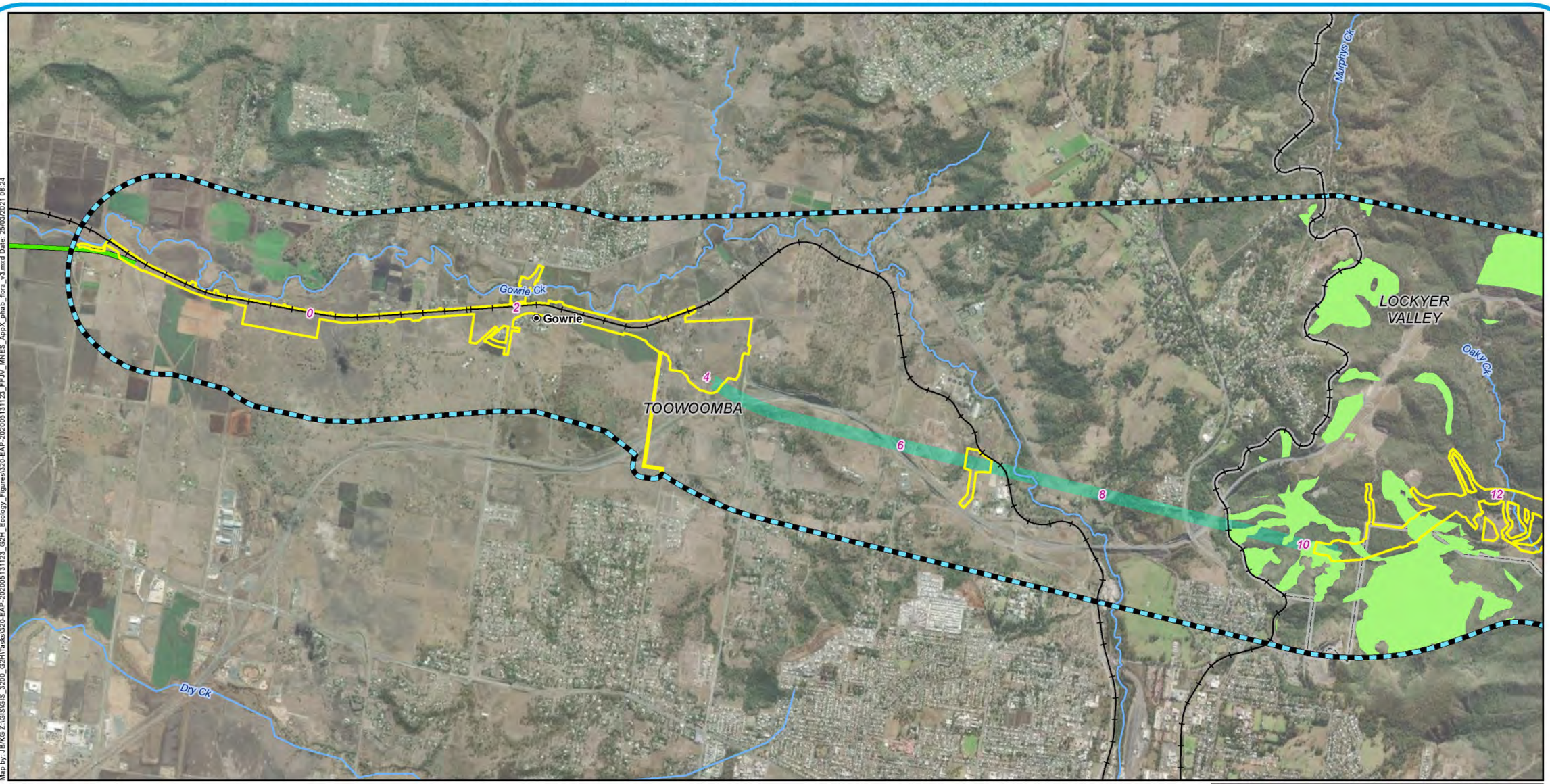
GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT

IR_1536

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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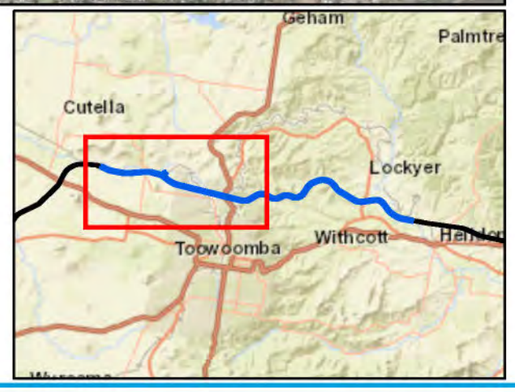
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

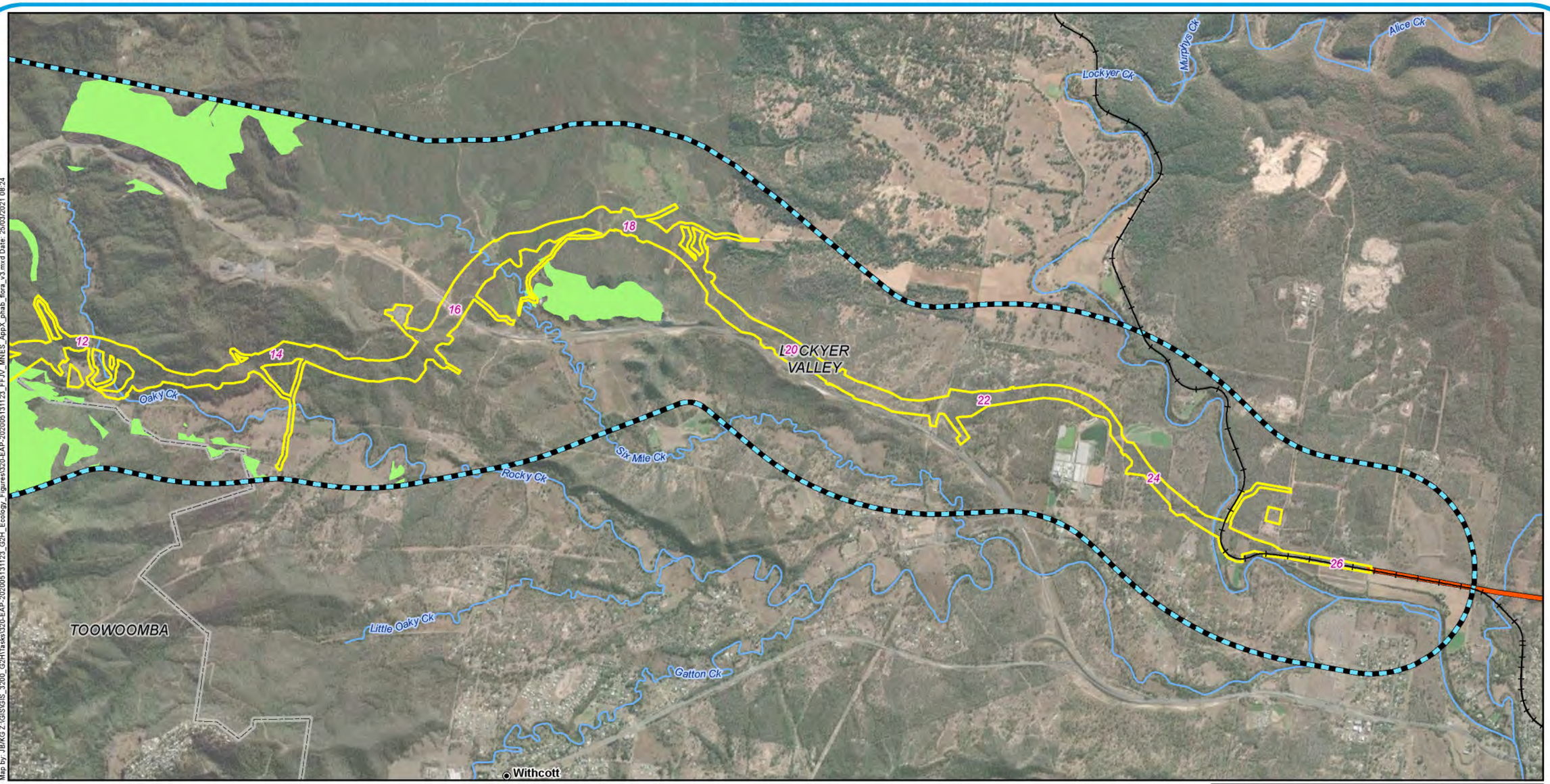
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Arthraxon hispidus* (Hairy-joint grass)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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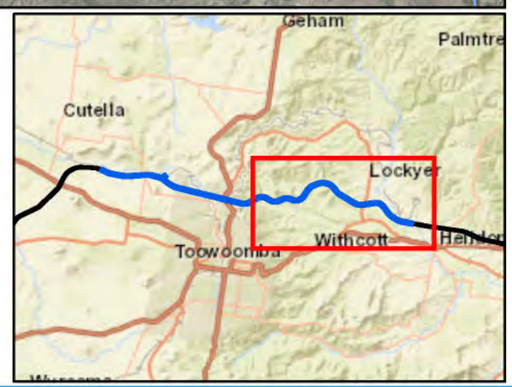
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

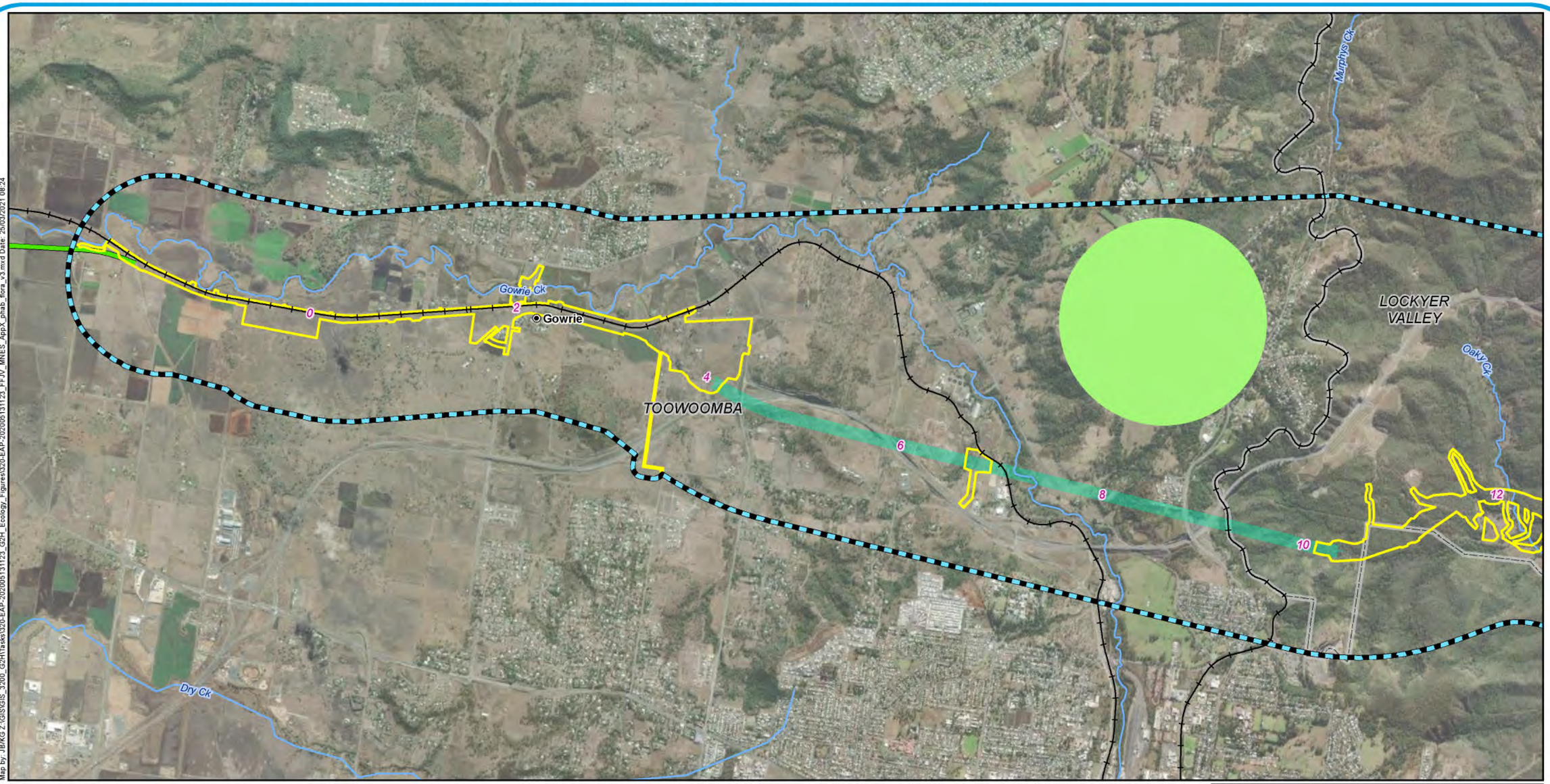
Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Arthraxon hispidus* (Hairy-joint grass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:25

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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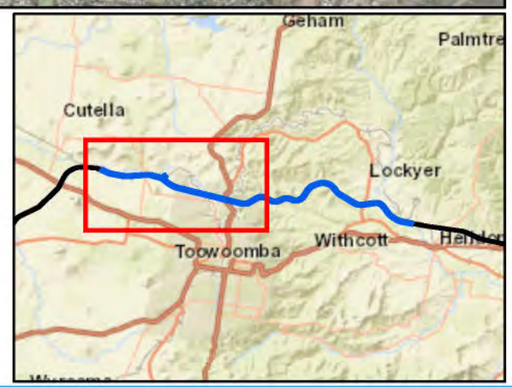
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Bothriochloa bunyensis* (Bunya Mountains bluegrass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:25

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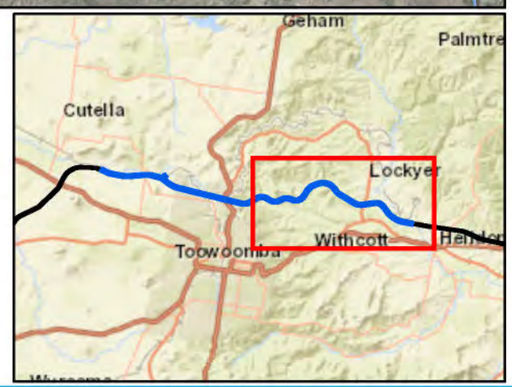
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Bothriochloa bunyensis* (Bunya Mountains bluegrass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:26

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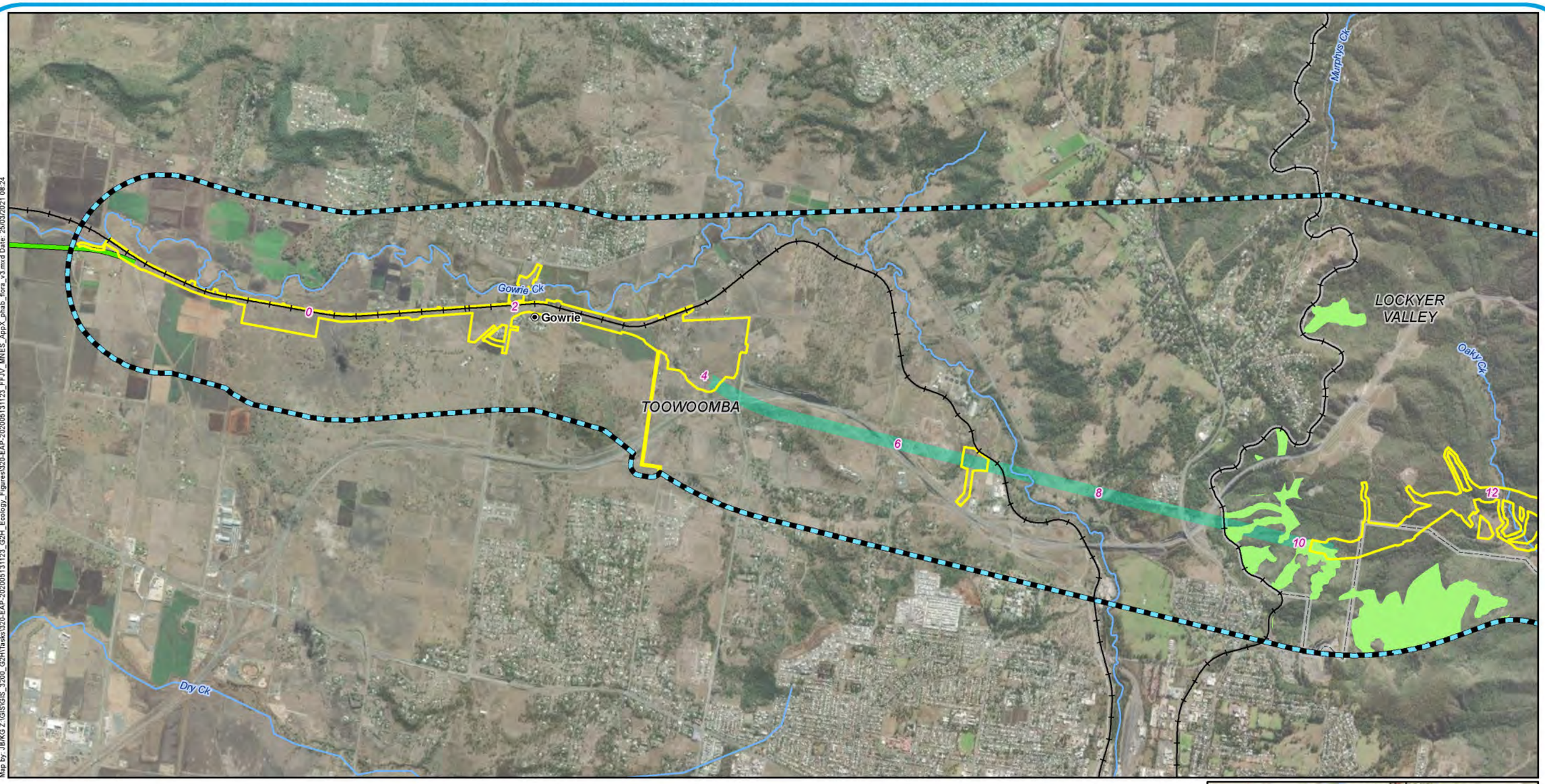

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Legend

- 5 Chainage (km)
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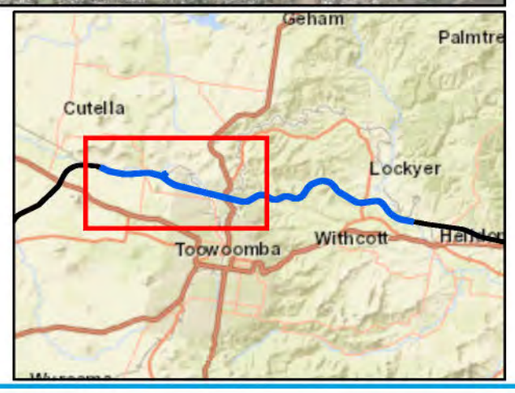
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Bulbophyllum globuliforme* (Miniature moss-orchid)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:26

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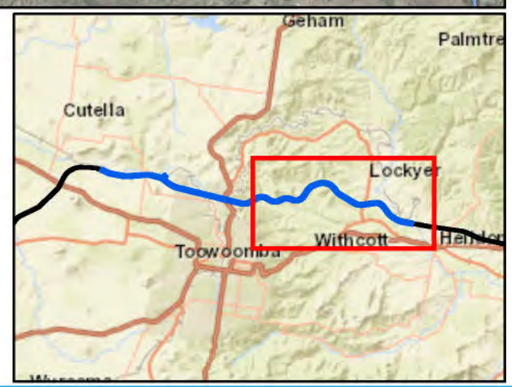
Predicted Habitat

- Potential habitat



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ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Bulbophyllum globuliforme* (Miniature moss-orchid)

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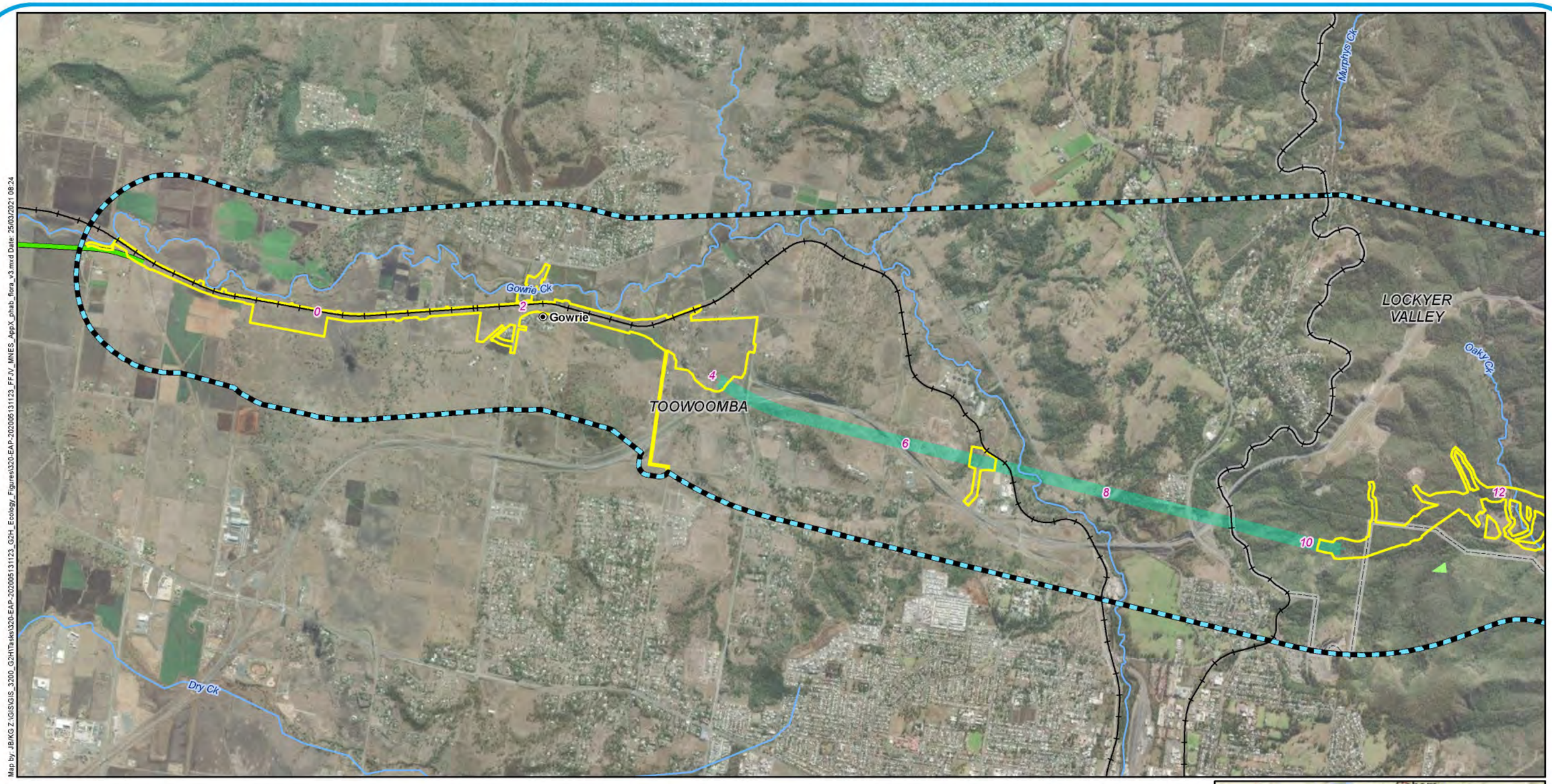

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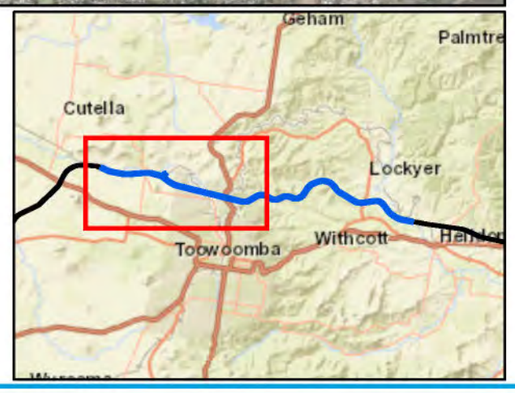
Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Clematis fawcettii* (Stream clematis)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:27

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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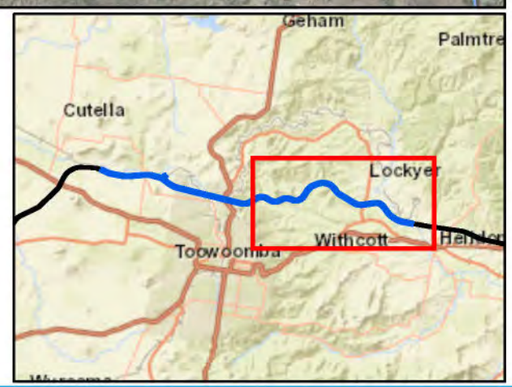
Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Clematis fawcettii* (Stream clematis)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:27

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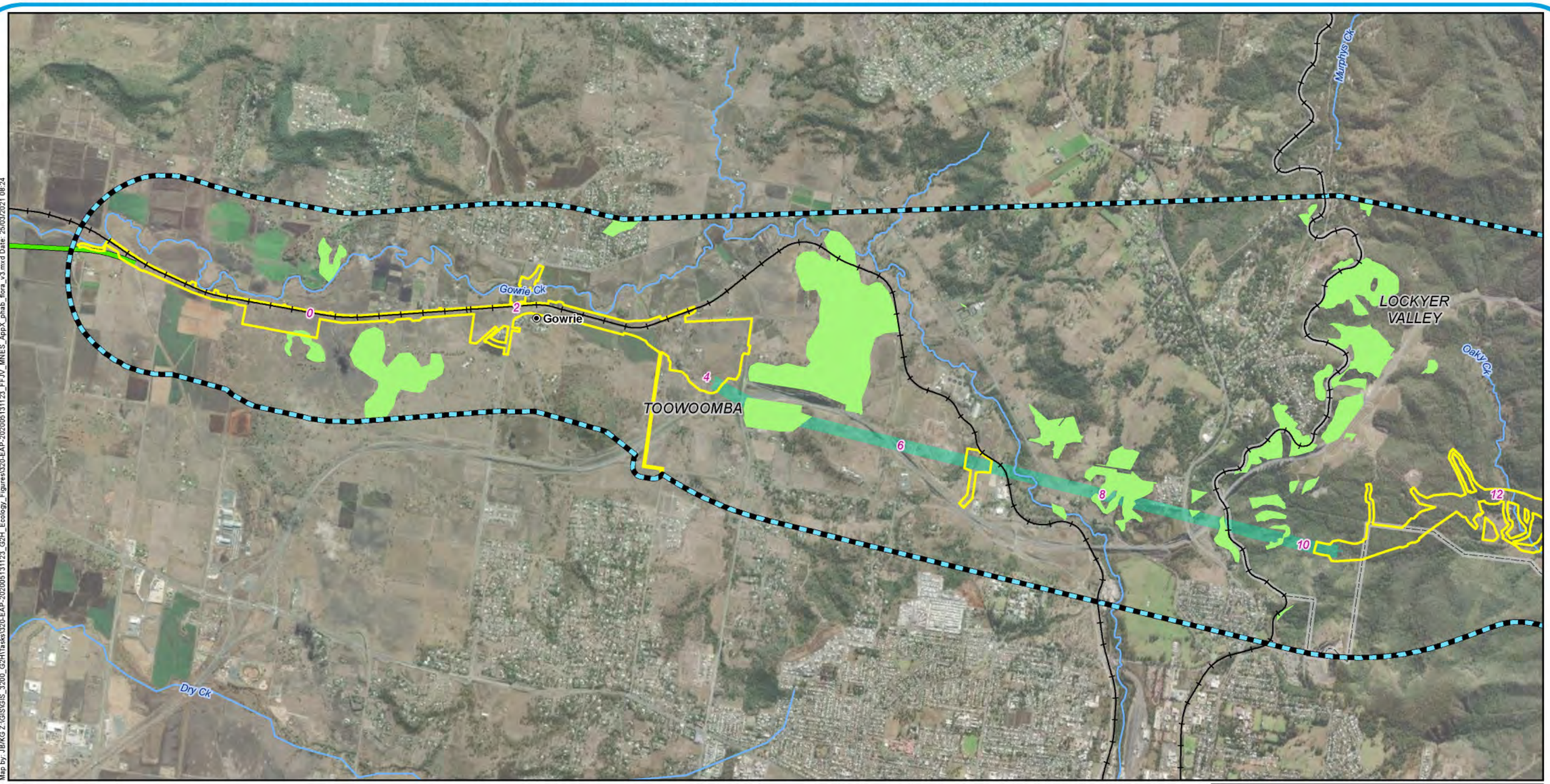

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- Local Government Areas
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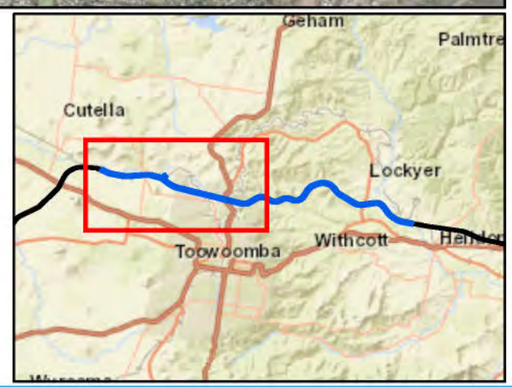
Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dichanthium queenslandicum* (King blue-grass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:27

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Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

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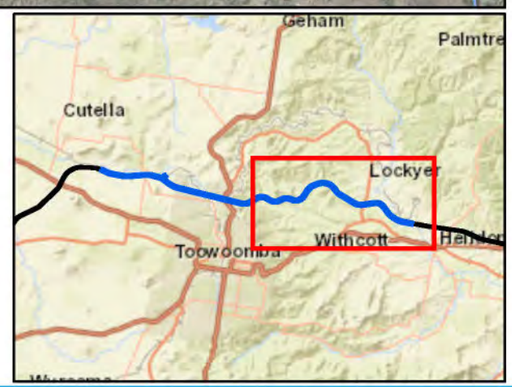
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dichanthium queenslandicum* (King blue-grass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:28

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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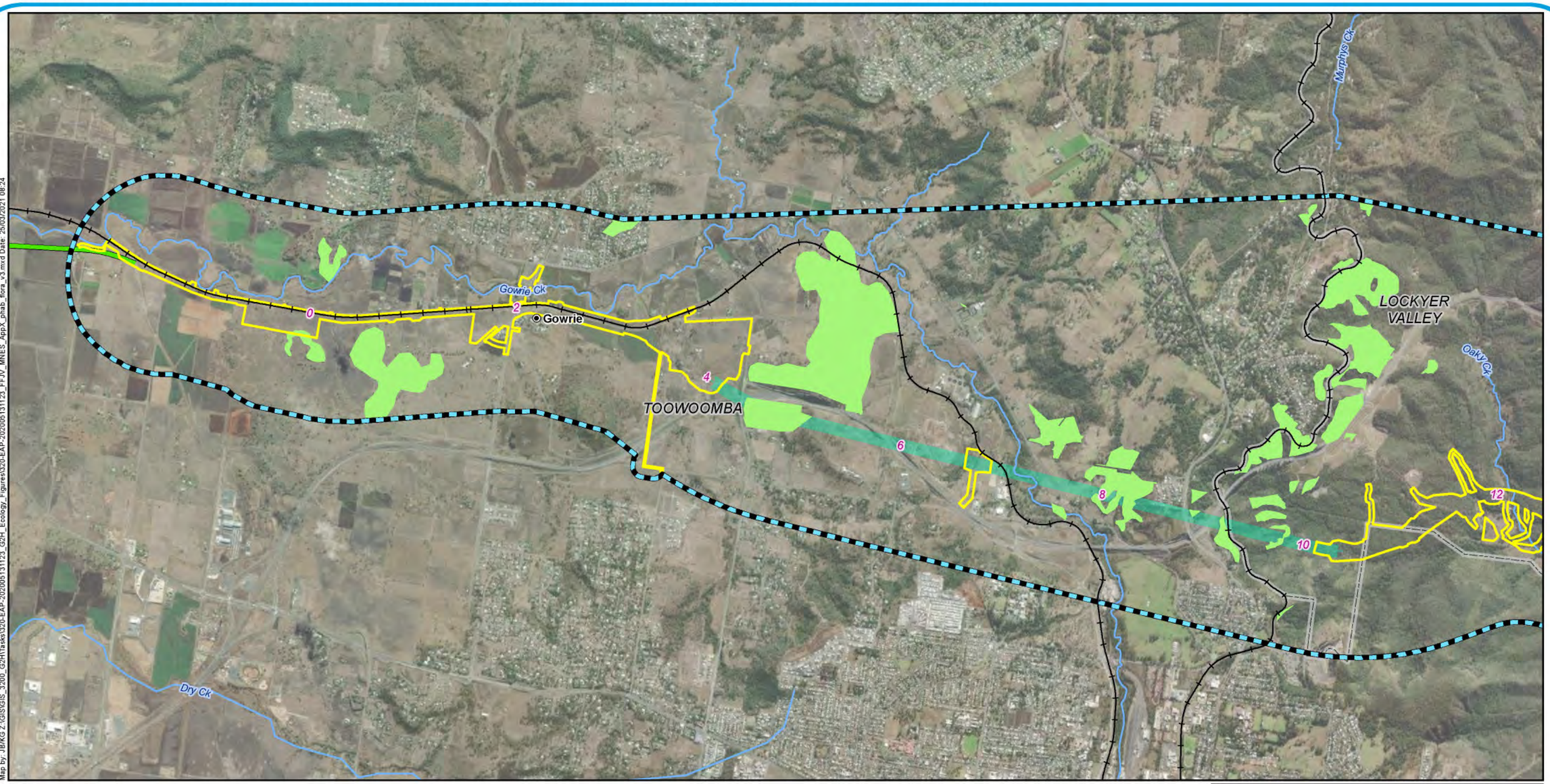

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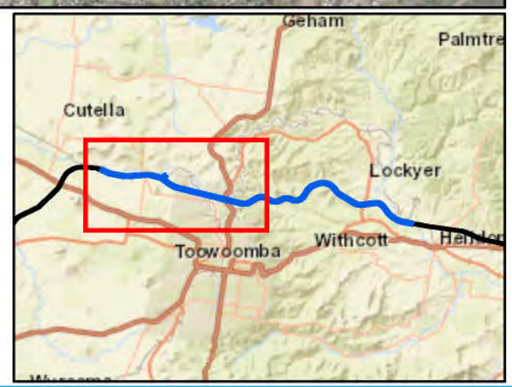
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dichanthium setosum* (Bluegrass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:28

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- 5 Chainage (km)
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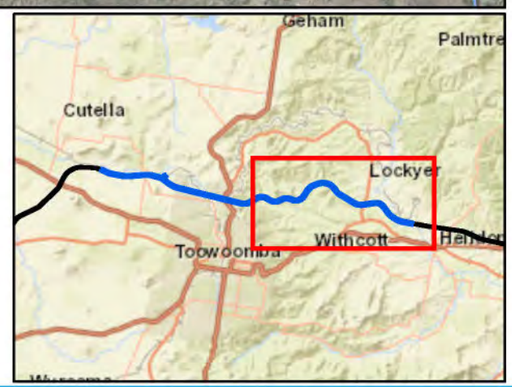
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dichanthium setosum* (Bluegrass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:28

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

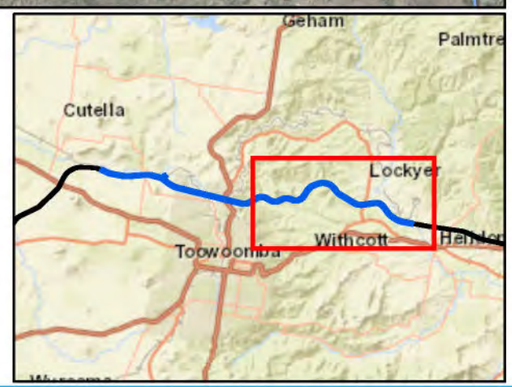
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Grevillea quadricauda* (Four-tailed grevillea)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:29

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

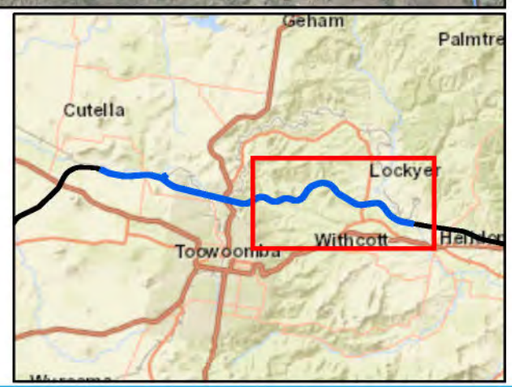
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Leionema obtusifolium* (Blunt-leaved leionema)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:29

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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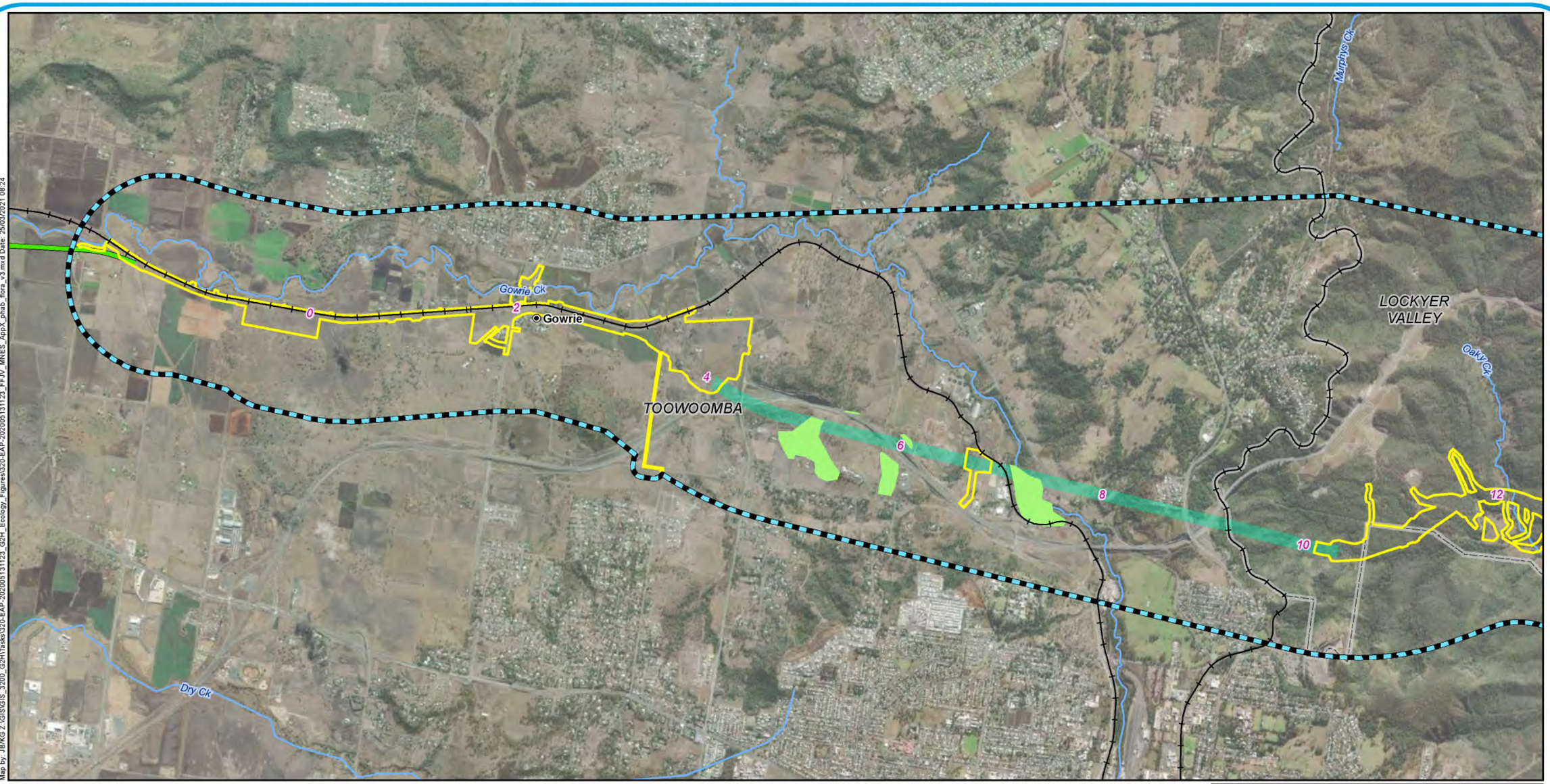

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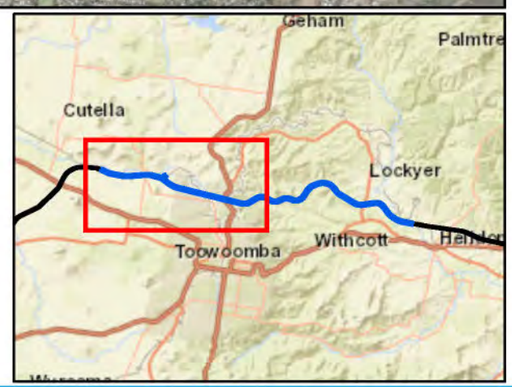
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Lepidium peregrinum* (Wandering pepper-cress)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:29

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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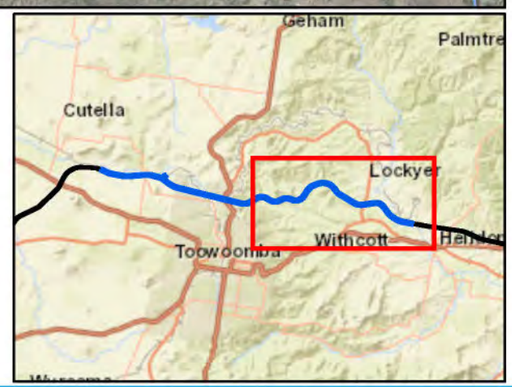
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Lepidium peregrinum* (Wandering pepper-cress)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:29

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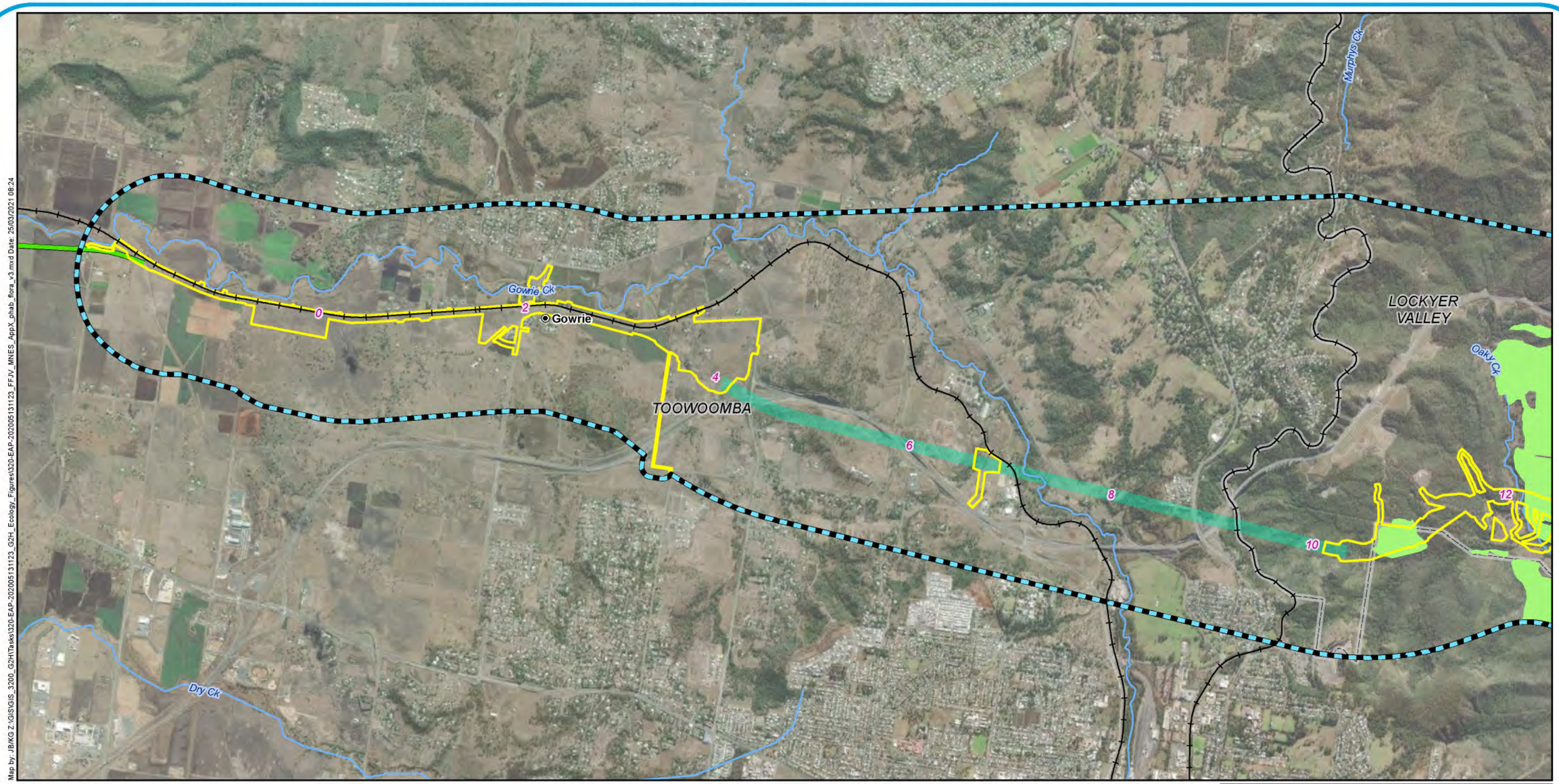

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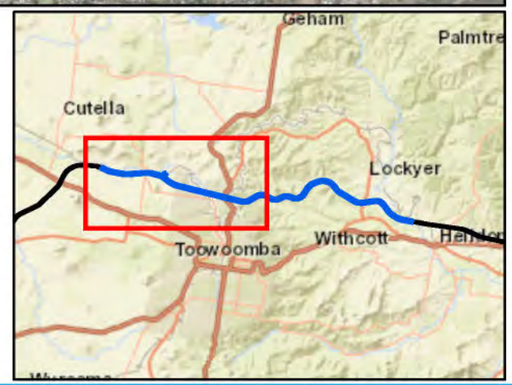
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

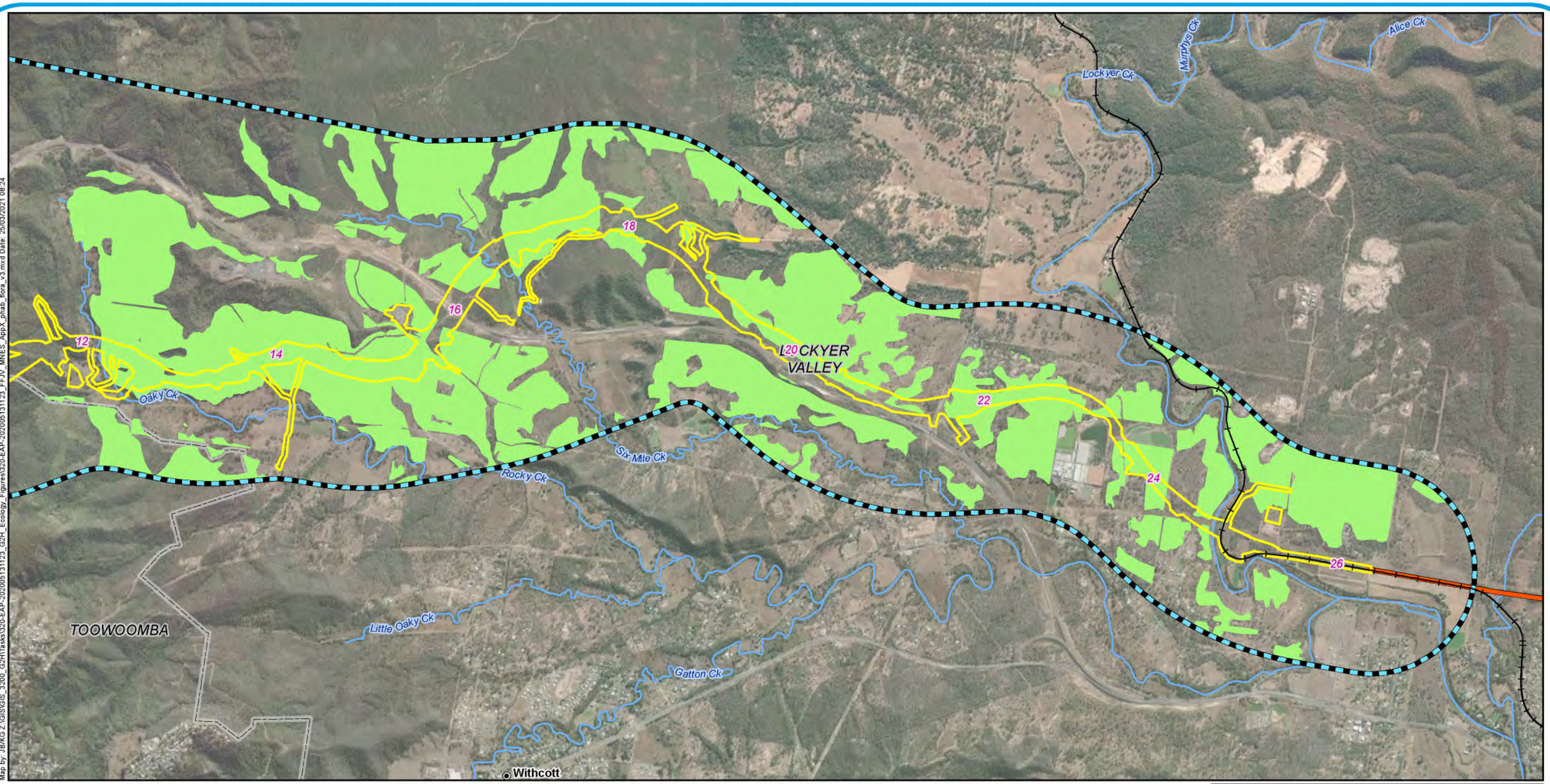
Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Paspalidium grandispiculatum* (A grass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:30

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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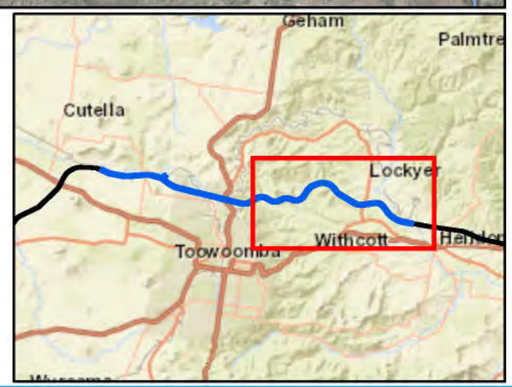
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Paspalidium grandispiculatum* (A grass)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:30

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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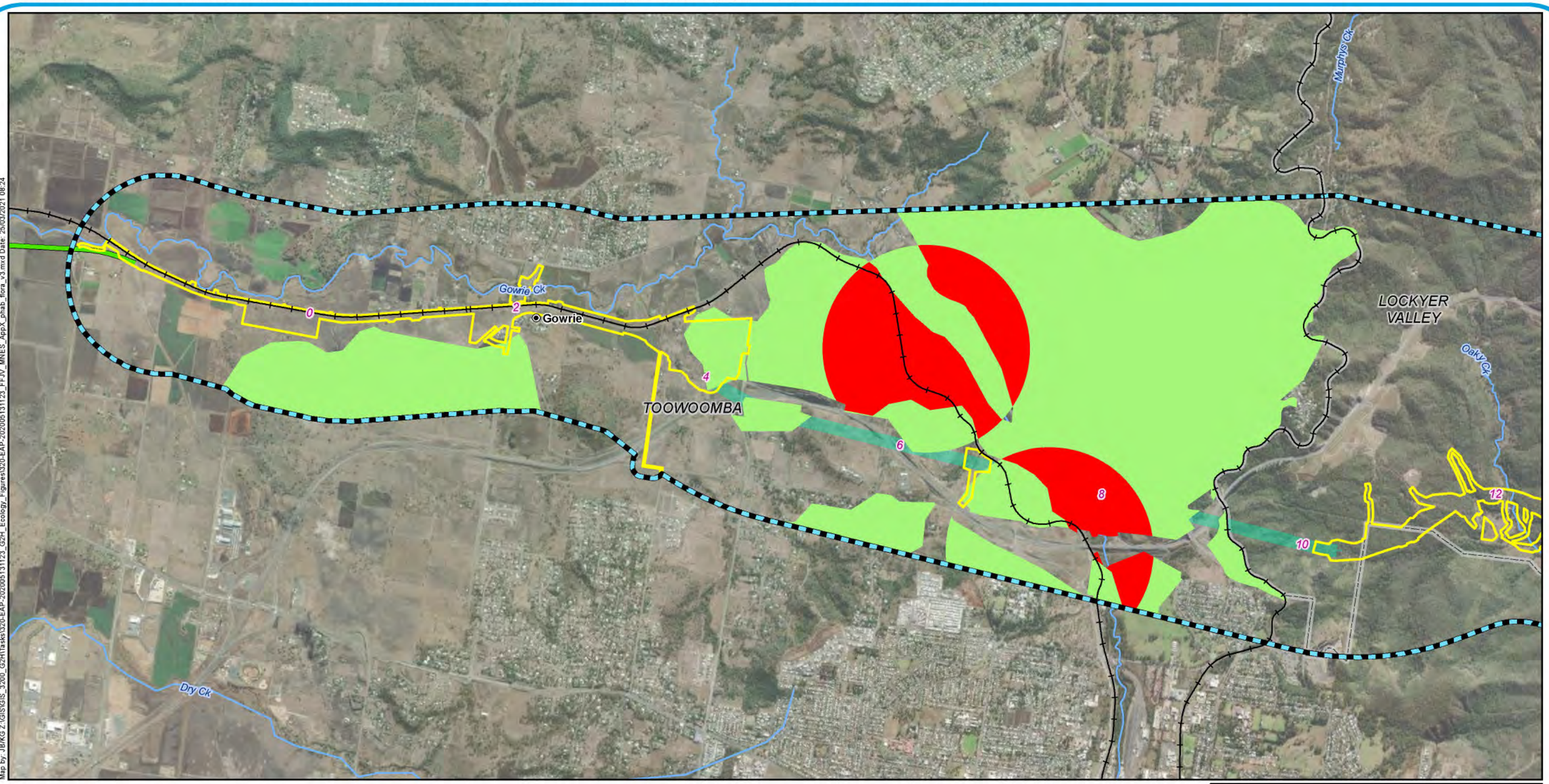

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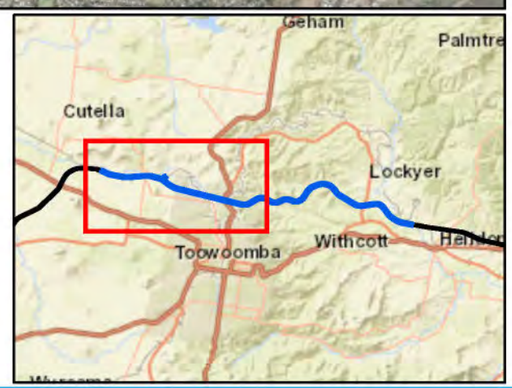
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Picris evae* (A hawkweed)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:30

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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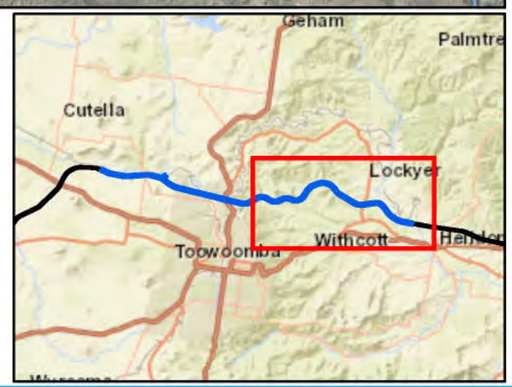
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area



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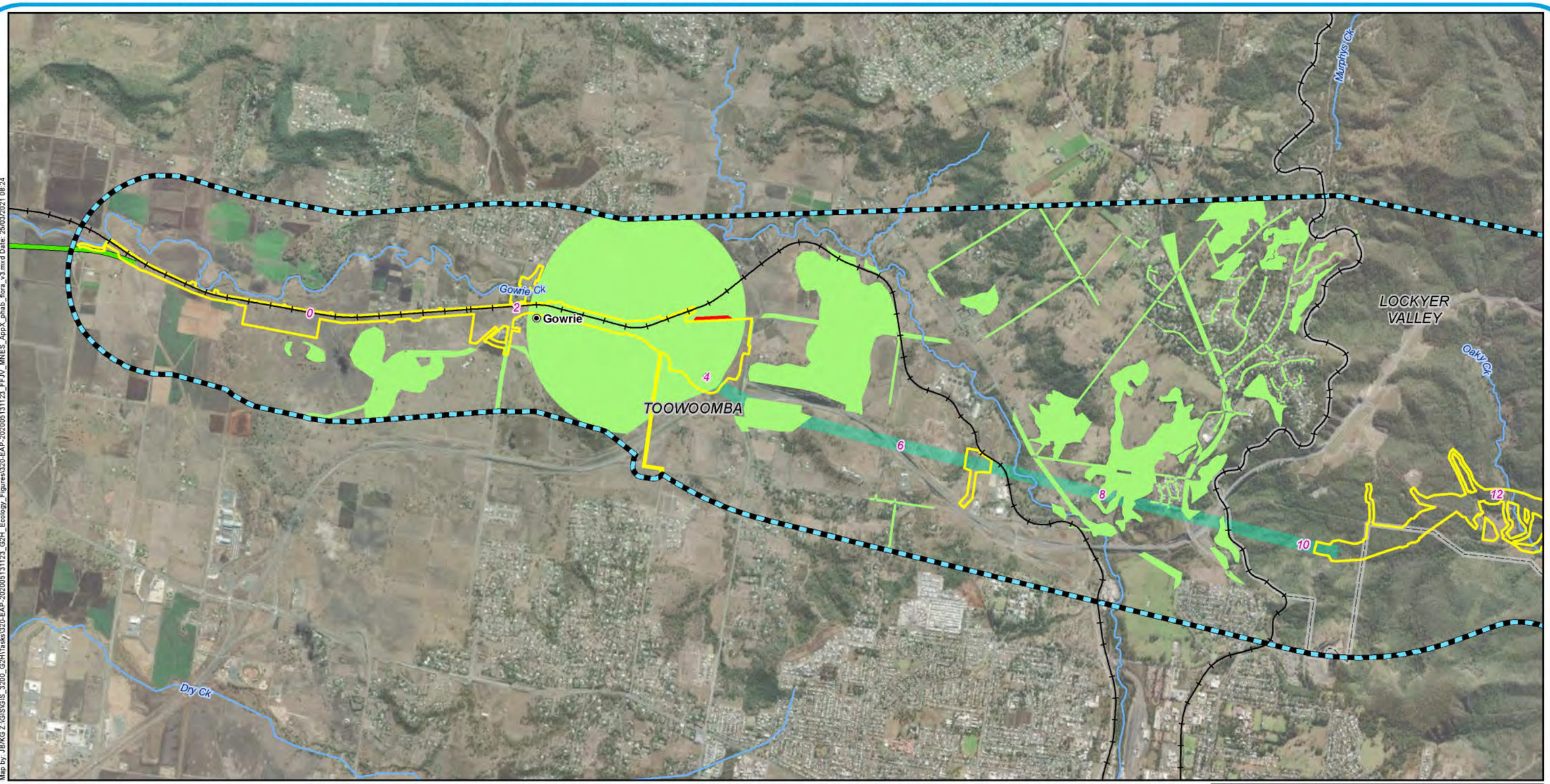
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Picris evae* (A hawkweed)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



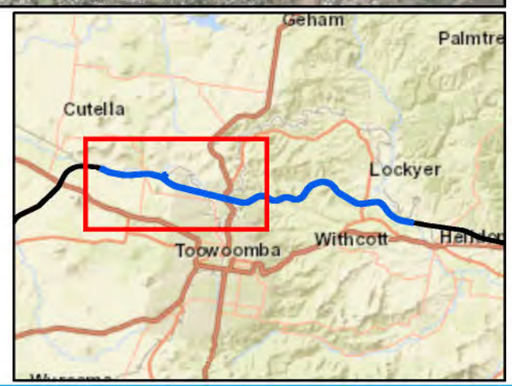
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Rhaponticum australe* (Austral cornflower)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:31

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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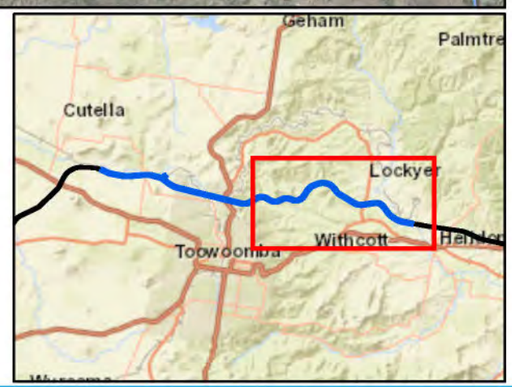
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area



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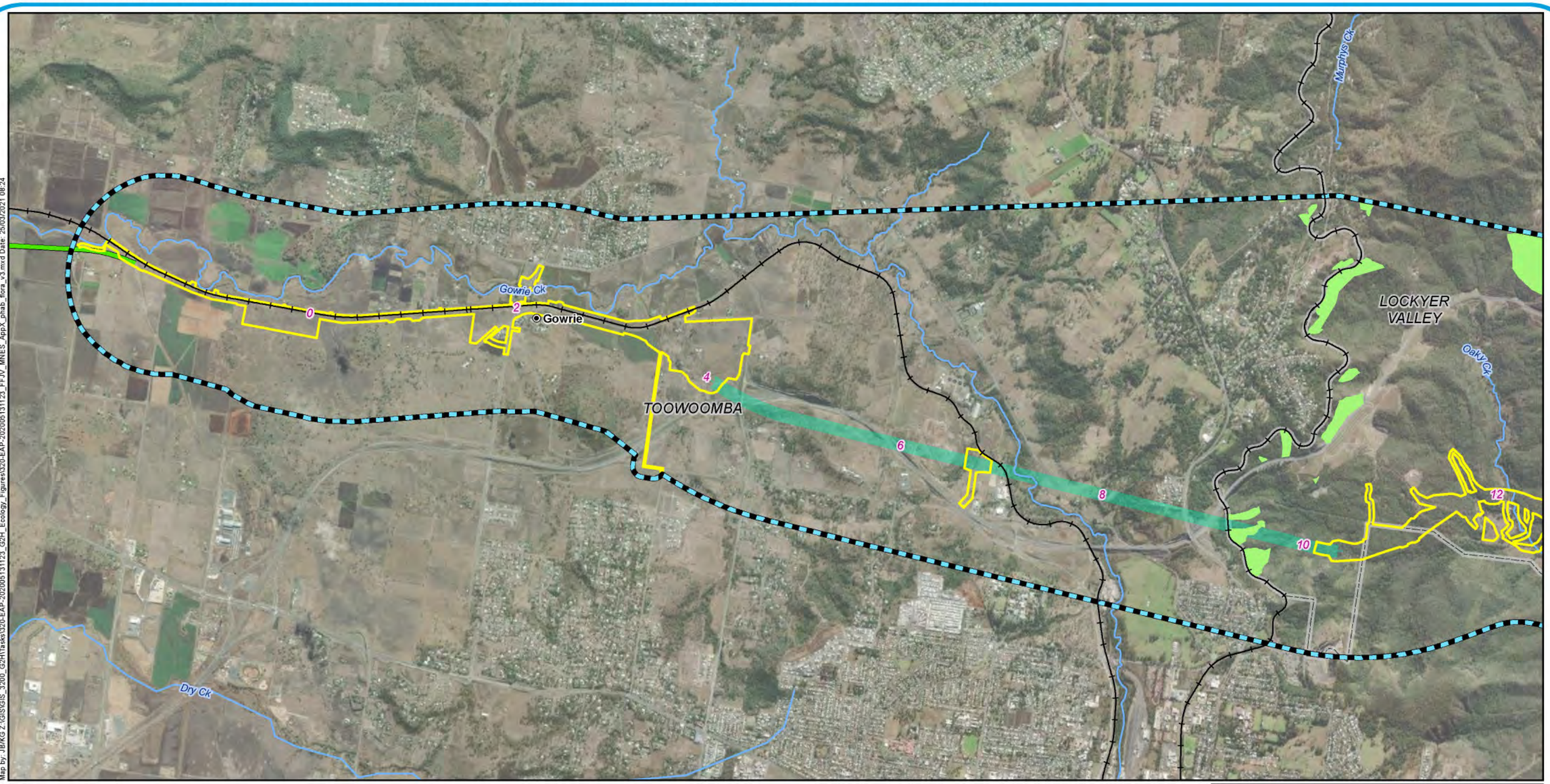
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Rhaponticum australe* (Austral cornflower)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



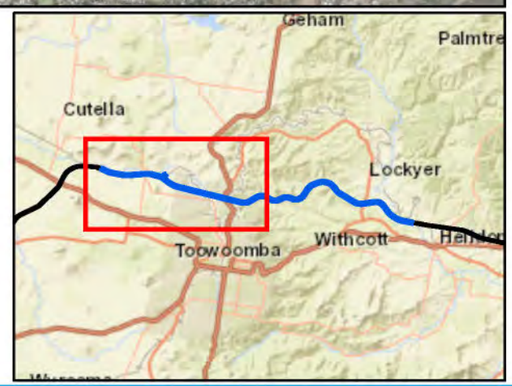
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sarcochilus hartmanii* (Waxy sarcochilus)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:31

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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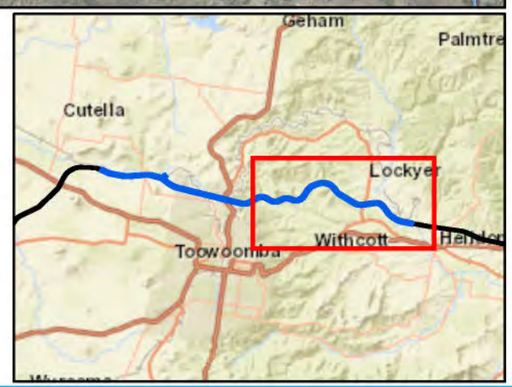
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

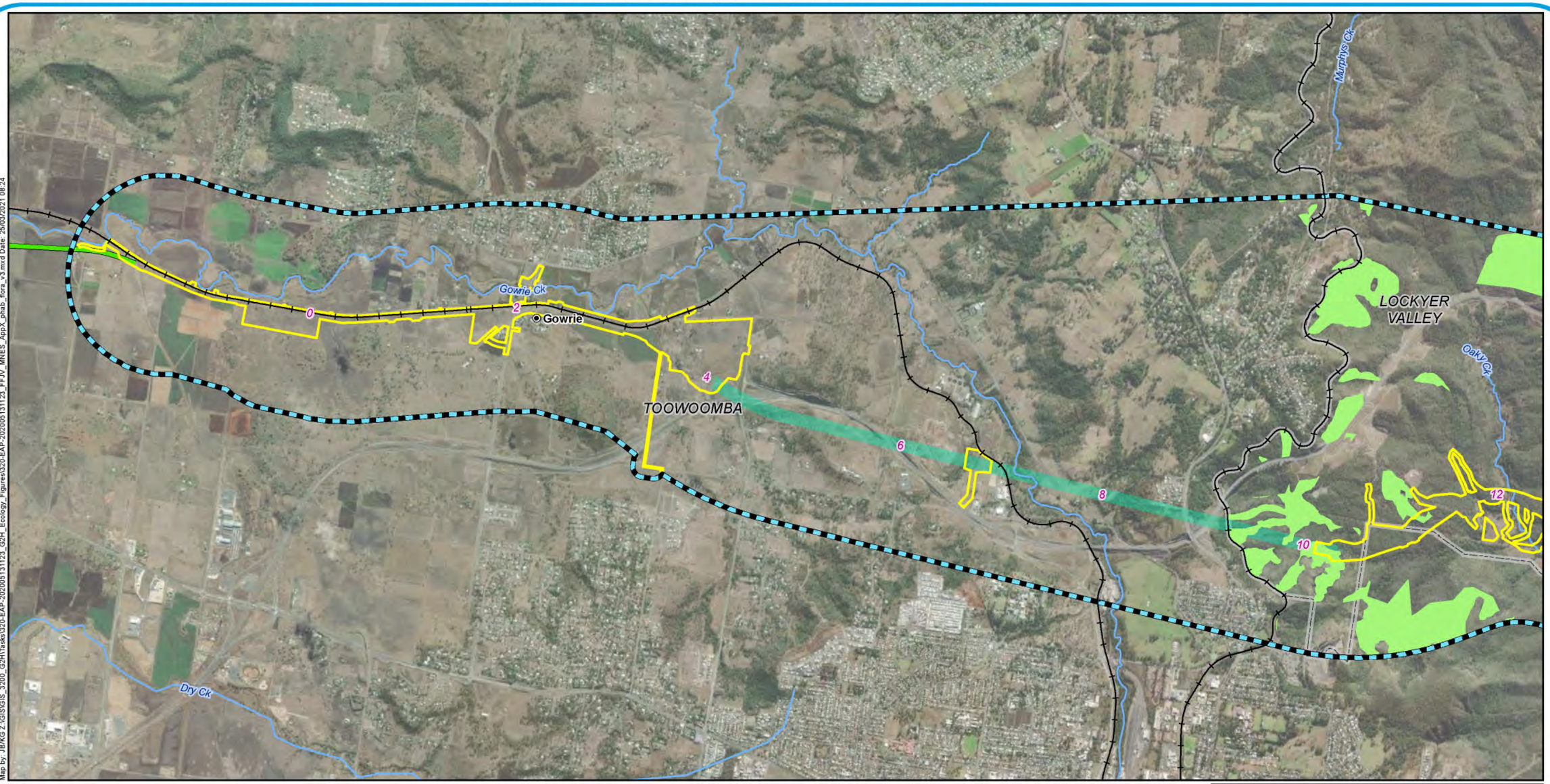
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sarcochilus hartmanii* (Waxy sarcochilus)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



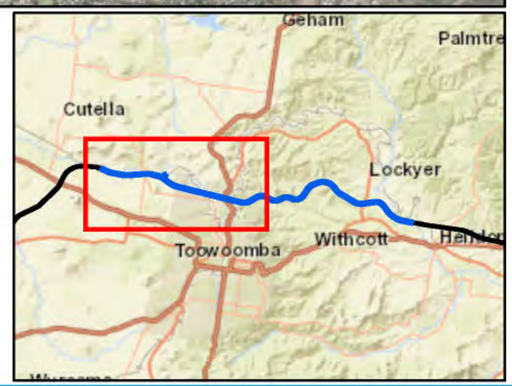
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sarcochilus weinthalii* (Blotched sarcochilus)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:32

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

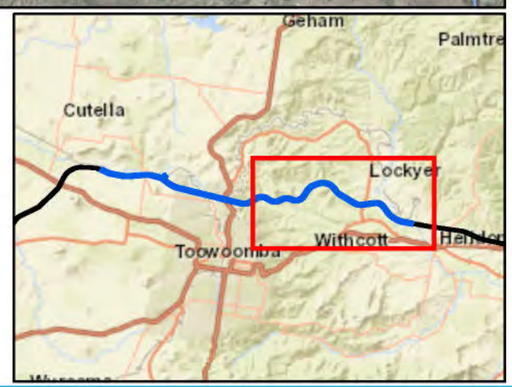
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sarcochilus weinthalii* (Blotched sarcochilus)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:32

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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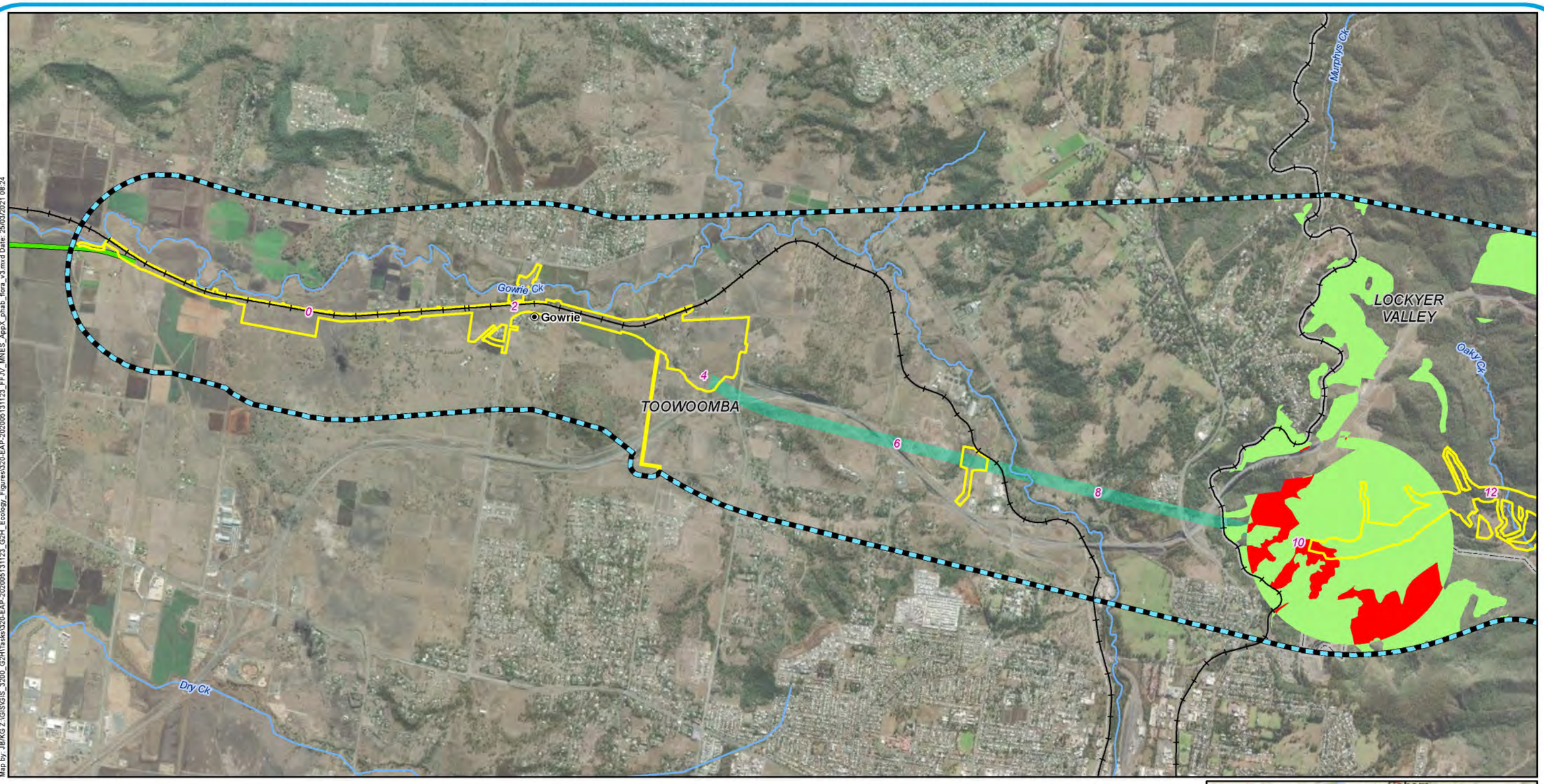

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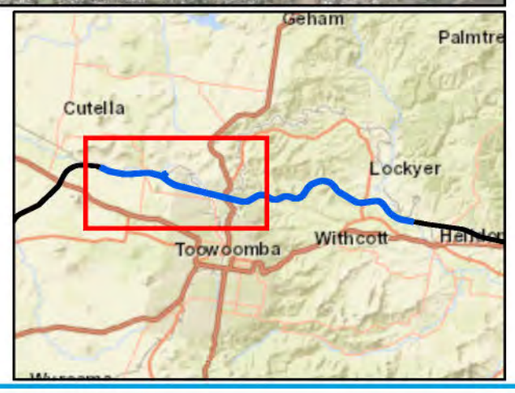
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sophora fraseri* (Brush sophora)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:32

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

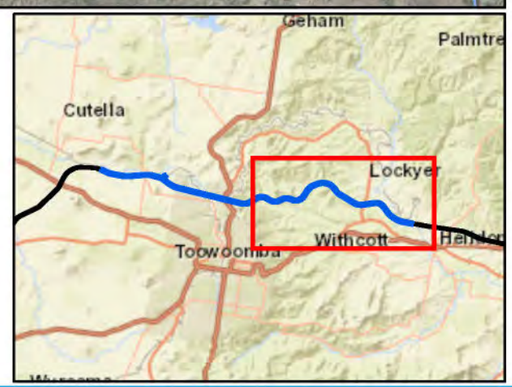
Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:24

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

Future Freight
Integrating Community, Environment and Engineering

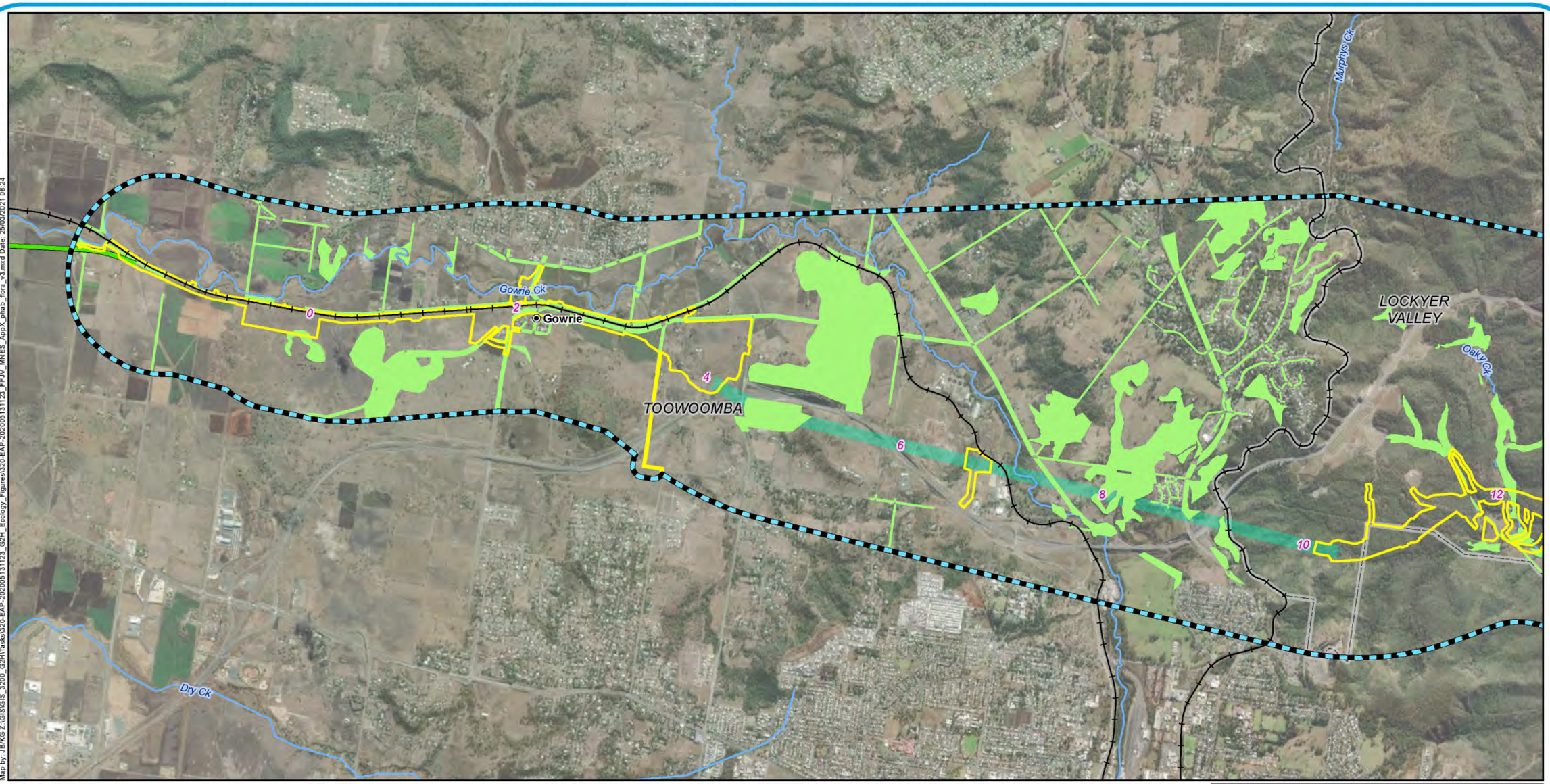
Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Sophora fraseri* (Brush sophora)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:33

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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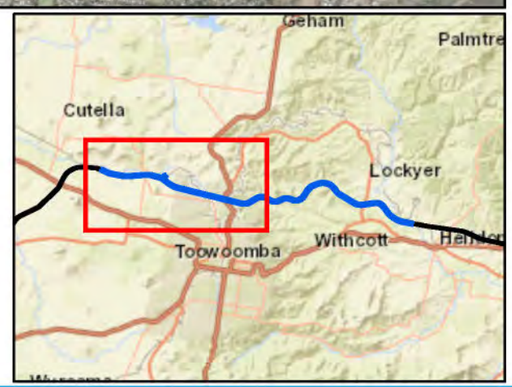
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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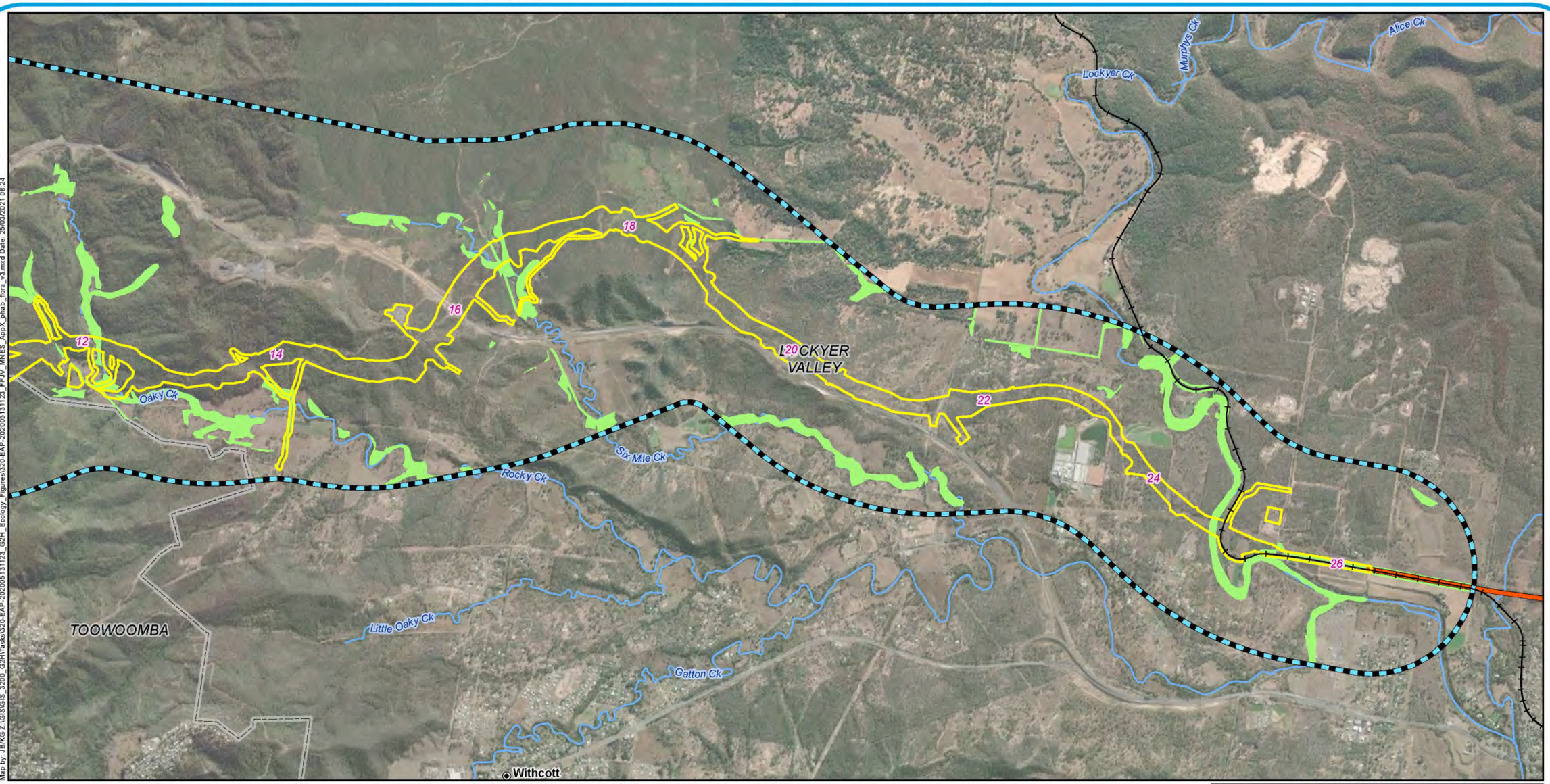
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Thesium australe* (Austral toadflax)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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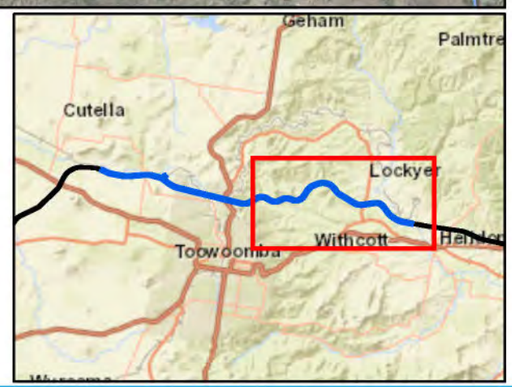
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5 km

Future Freight
Integrating Community, Environment and Engineering

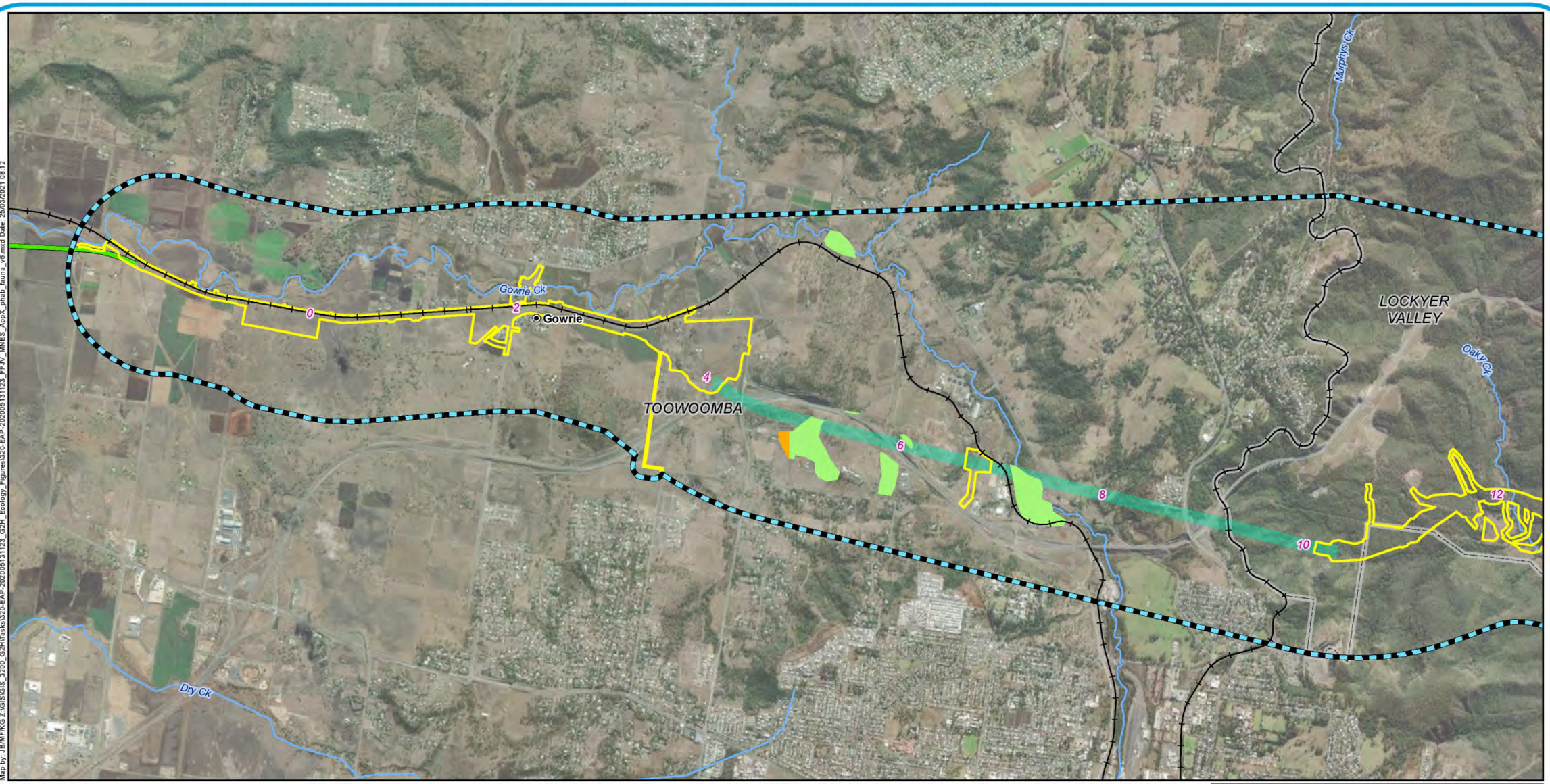
Issue date: 20/01/2021 Version: 3
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Thesium australe* (Austral toadflax)

Map by: JB/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_flora_v3.mxd Date: 25/03/2021 08:33

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



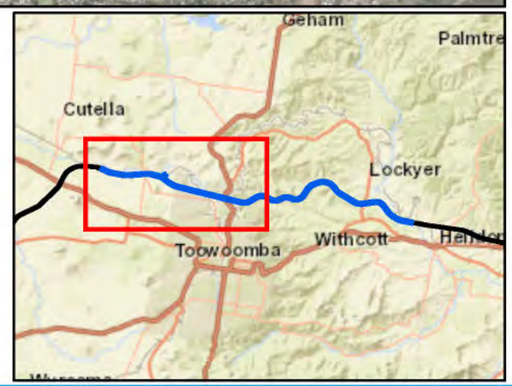
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Important habitat
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

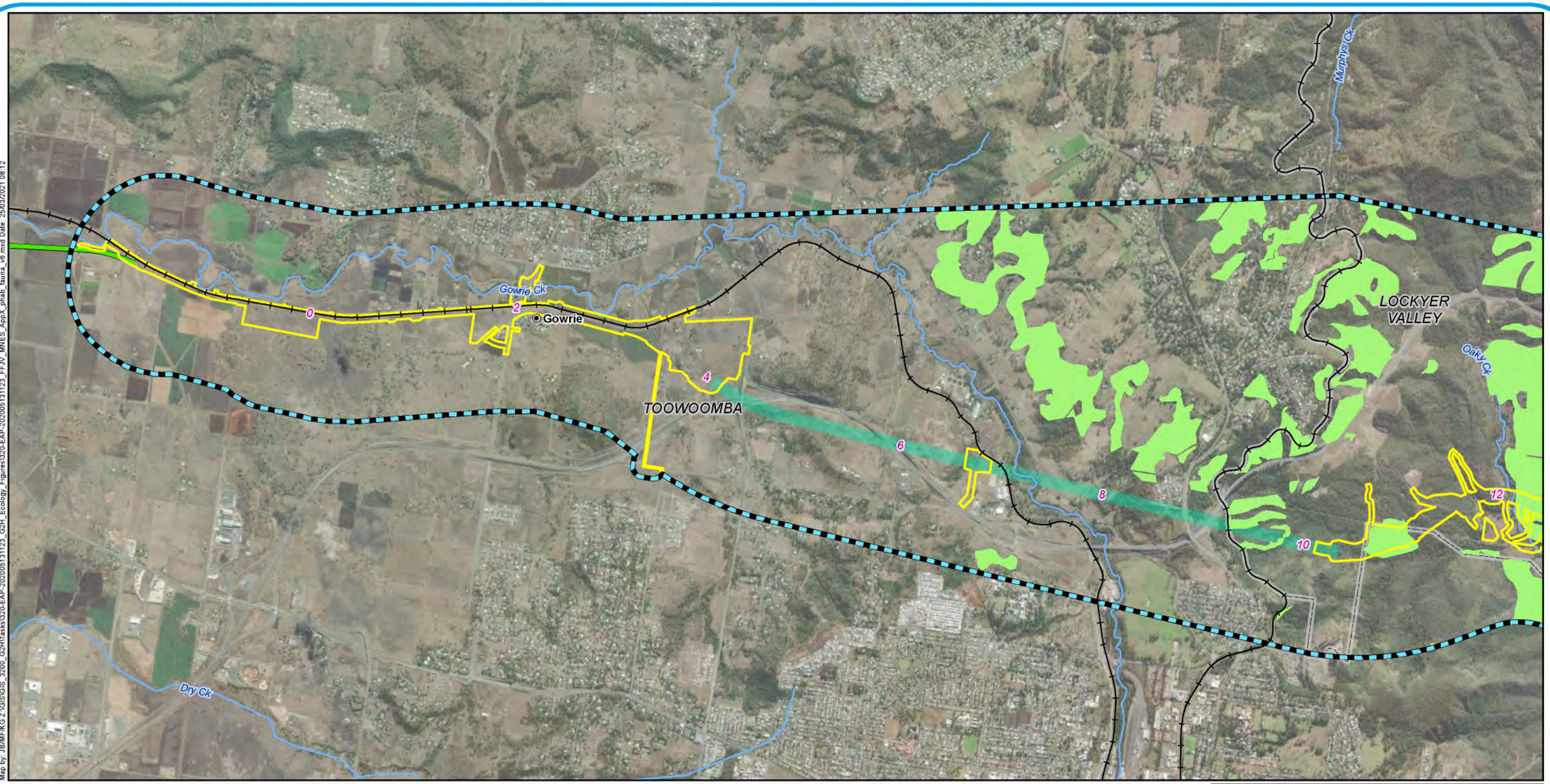
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Anomalopus mackayi* (Five-clawed worm-skink)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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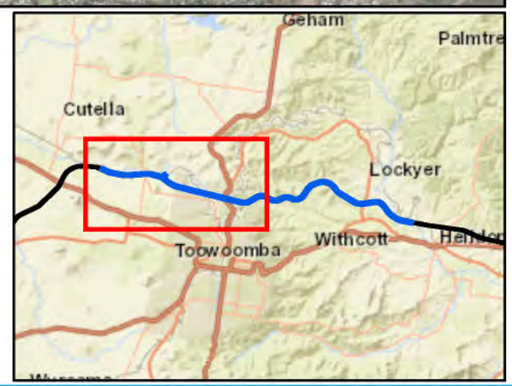
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Anthochaera phrygia* (Regent honeyeater)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:13

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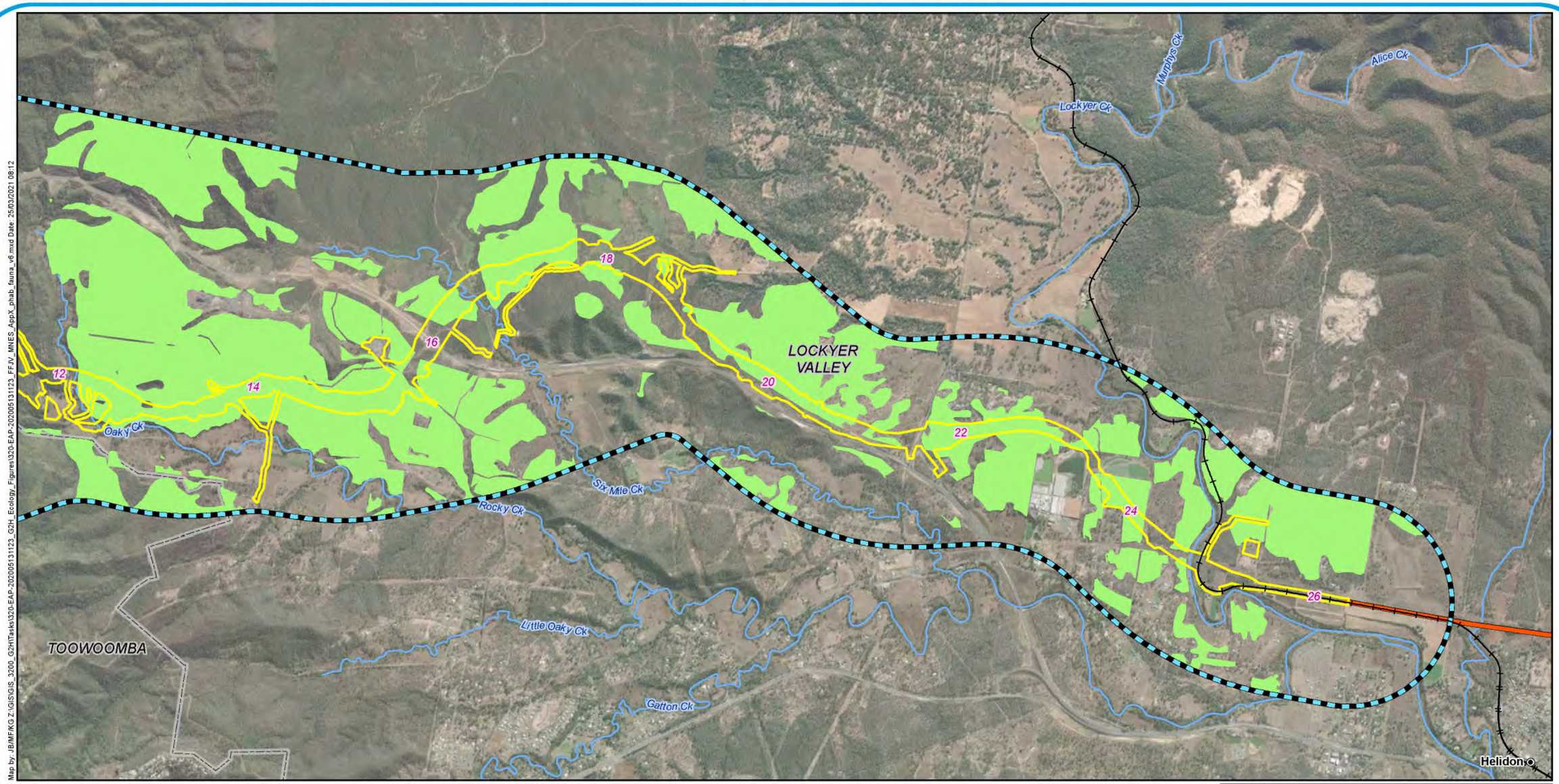
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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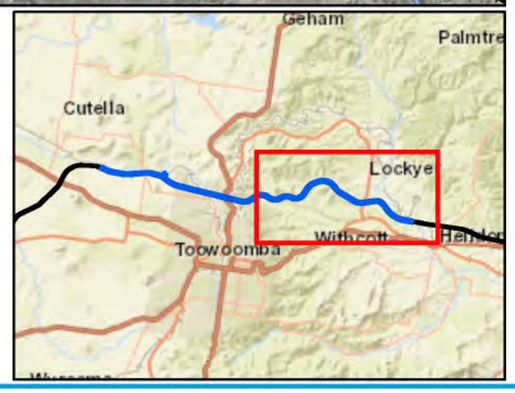
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

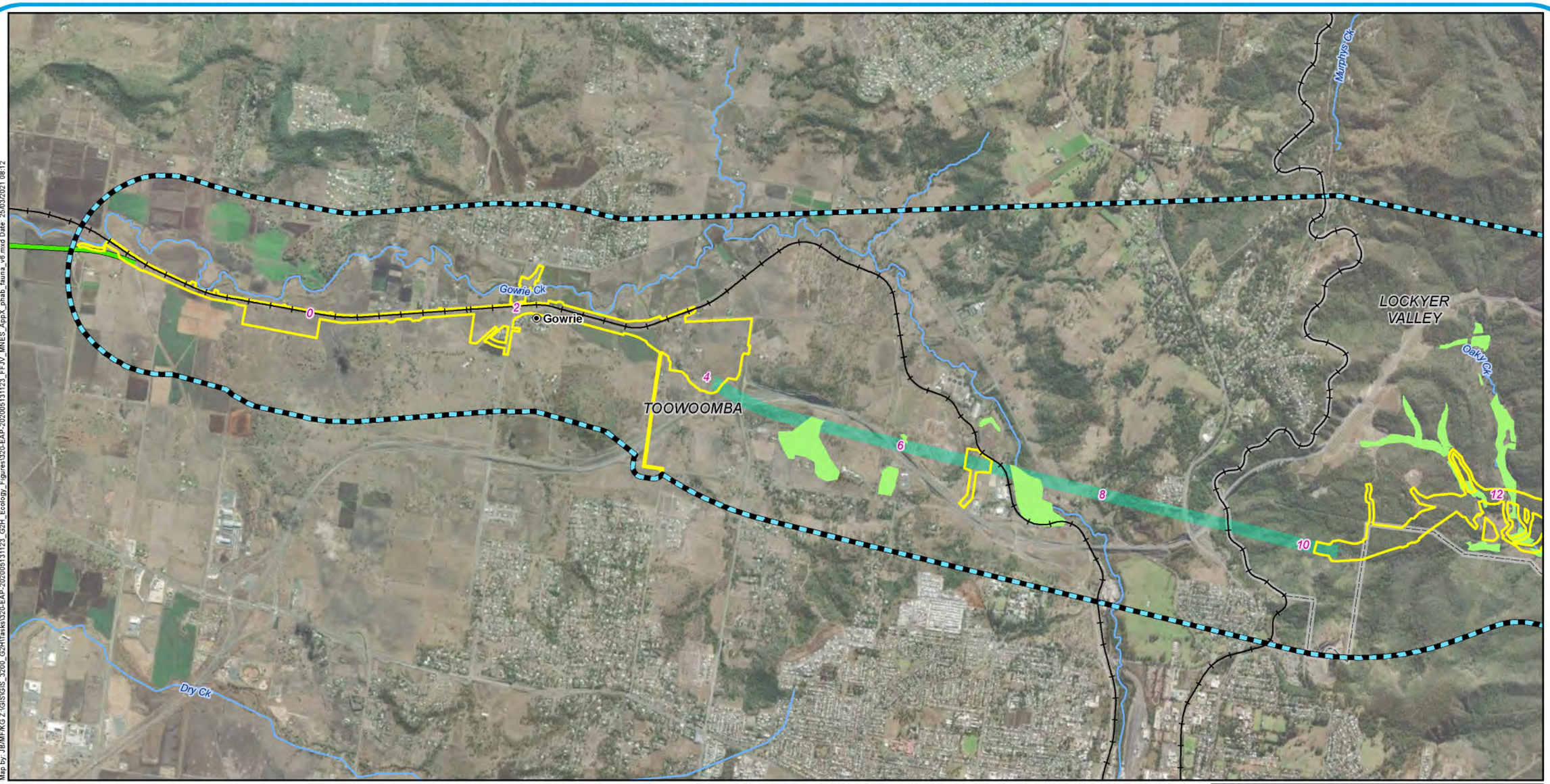
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Anthochaera phrygia* (Regent honeyeater)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:13

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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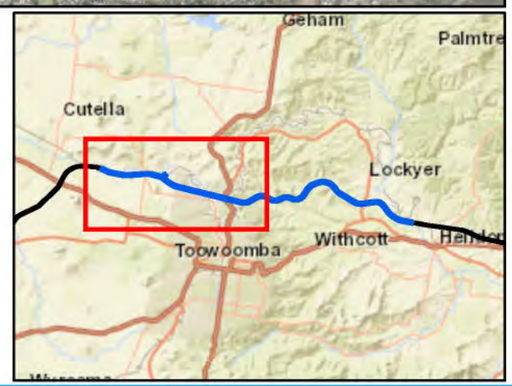
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

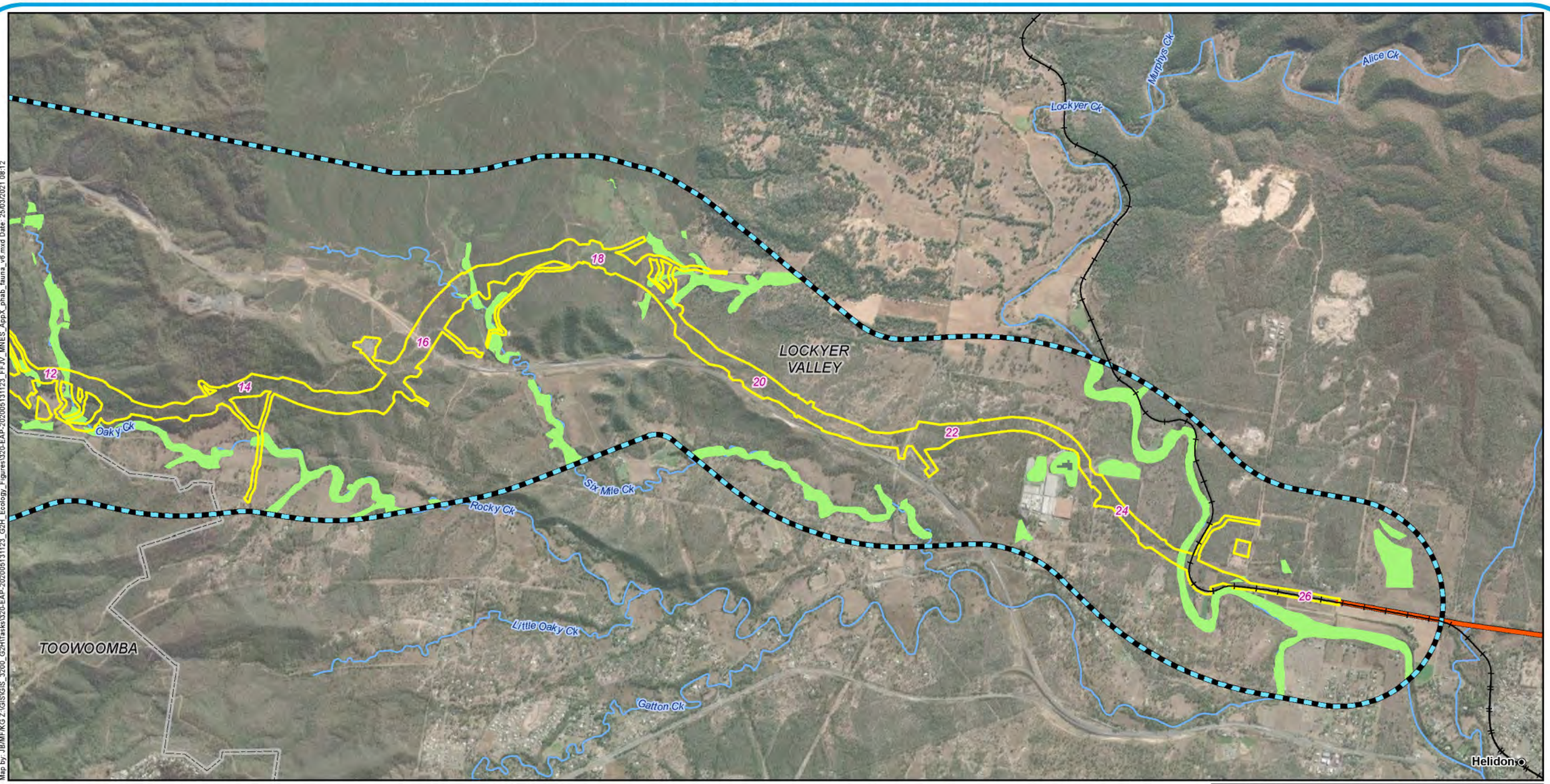
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Botaurus poiciloptilus* (Australasian bittern)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:14

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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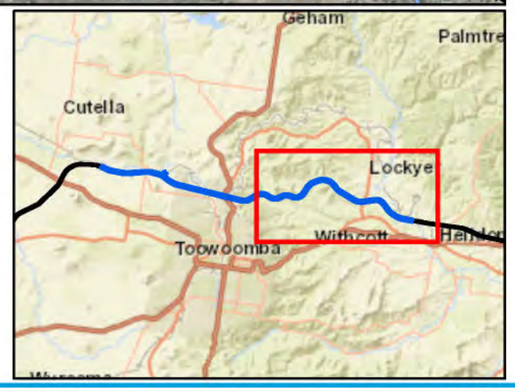
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

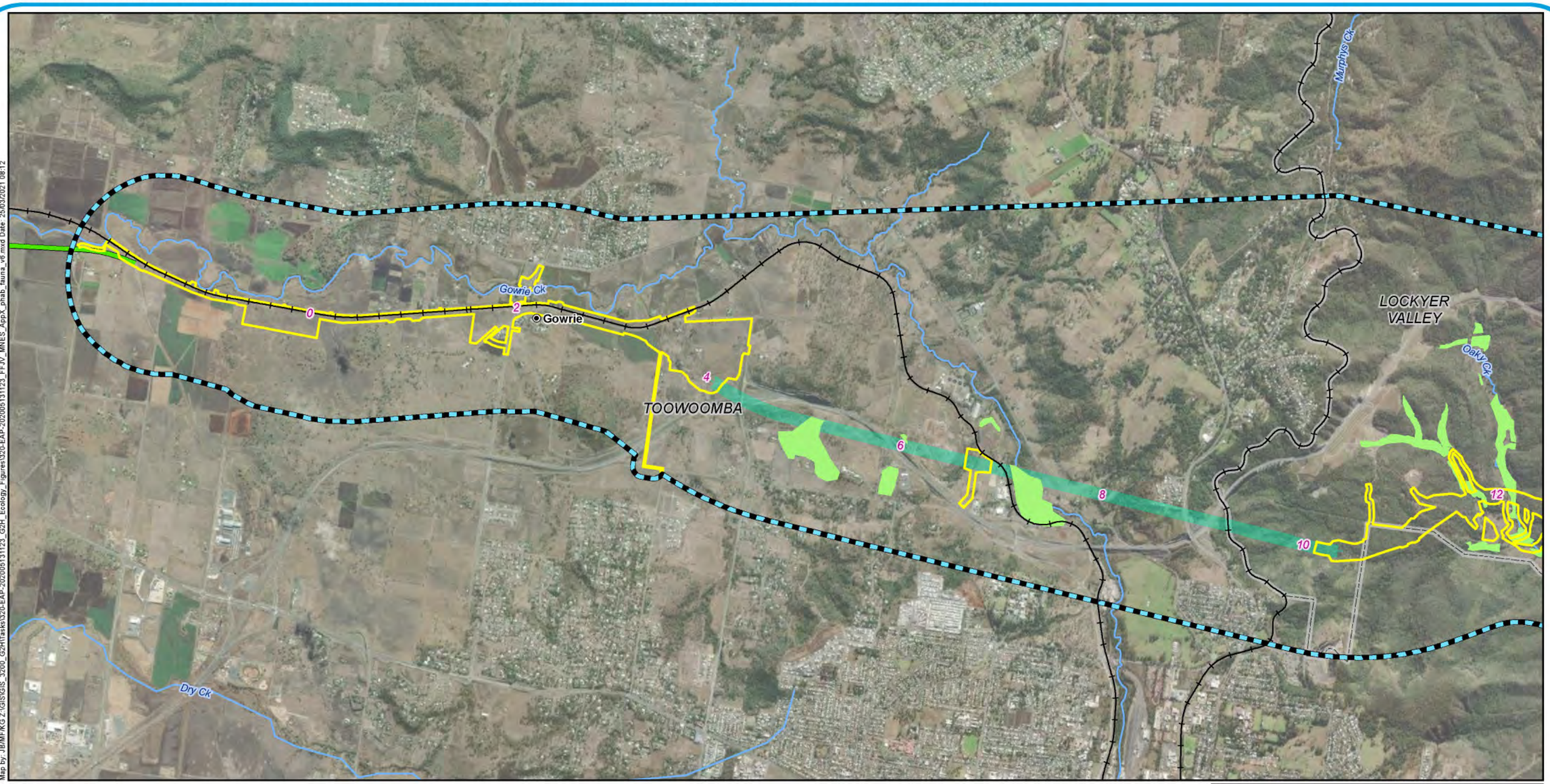
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Botaurus poiciloptilus* (Australasian bittern)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



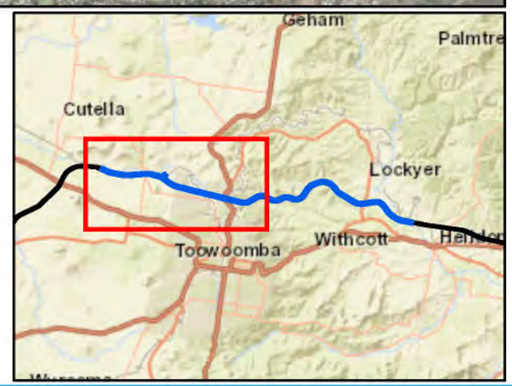
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

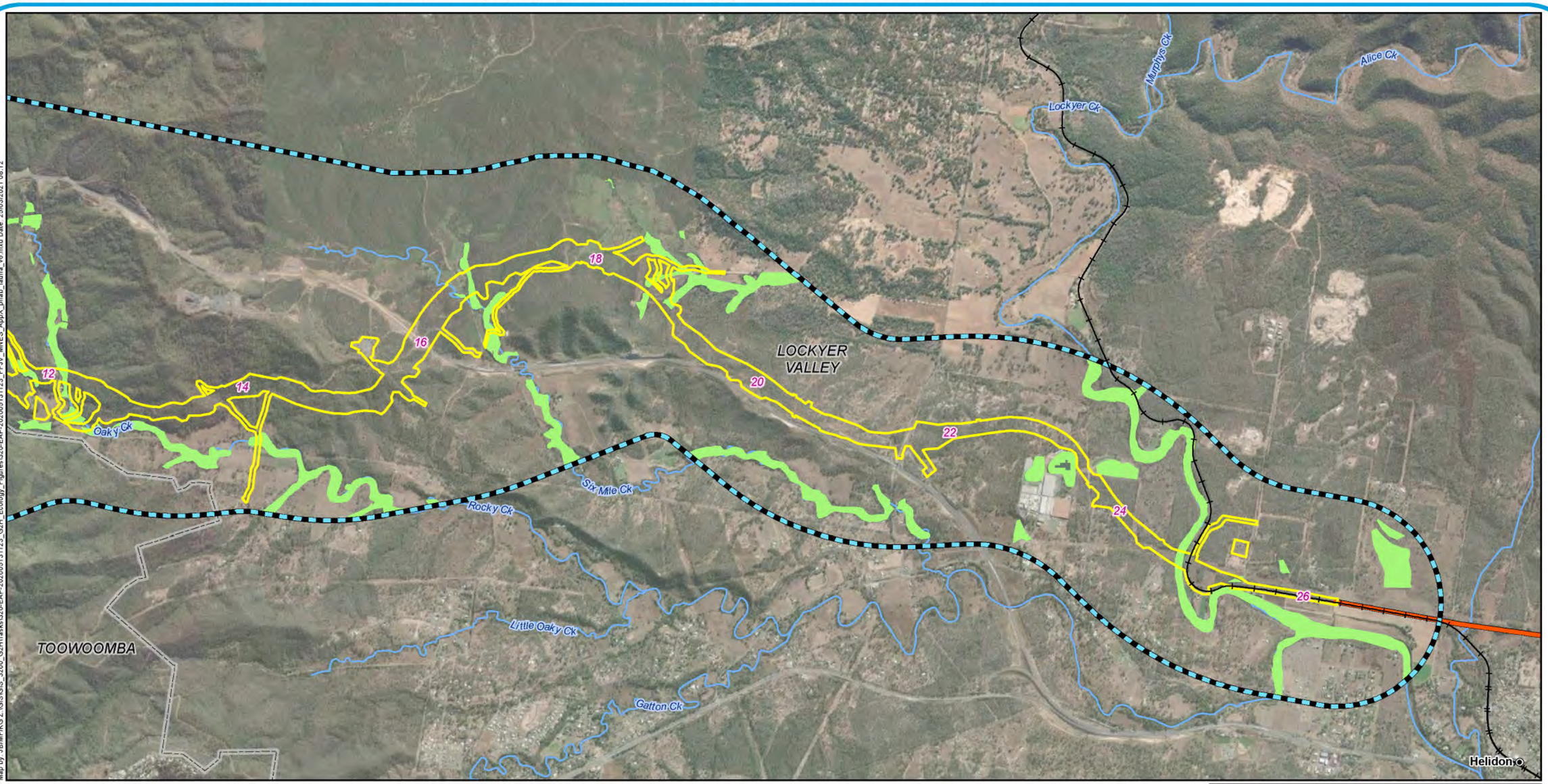
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Calidris ferruginea* (Curlew sandpiper)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



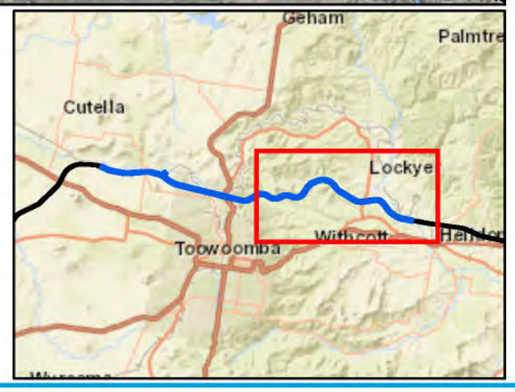
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

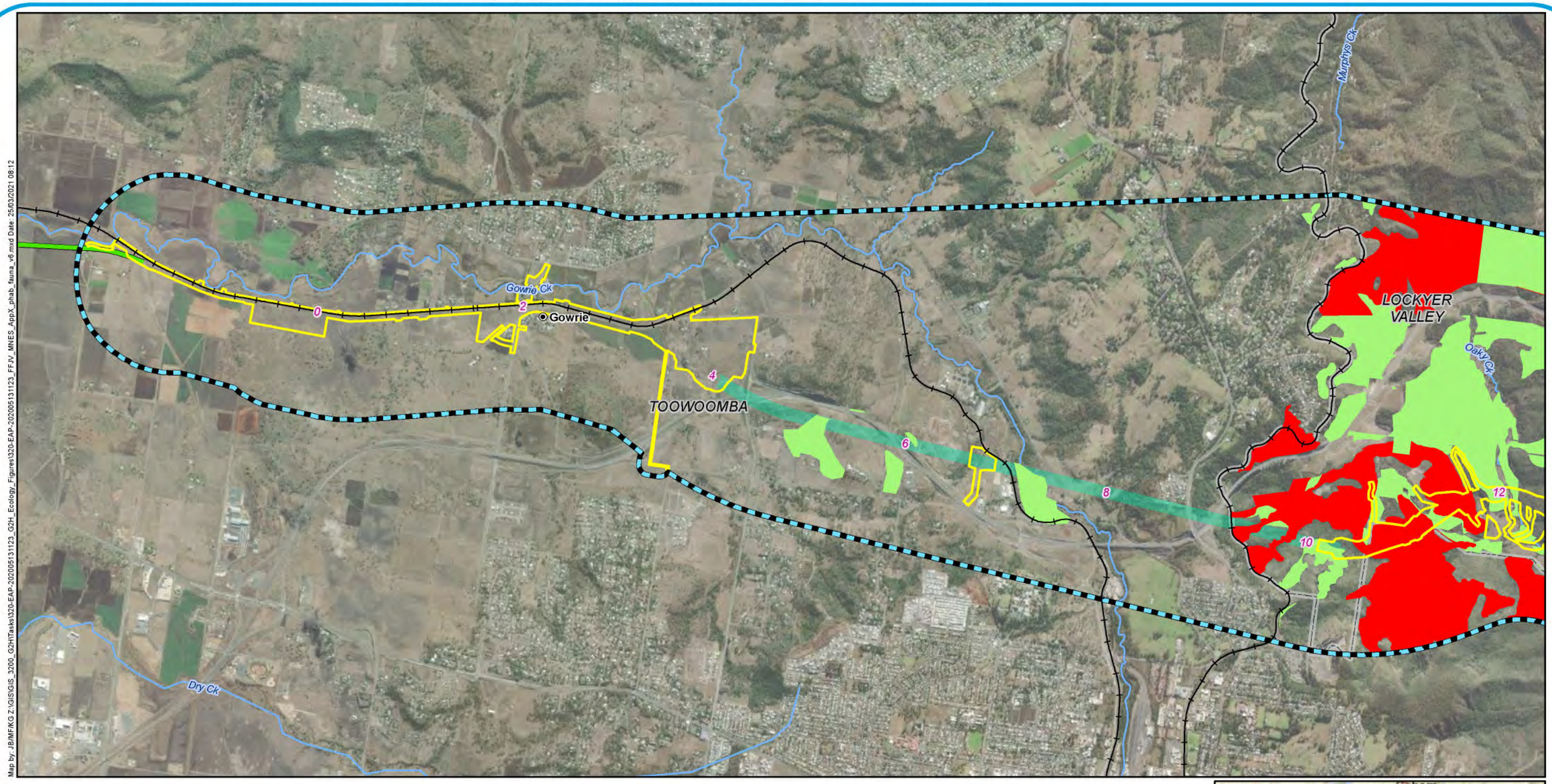
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Calidris ferruginea* (Curlew sandpiper)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:14

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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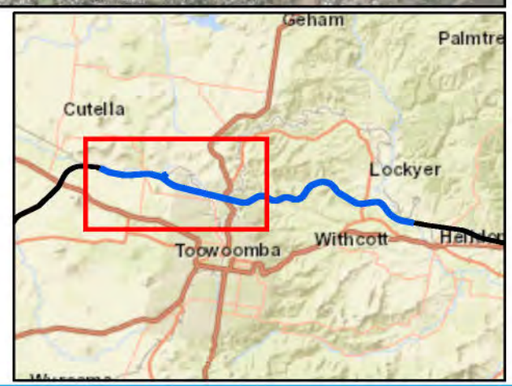
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

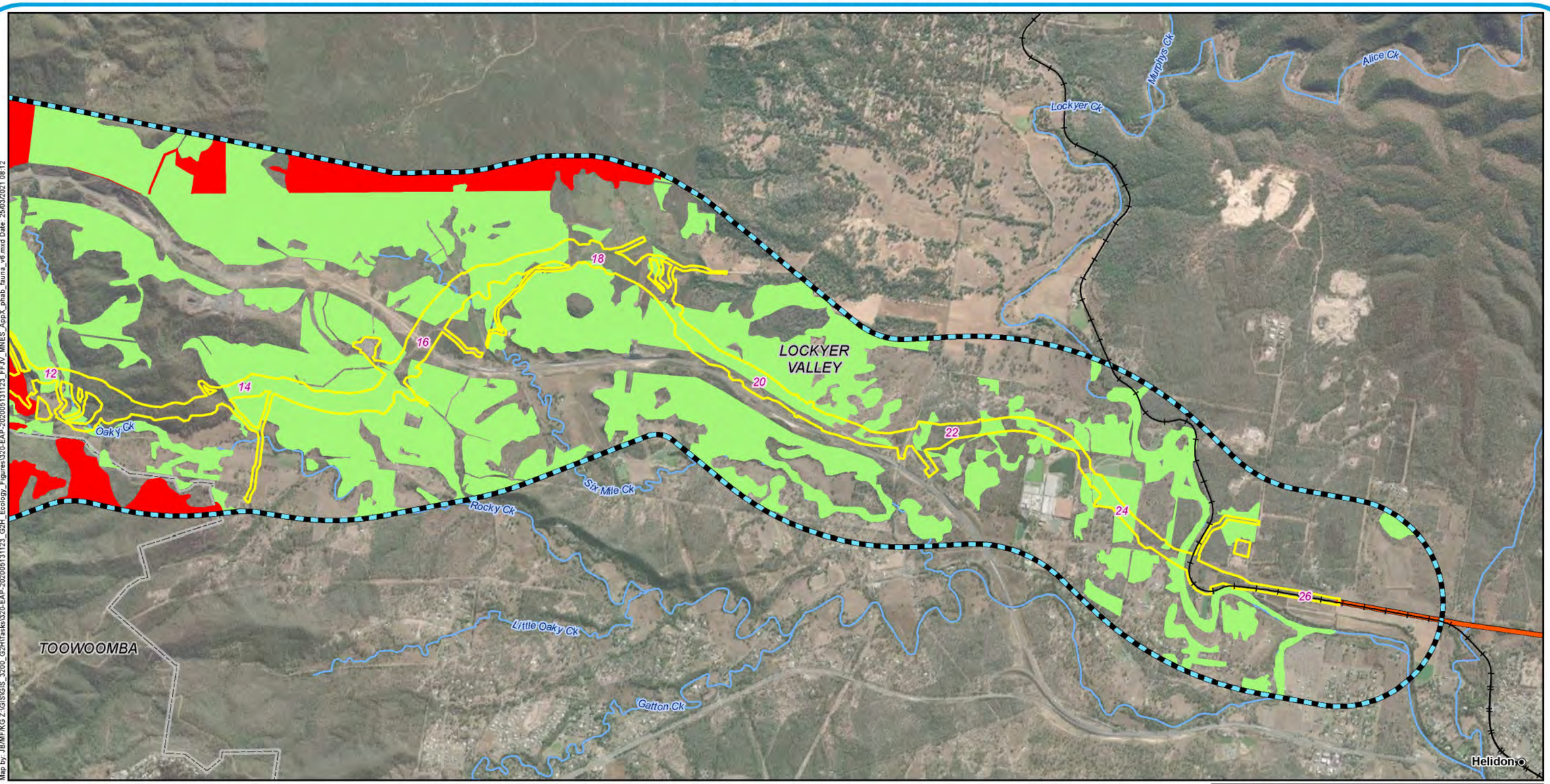
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dasyurus maculatus maculatus* (Spotted-tailed quoll)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:14

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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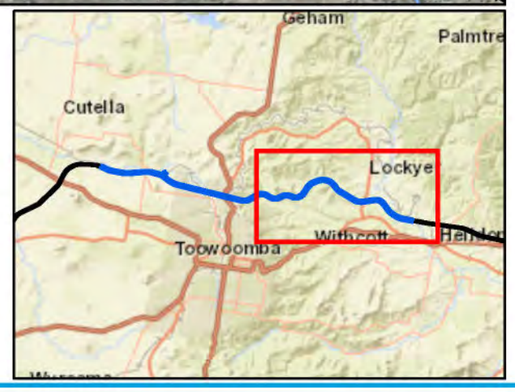
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Dasyurus maculatus maculatus* (Spotted-tailed quoll)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:15

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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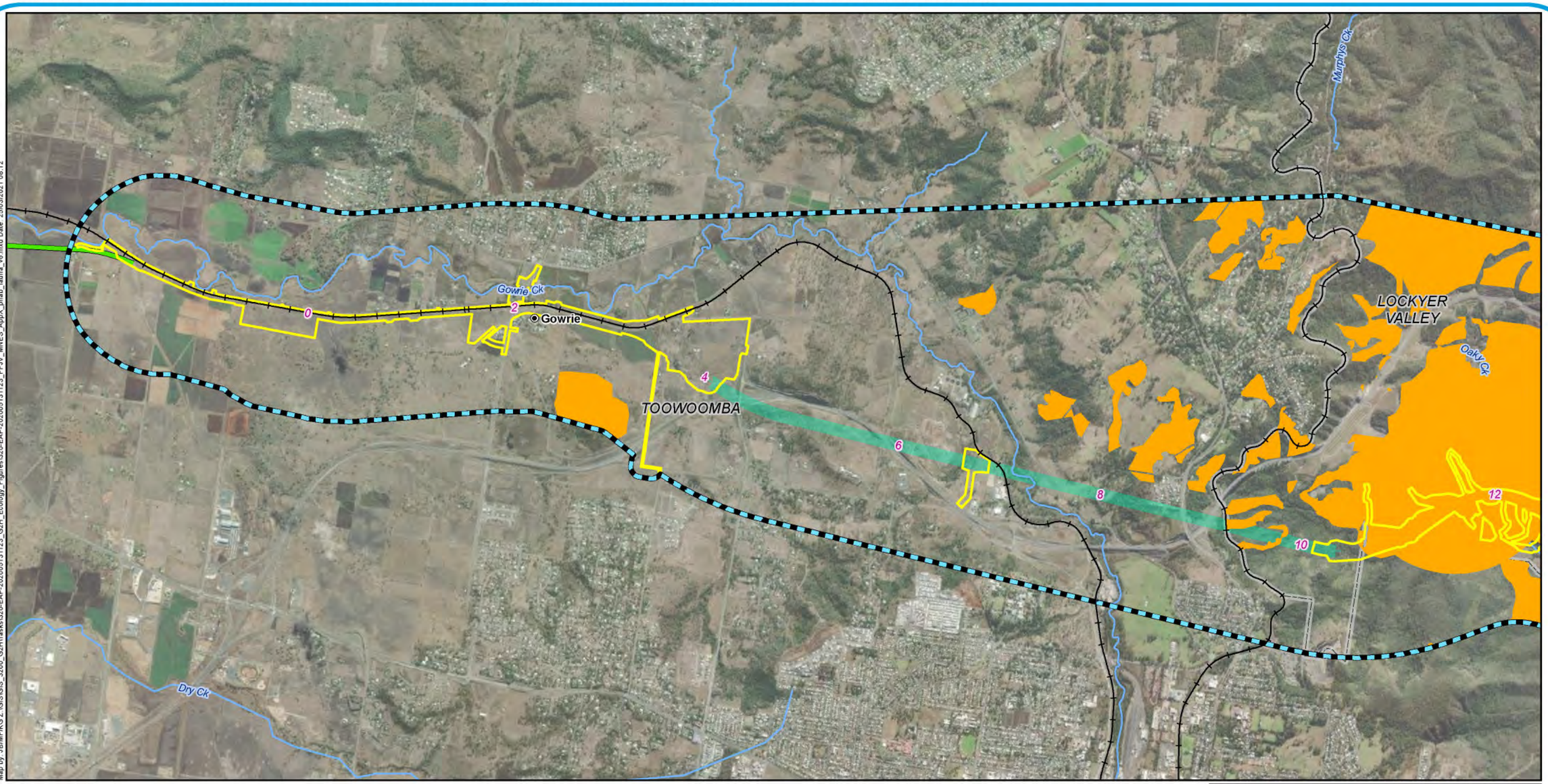

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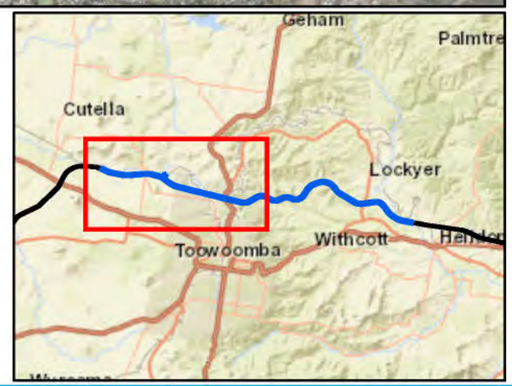
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Important habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

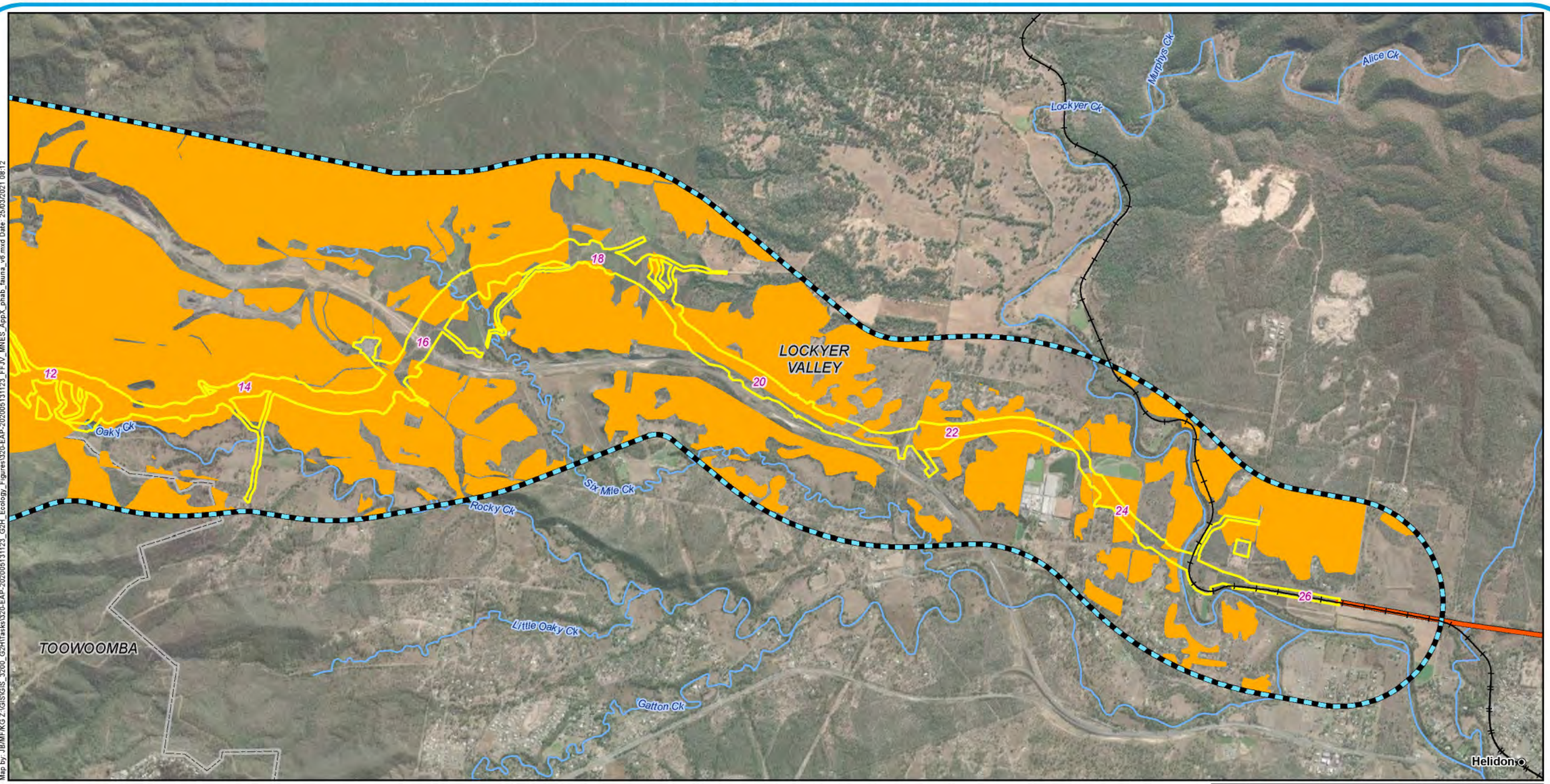
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Delma torquata* (Collared delma)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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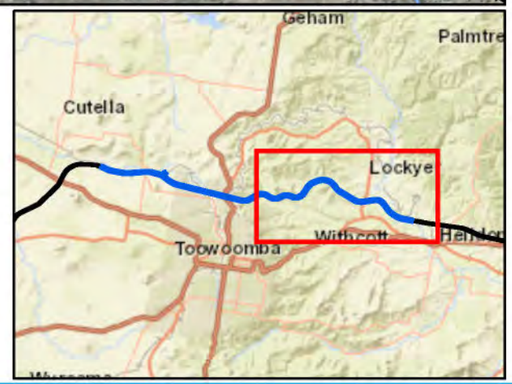
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Important habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Delma torquata* (Collared delma)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:15

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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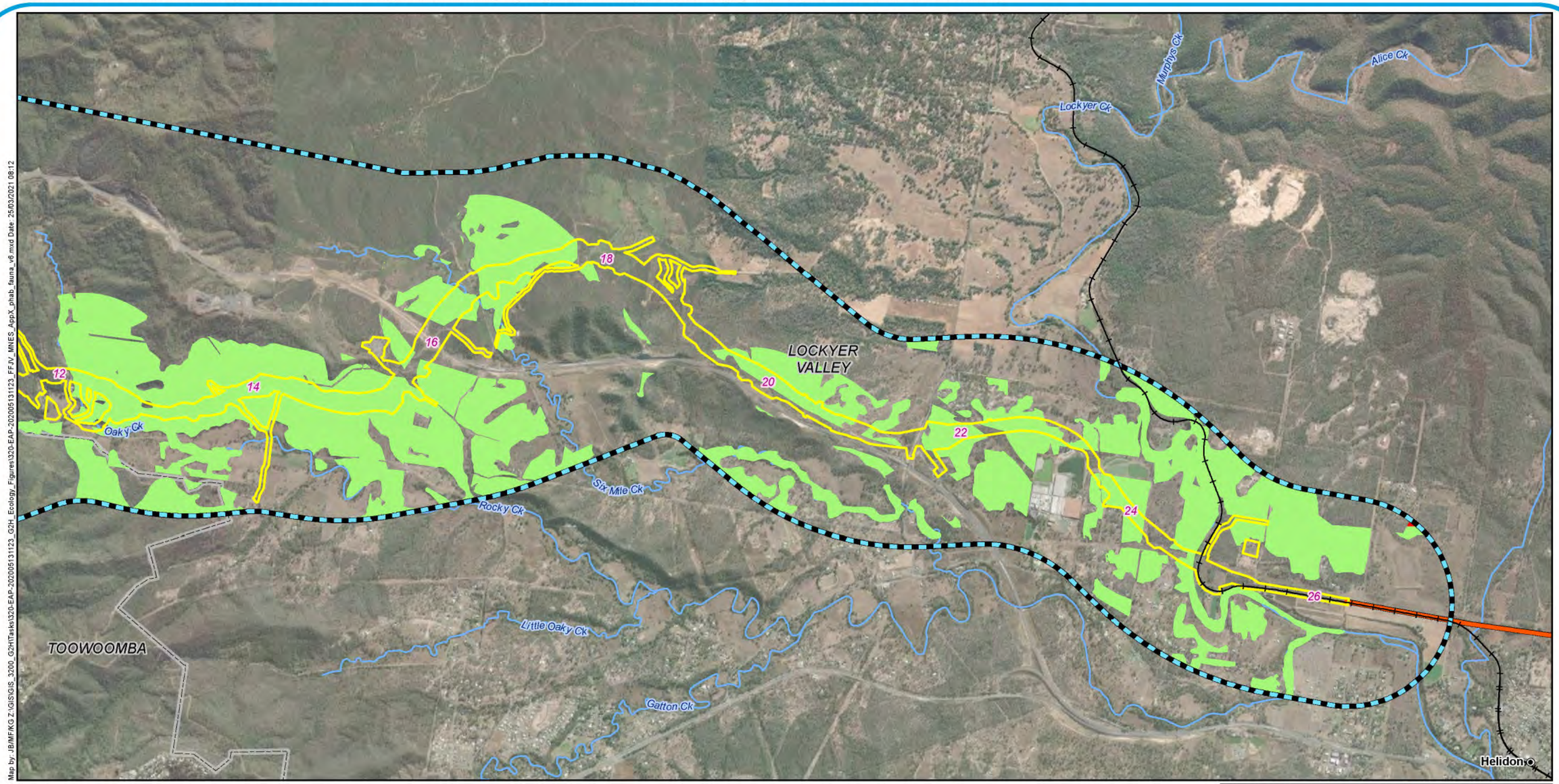

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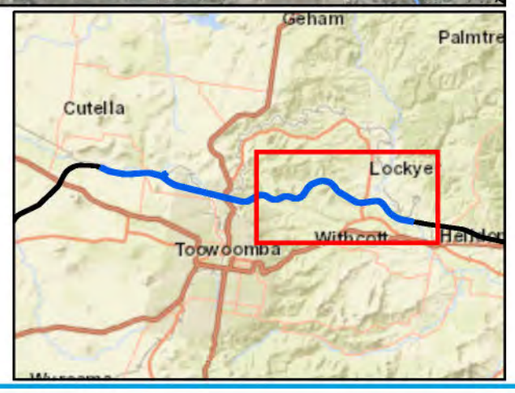
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

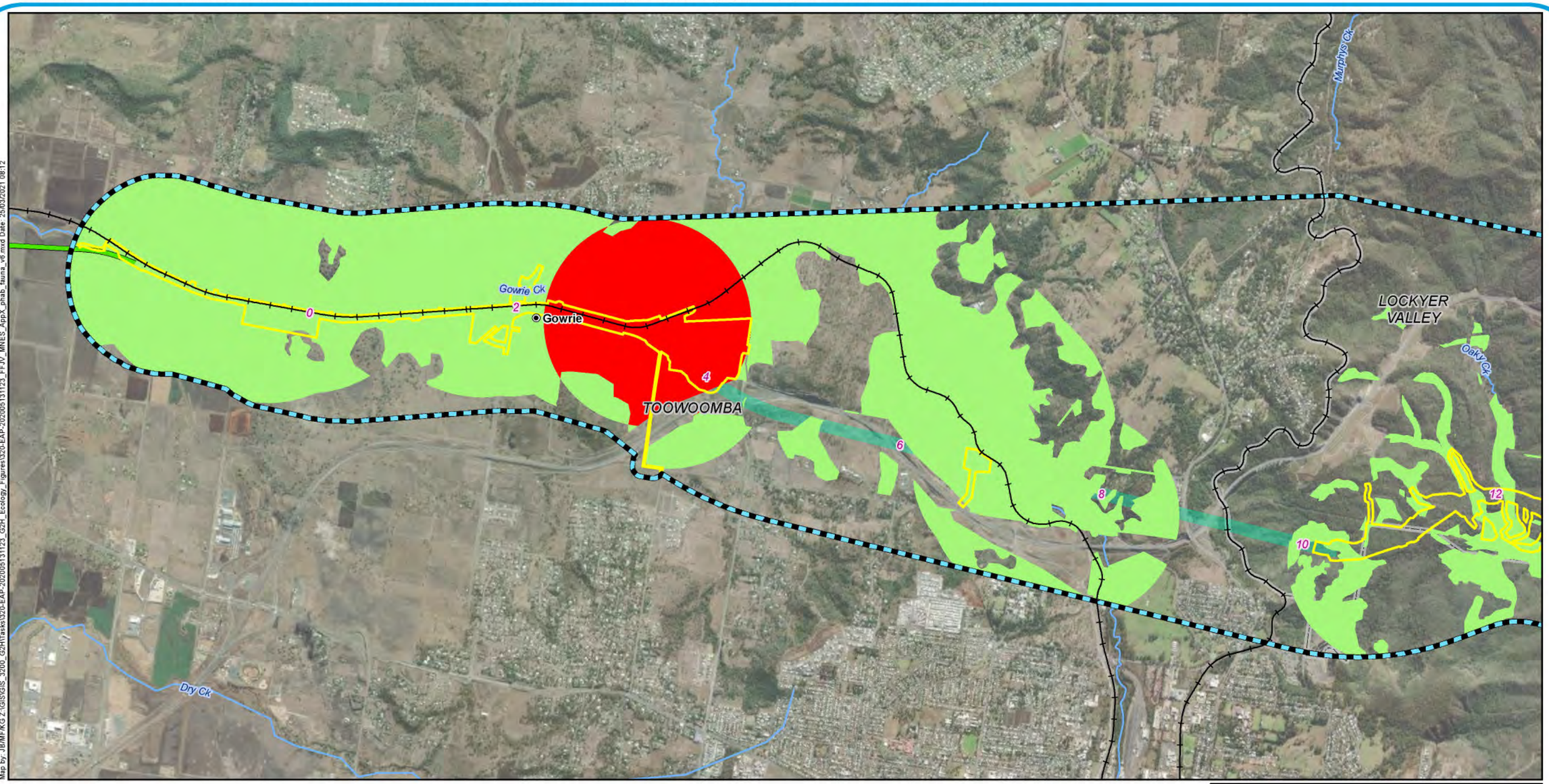
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Erythrotriorchis radiatus* (Red goshawk)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:15

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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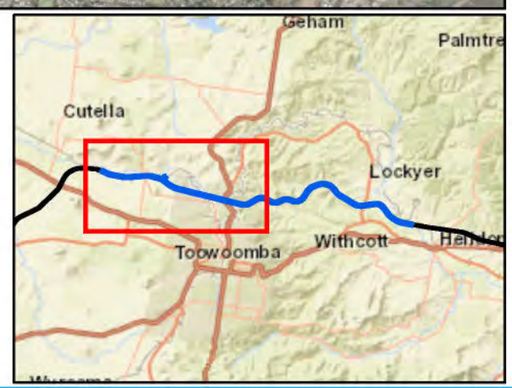
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Falco hypoleucos* (Grey falcon)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:15

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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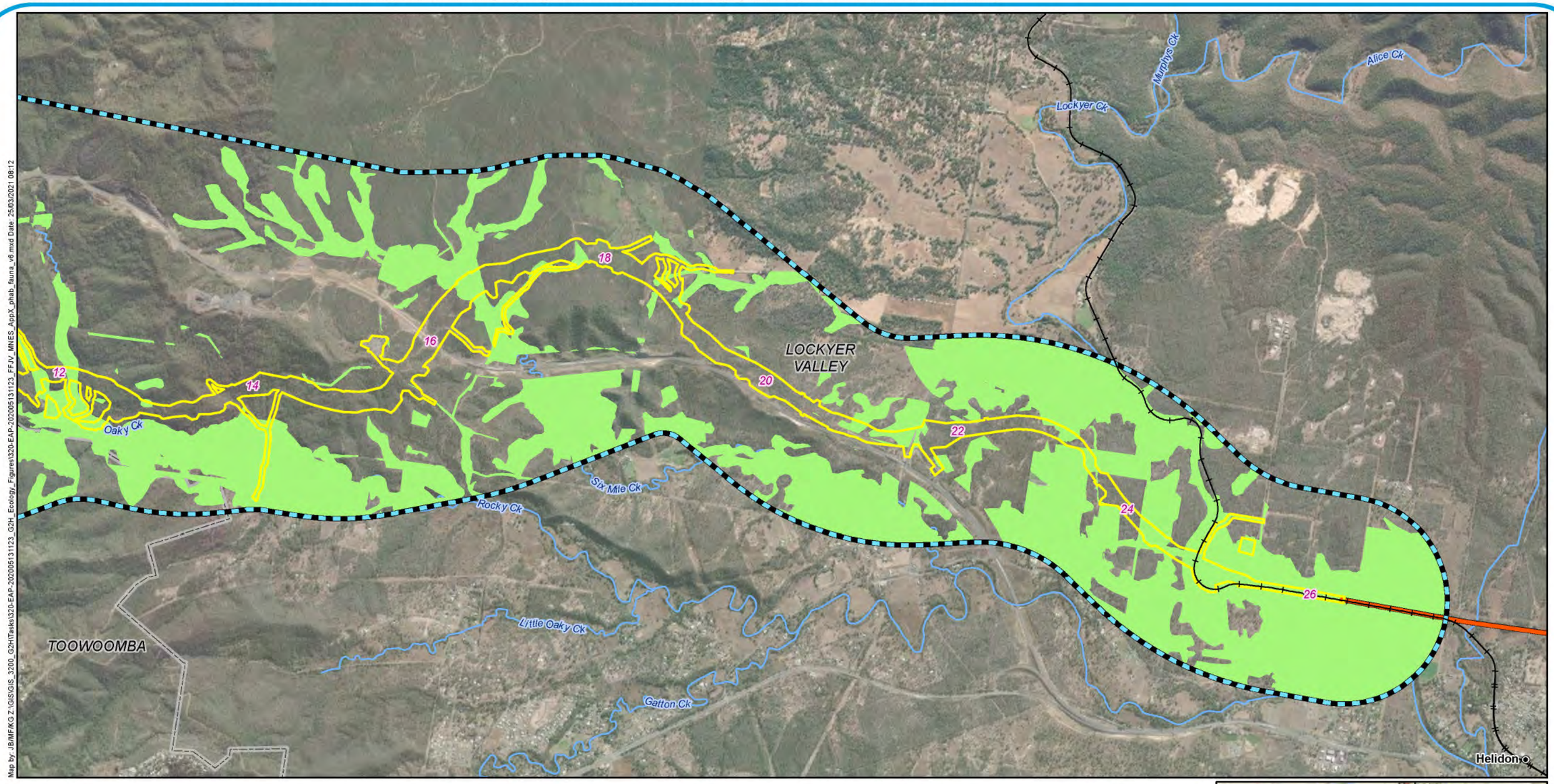

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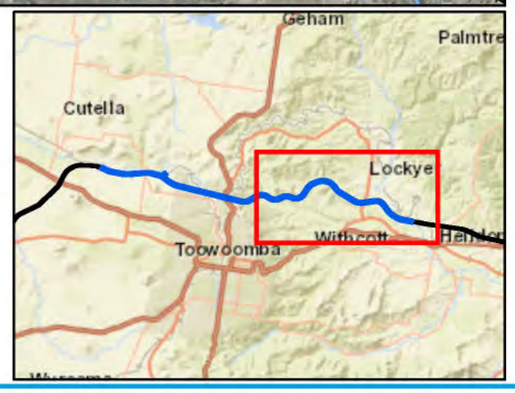
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Falco hypoleucos* (Grey falcon)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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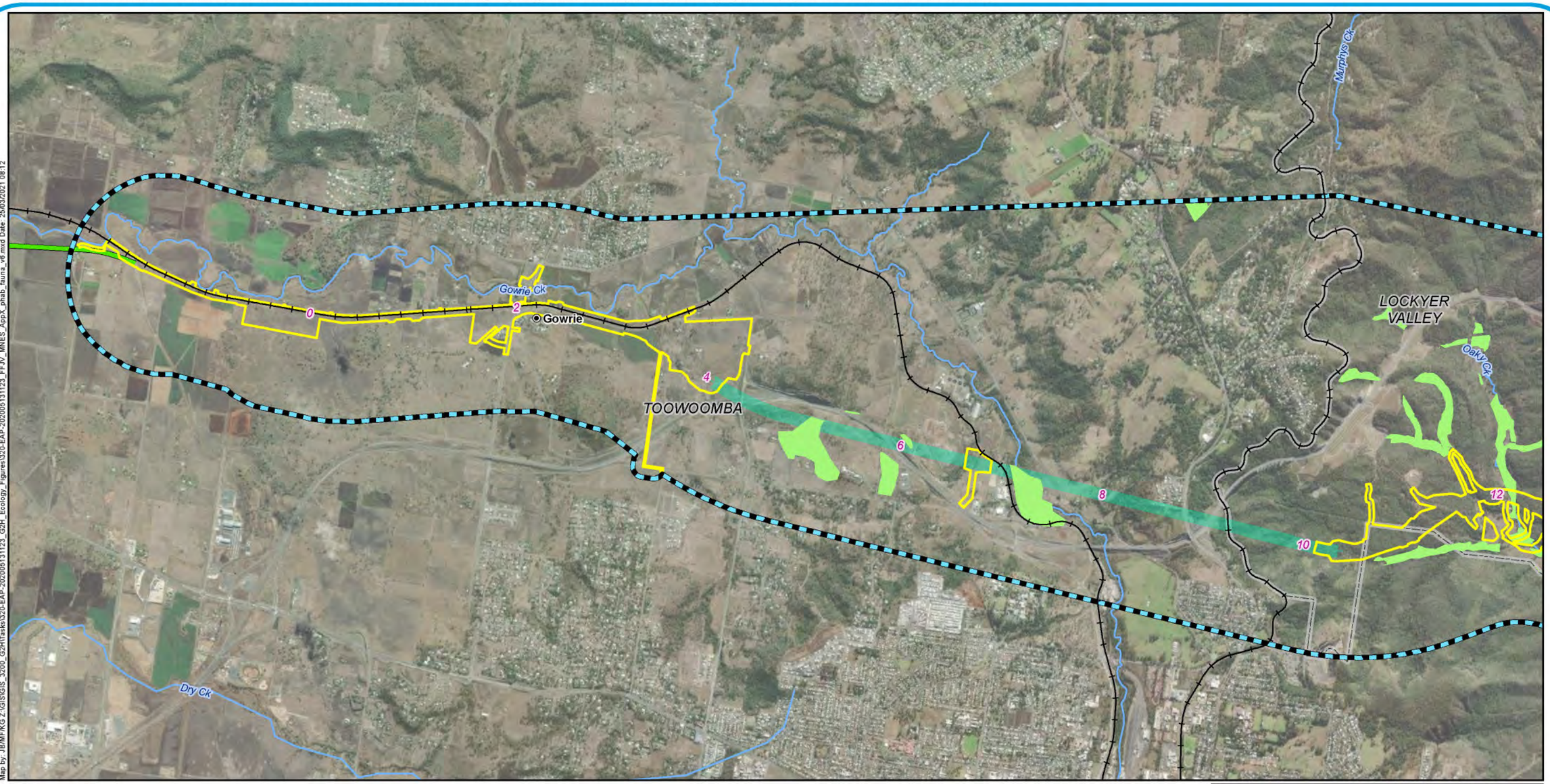

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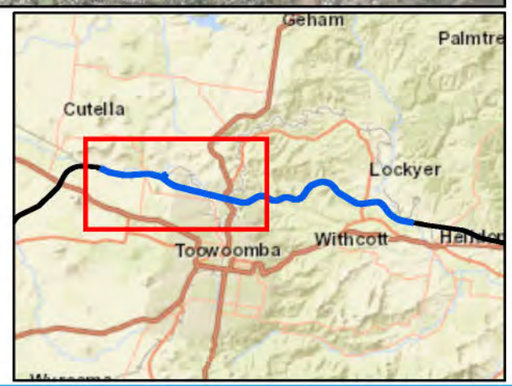
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

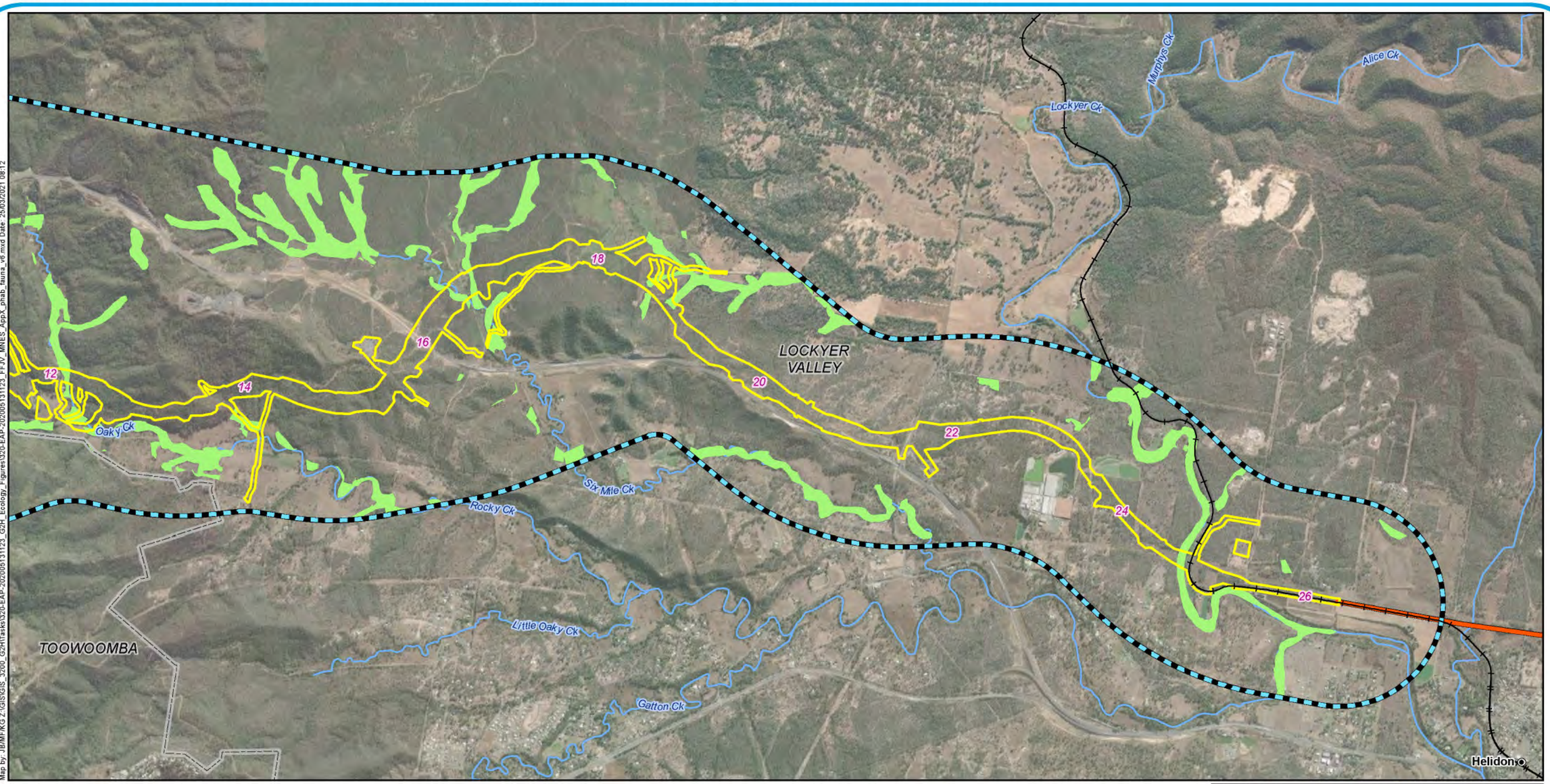
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Grantiella picta* (Painted honeyeater)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



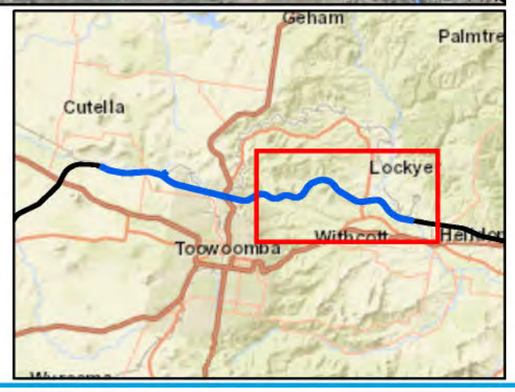
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

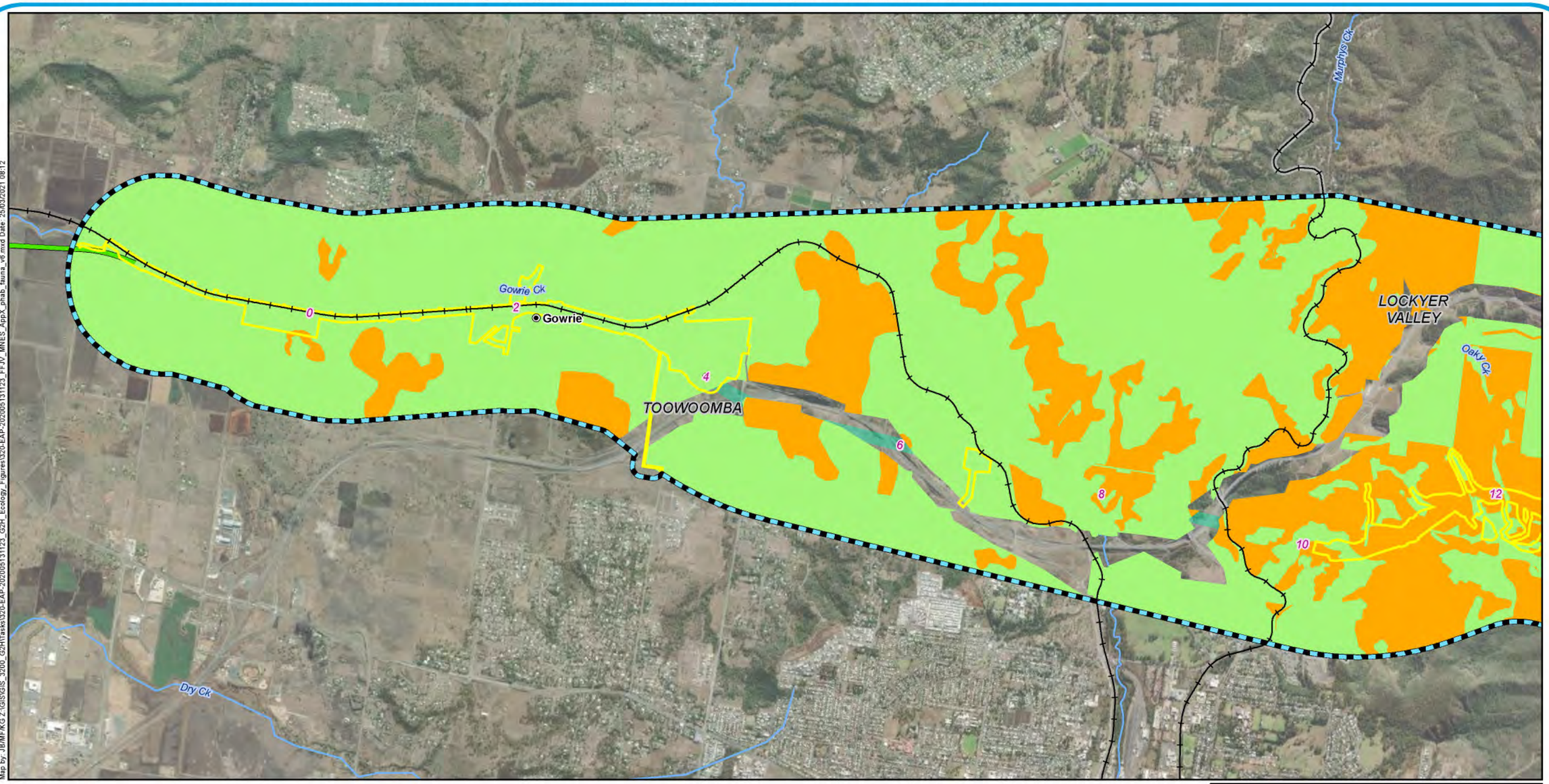
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Grantiella picta* (Painted honeyeater)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:16

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



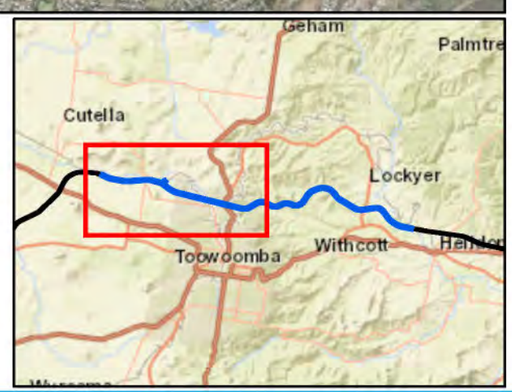
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Important habitat
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

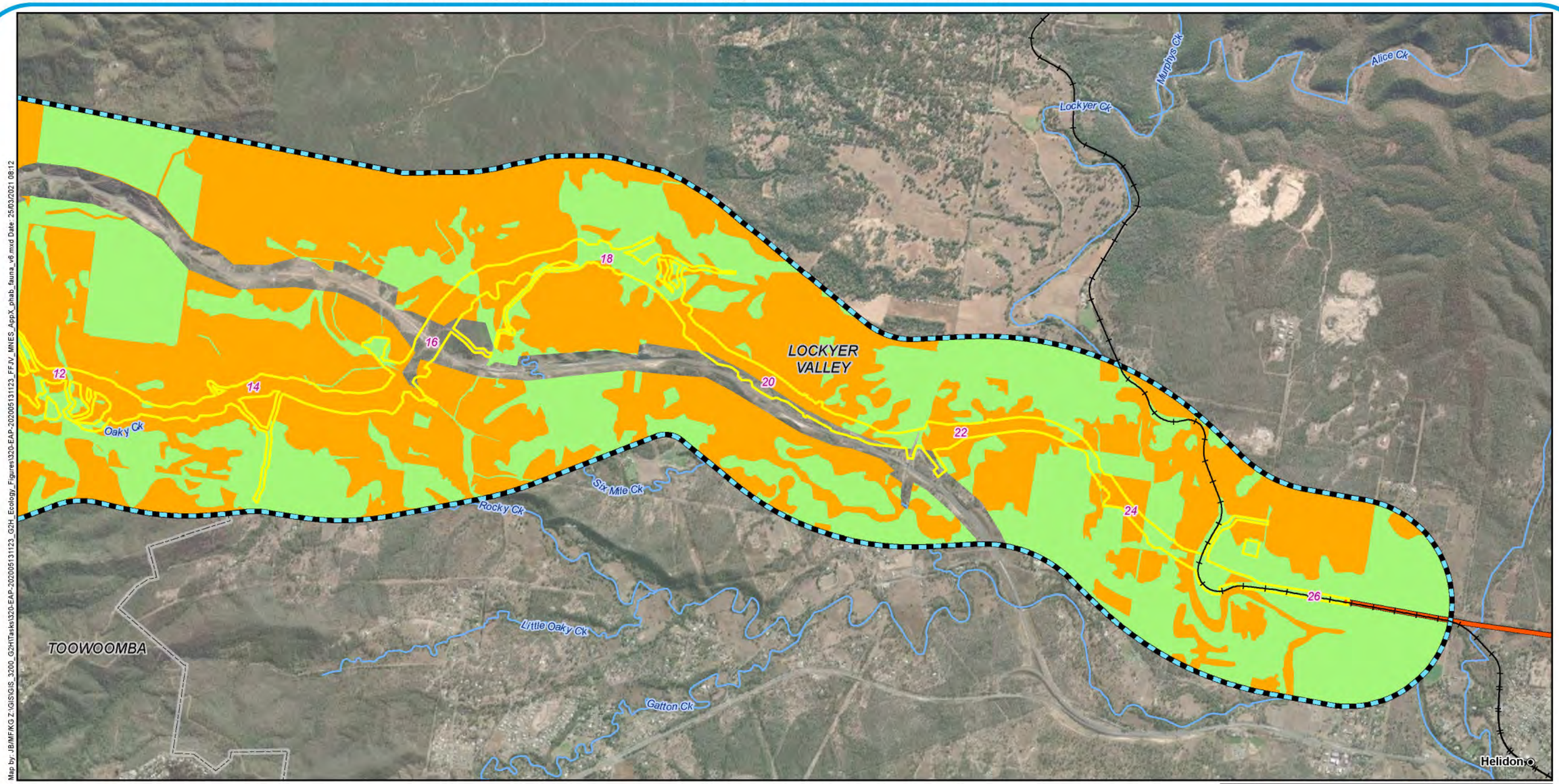
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Hirundapus caudacutus* (White-throated needletail)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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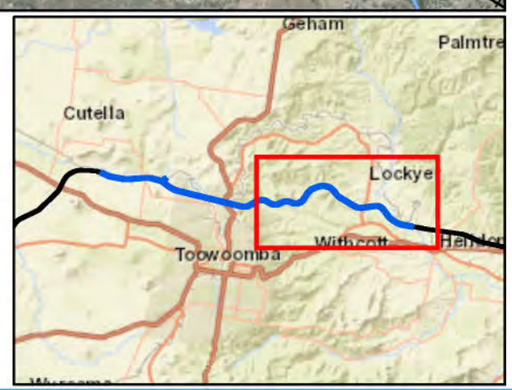
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Important habitat
- Potential habitat



A3 scale: 1:40,000

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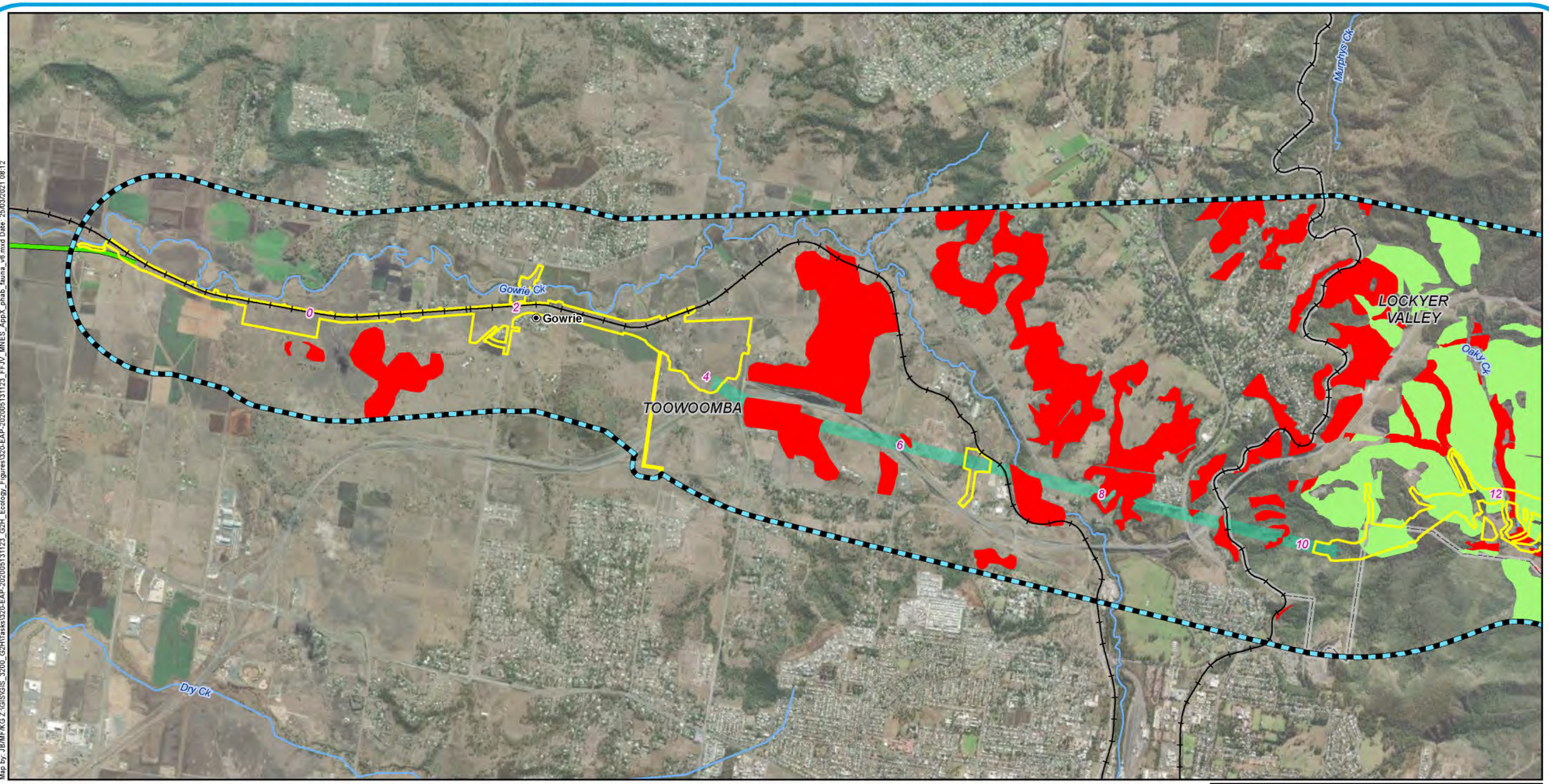
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Hirundapus caudacutus* (White-throated needletail)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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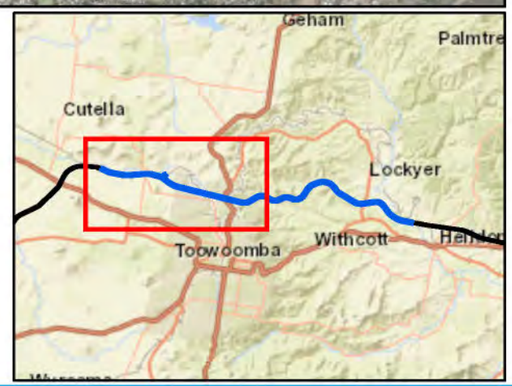
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

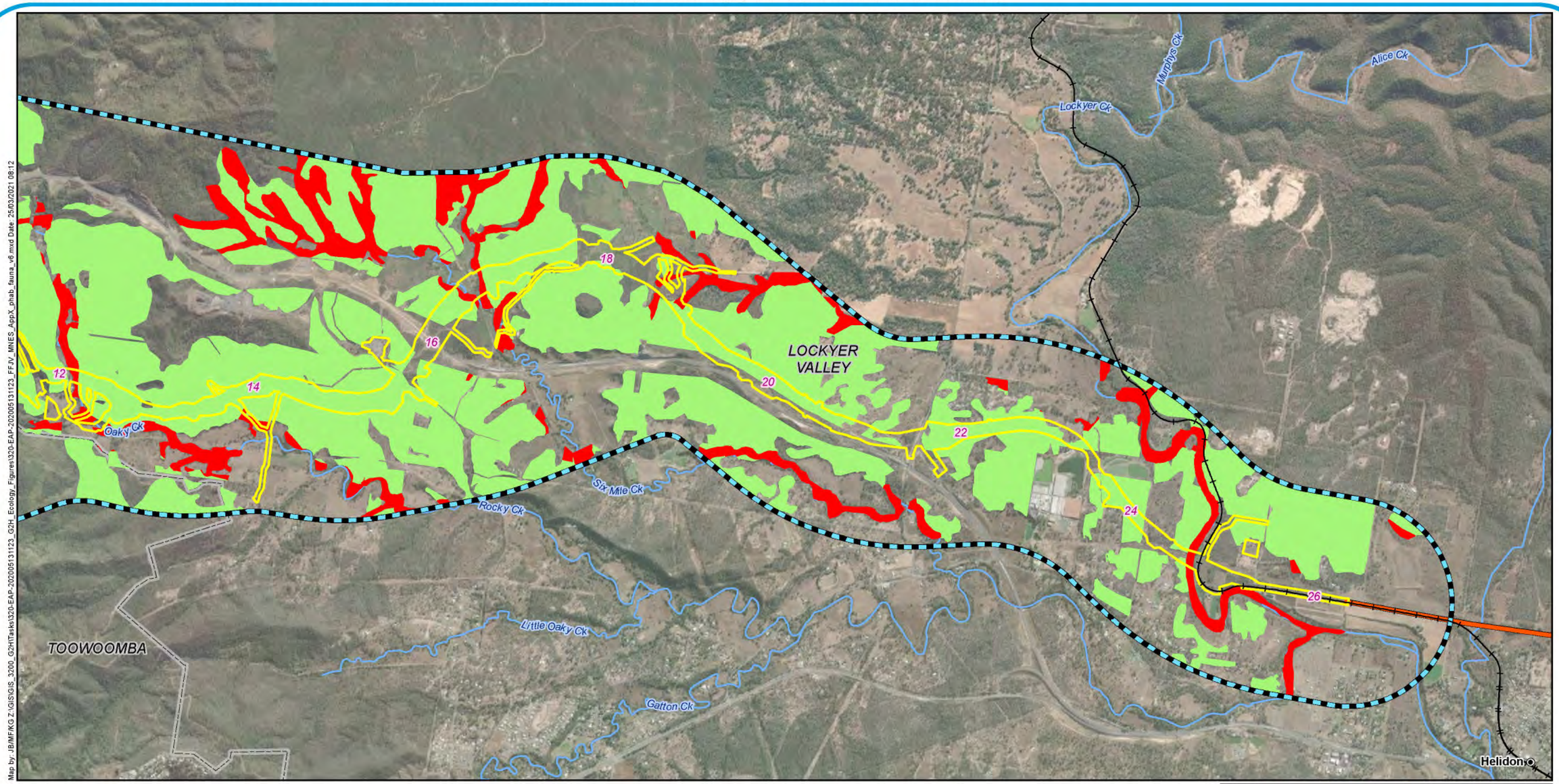
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Lathamus discolor* (Swift parrot)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:17

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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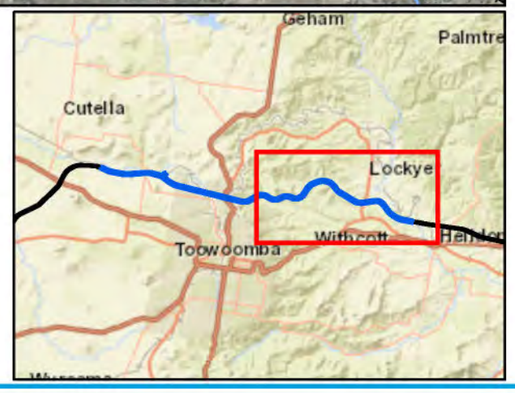
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Lathamus discolor* (Swift parrot)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:17

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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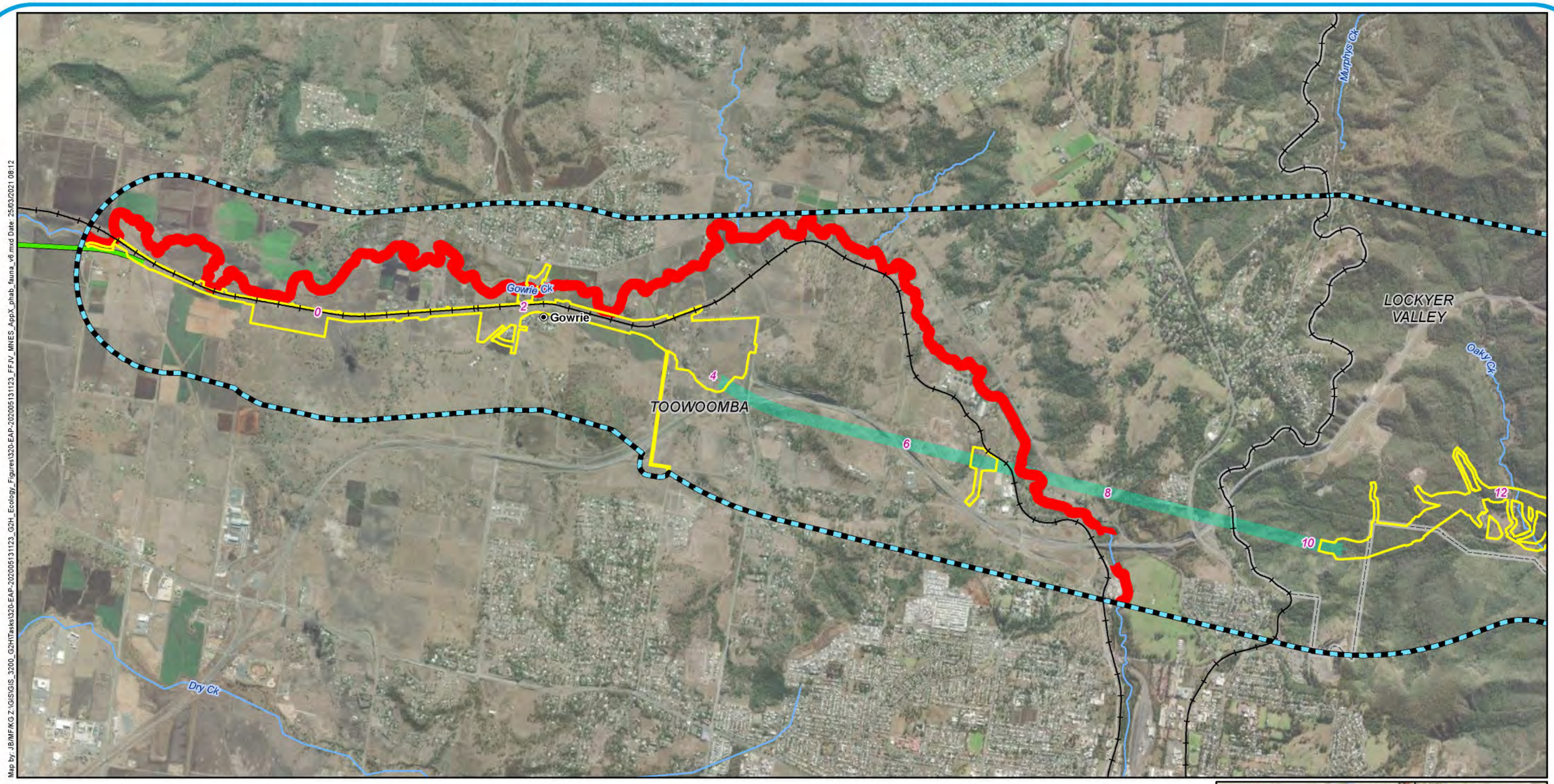

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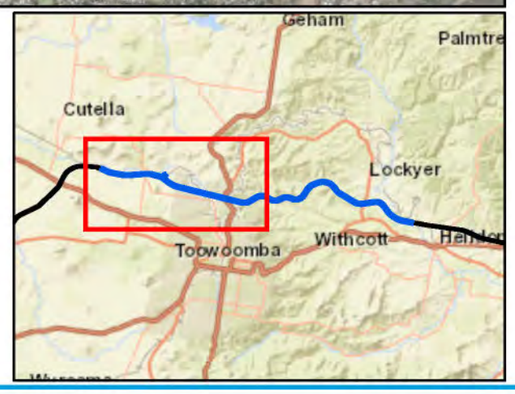
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

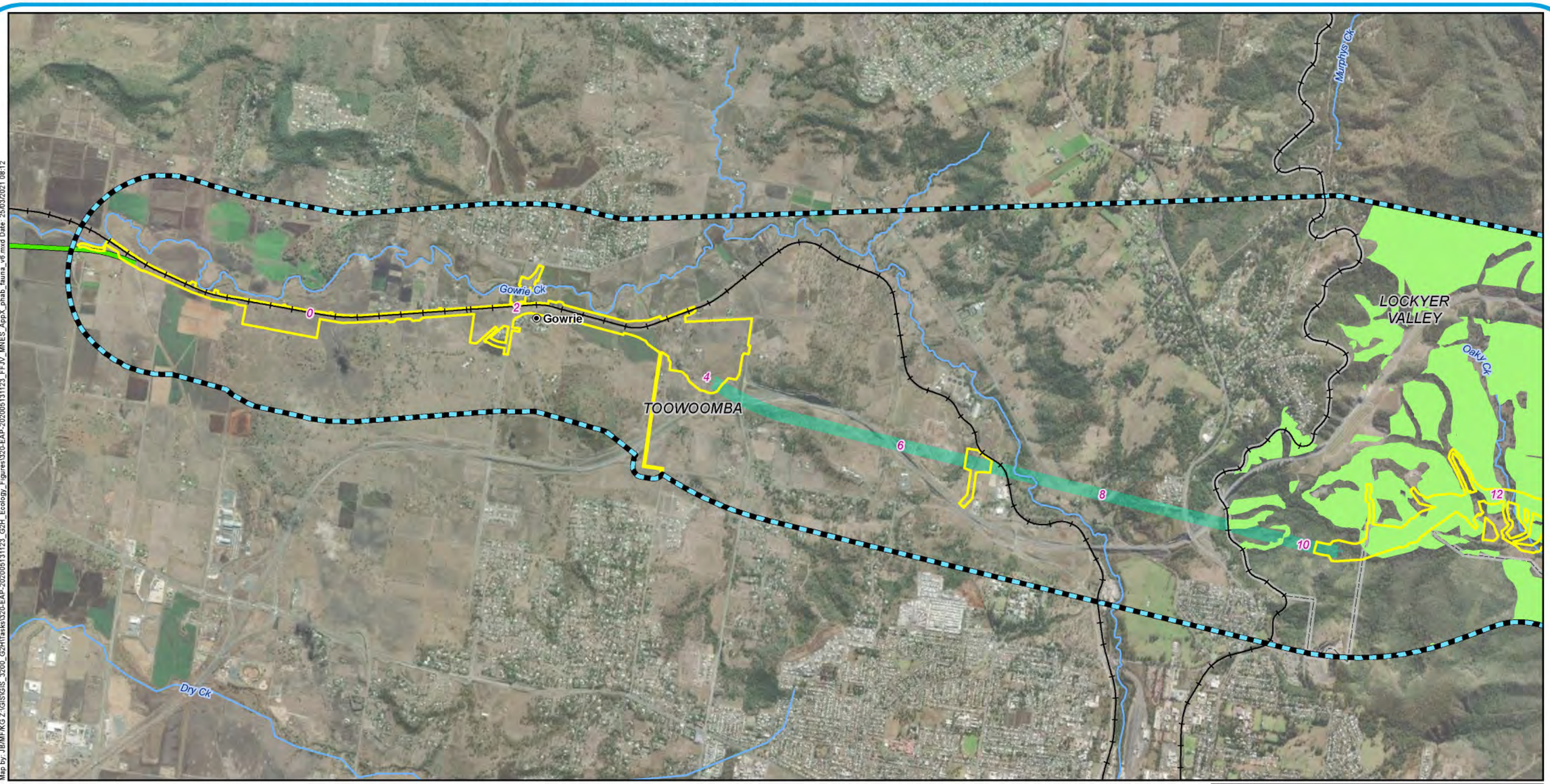
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Maccullochella peelii* (Murray cod)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:17

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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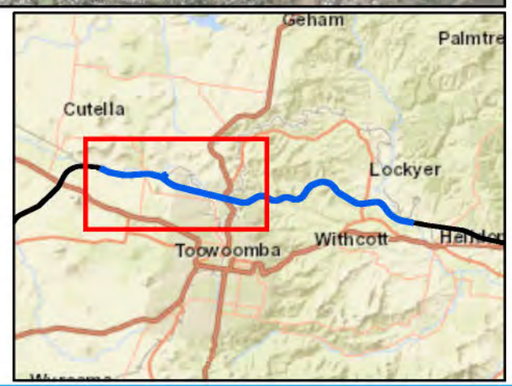
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Petauroides volans volans* (Southern greater glider)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:18

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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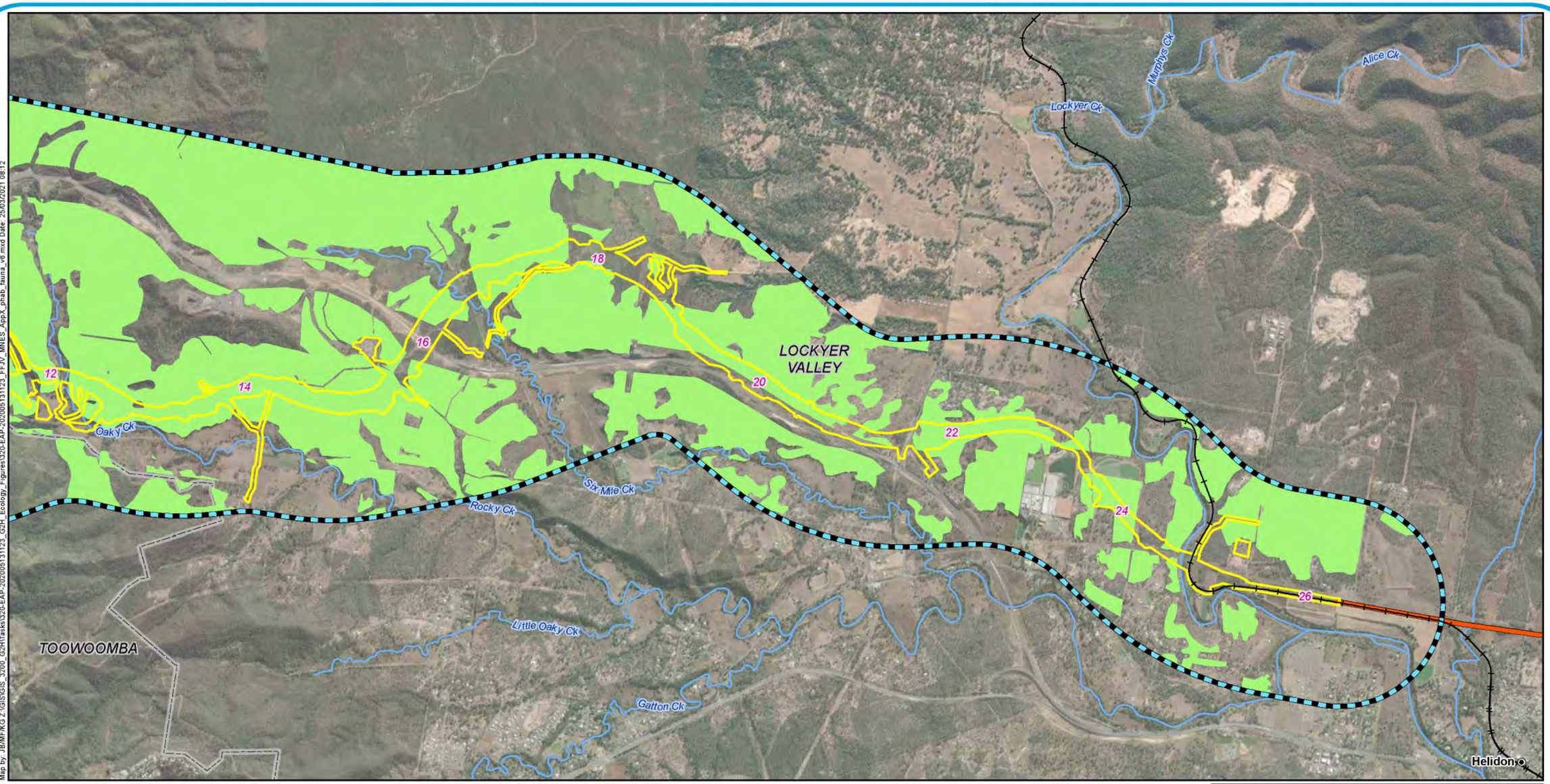

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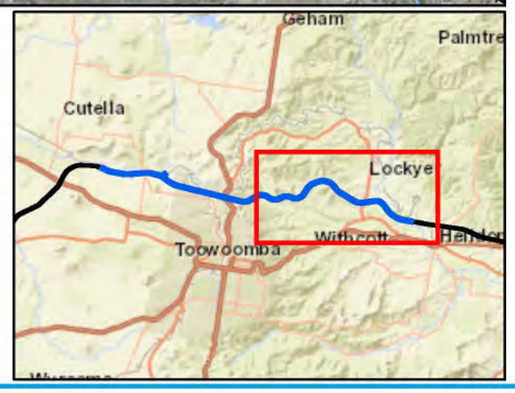
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Petauroides volans volans* (Southern greater glider)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:18

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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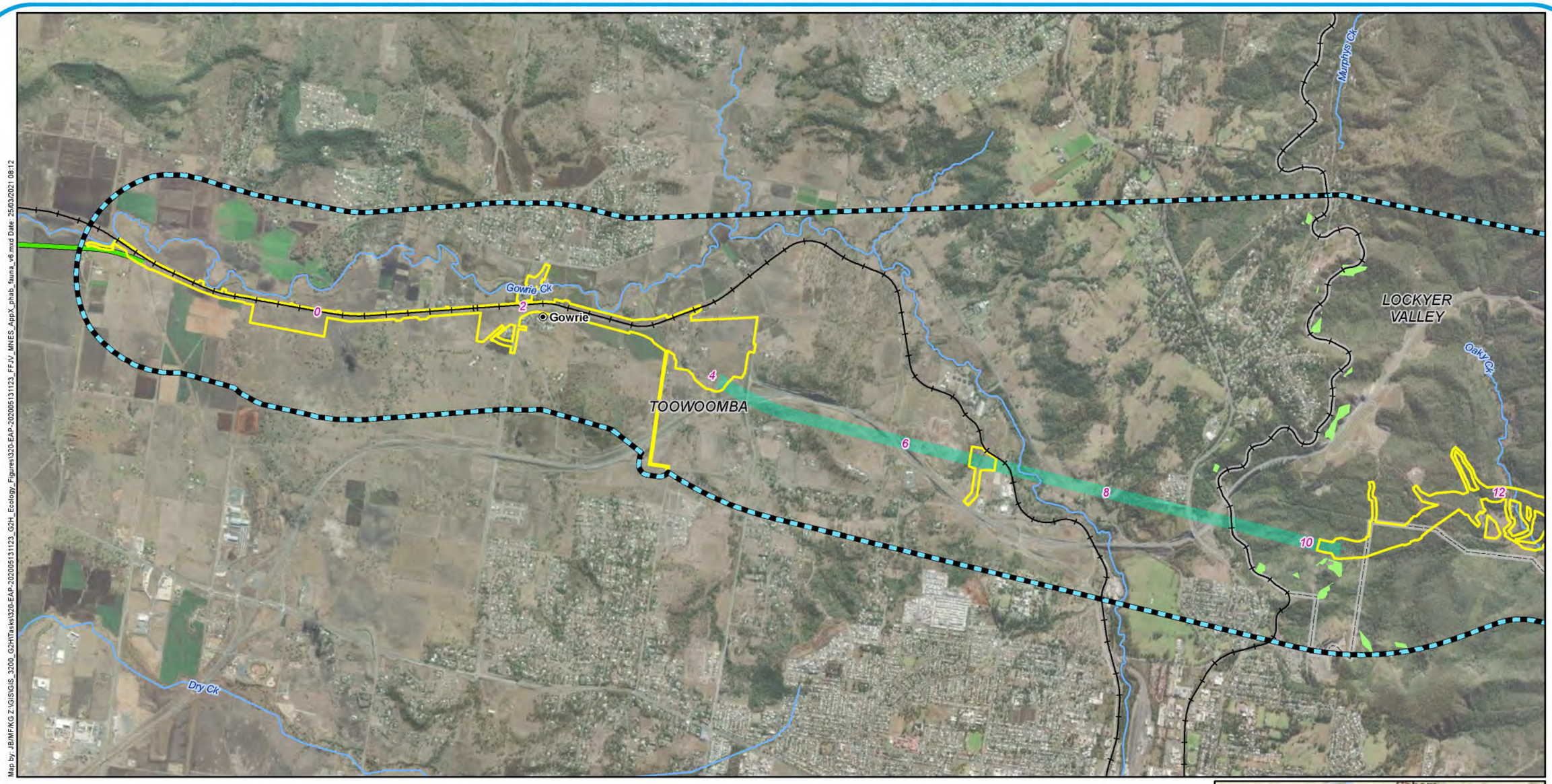

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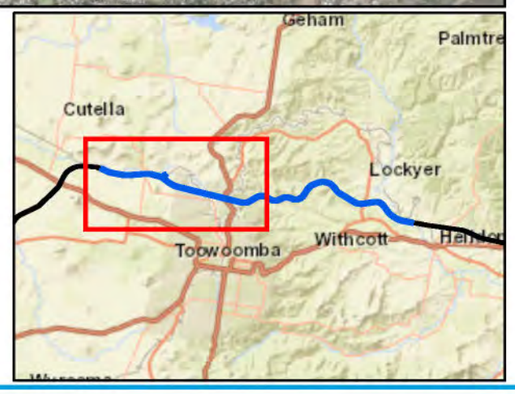
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

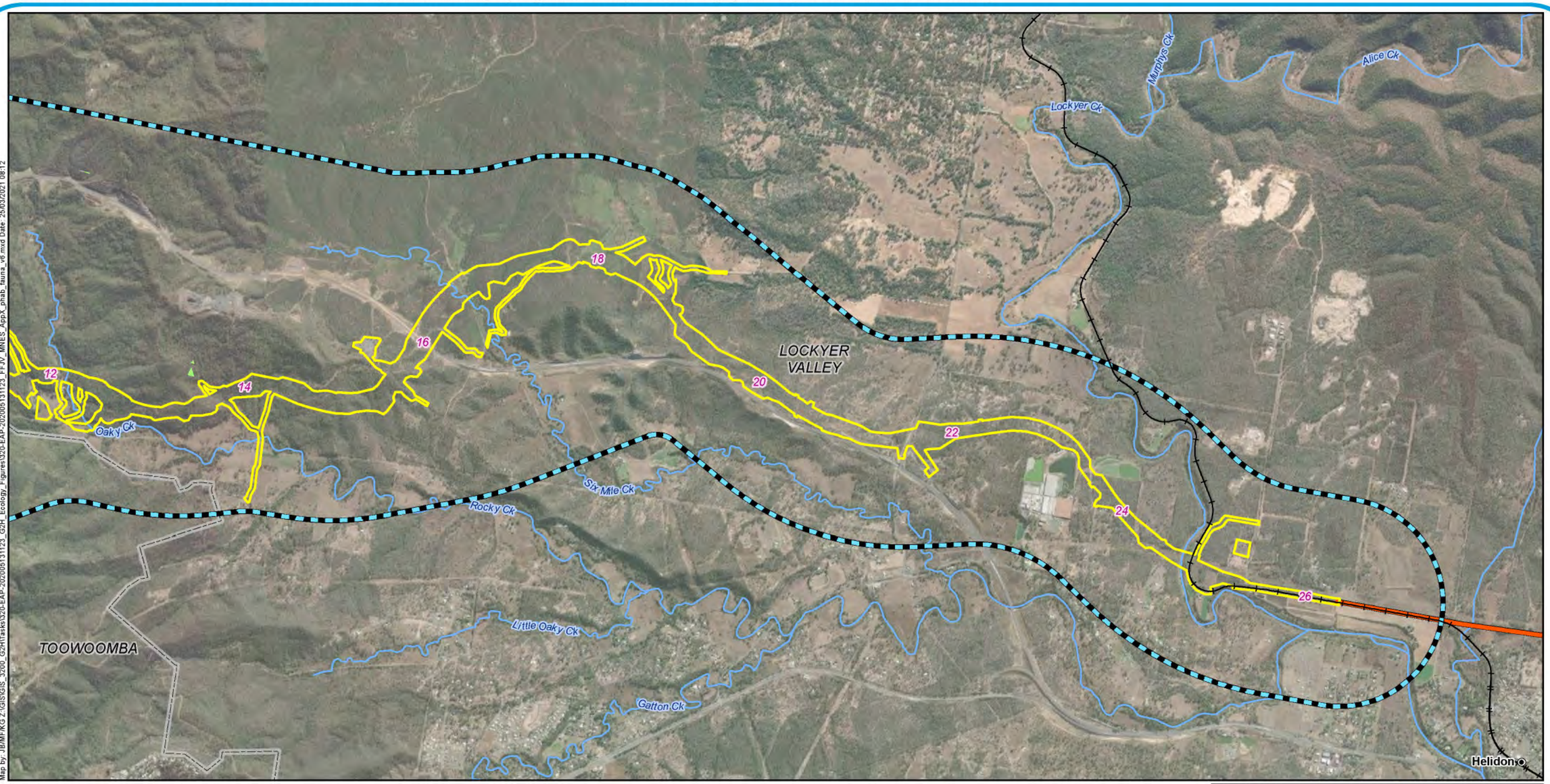
ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Petrogale penicillata* (Brush-tailed rock-wallaby)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:18

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

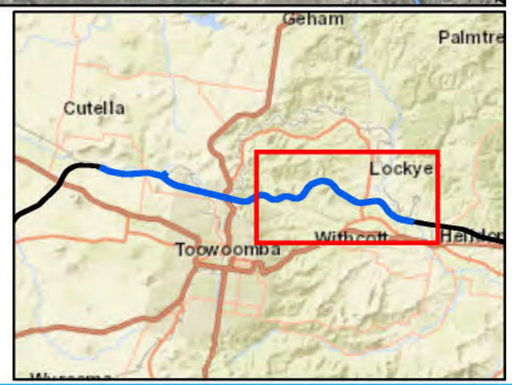


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

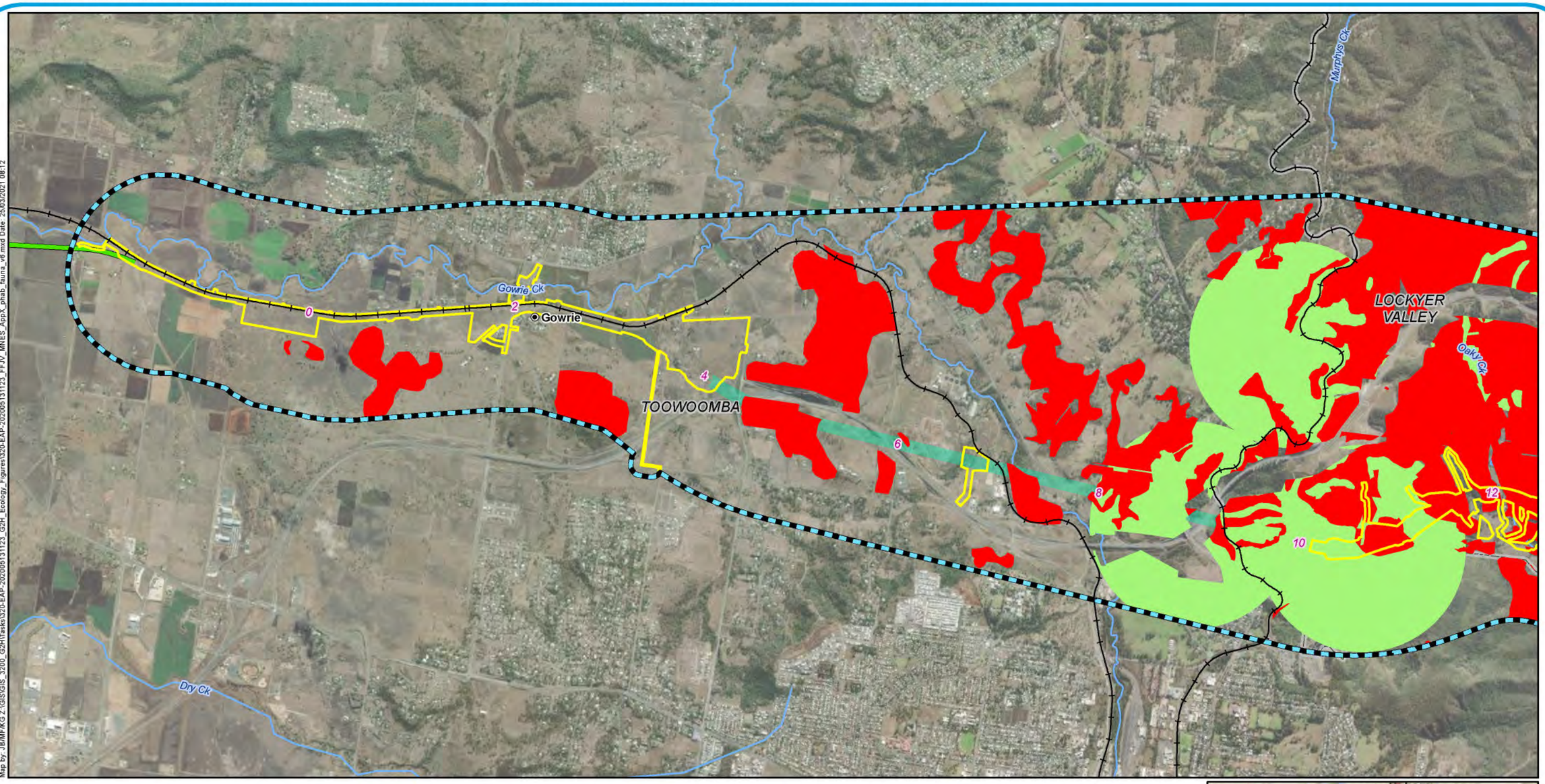
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Petrogale penicillata* (Brush-tailed rock-wallaby)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



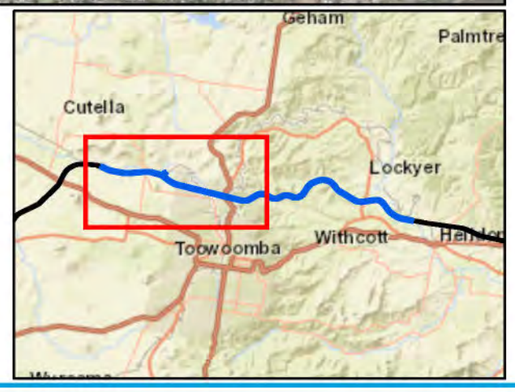
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

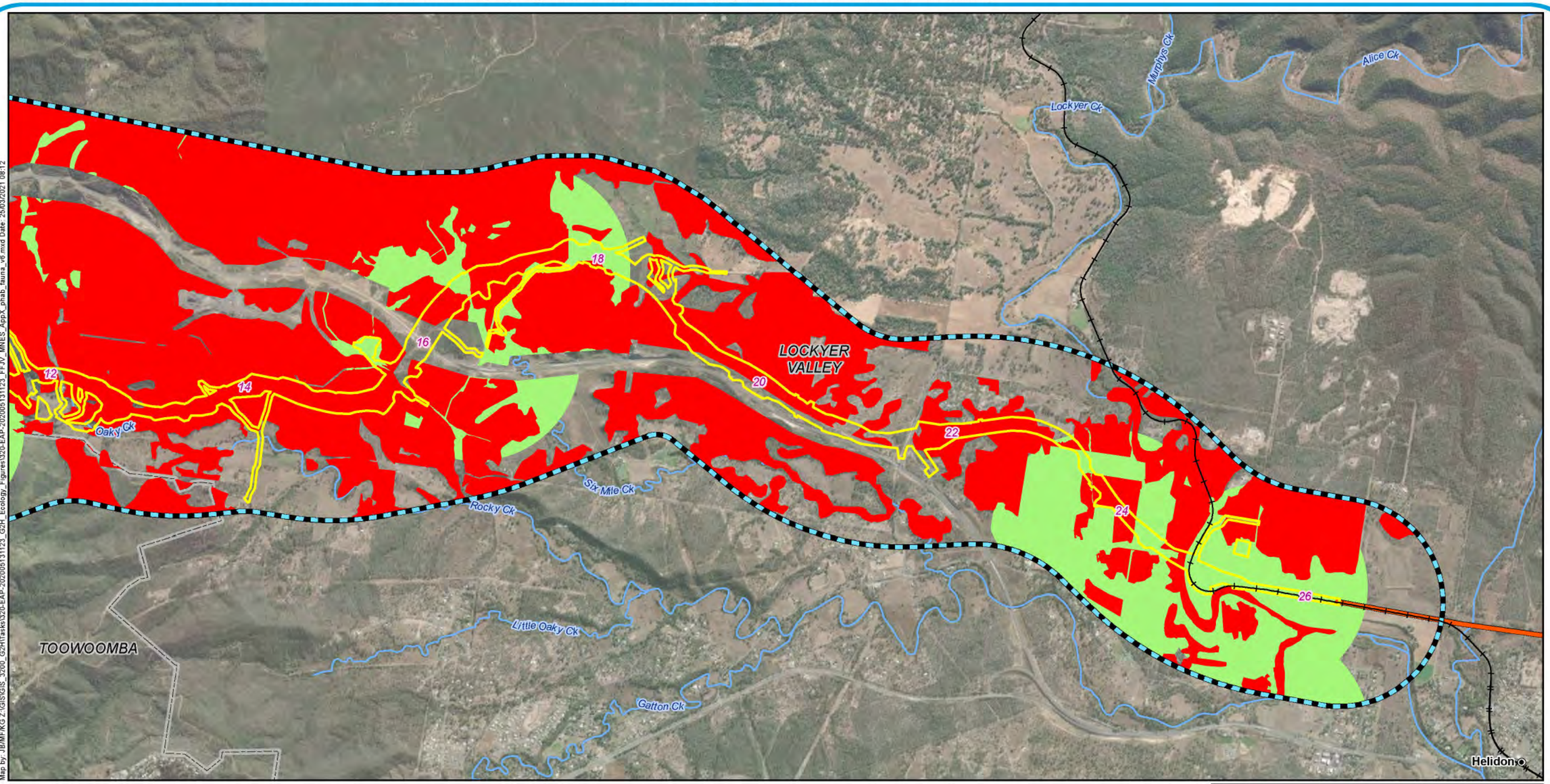
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Phascolarctos cinereus* (Koala)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:19

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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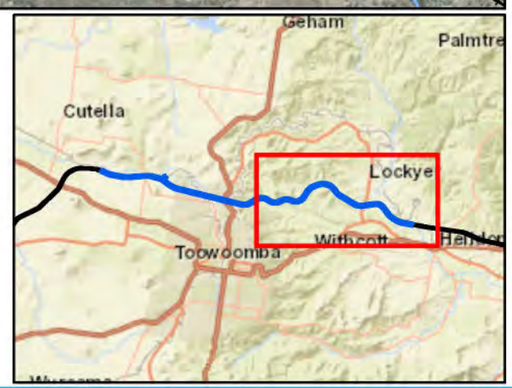
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

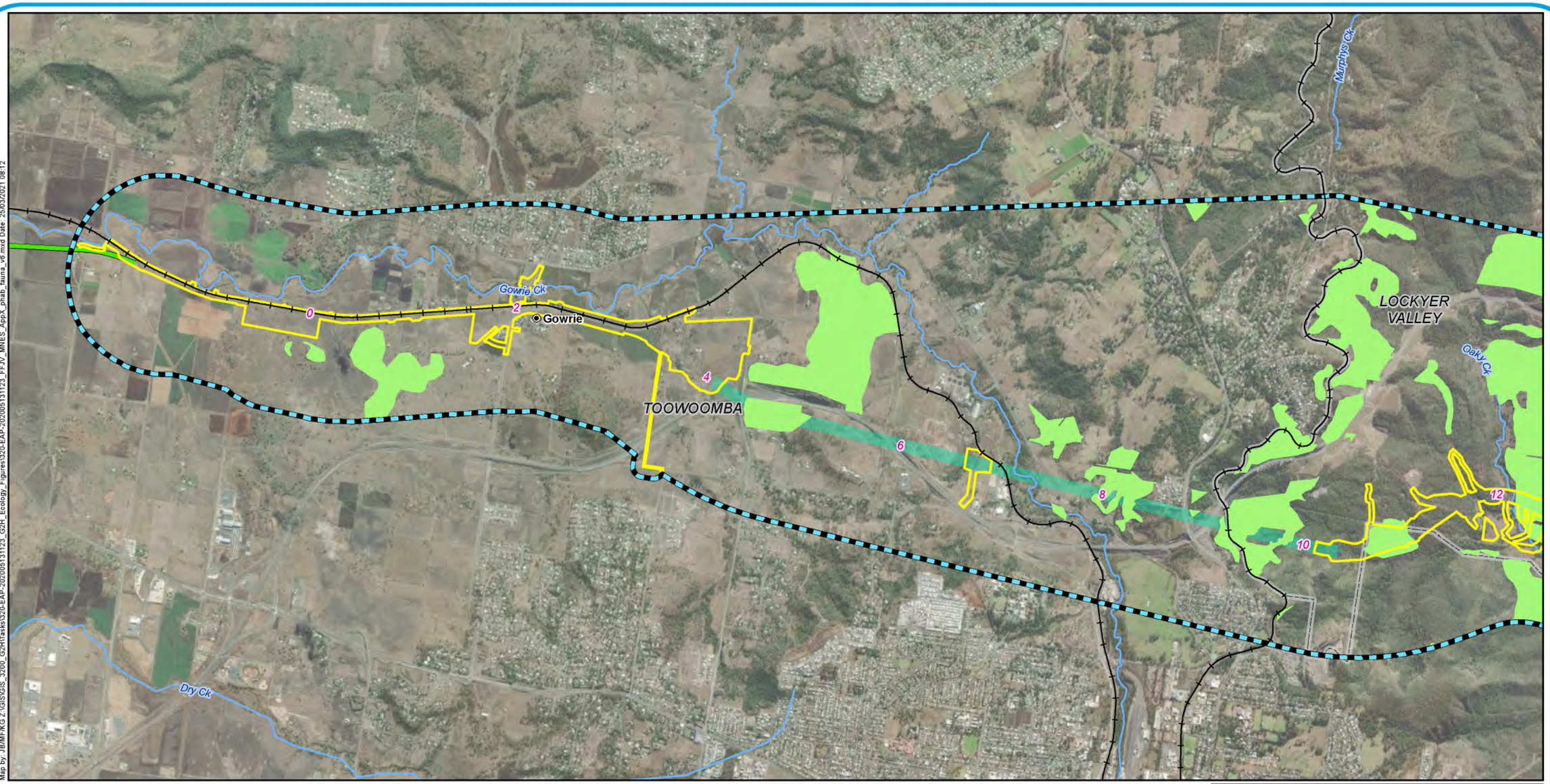
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Phascolarctos cinereus* (Koala)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:19

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



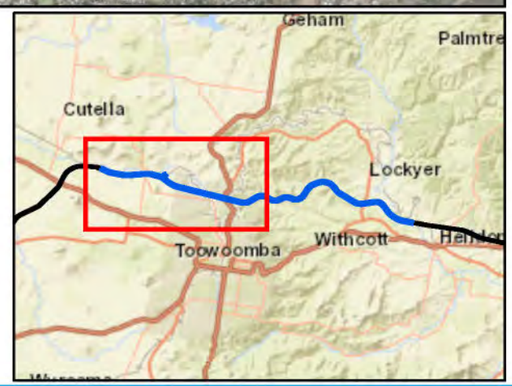
Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Potorous tridactylus tridactylus* (Long-nosed potoroo)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:19

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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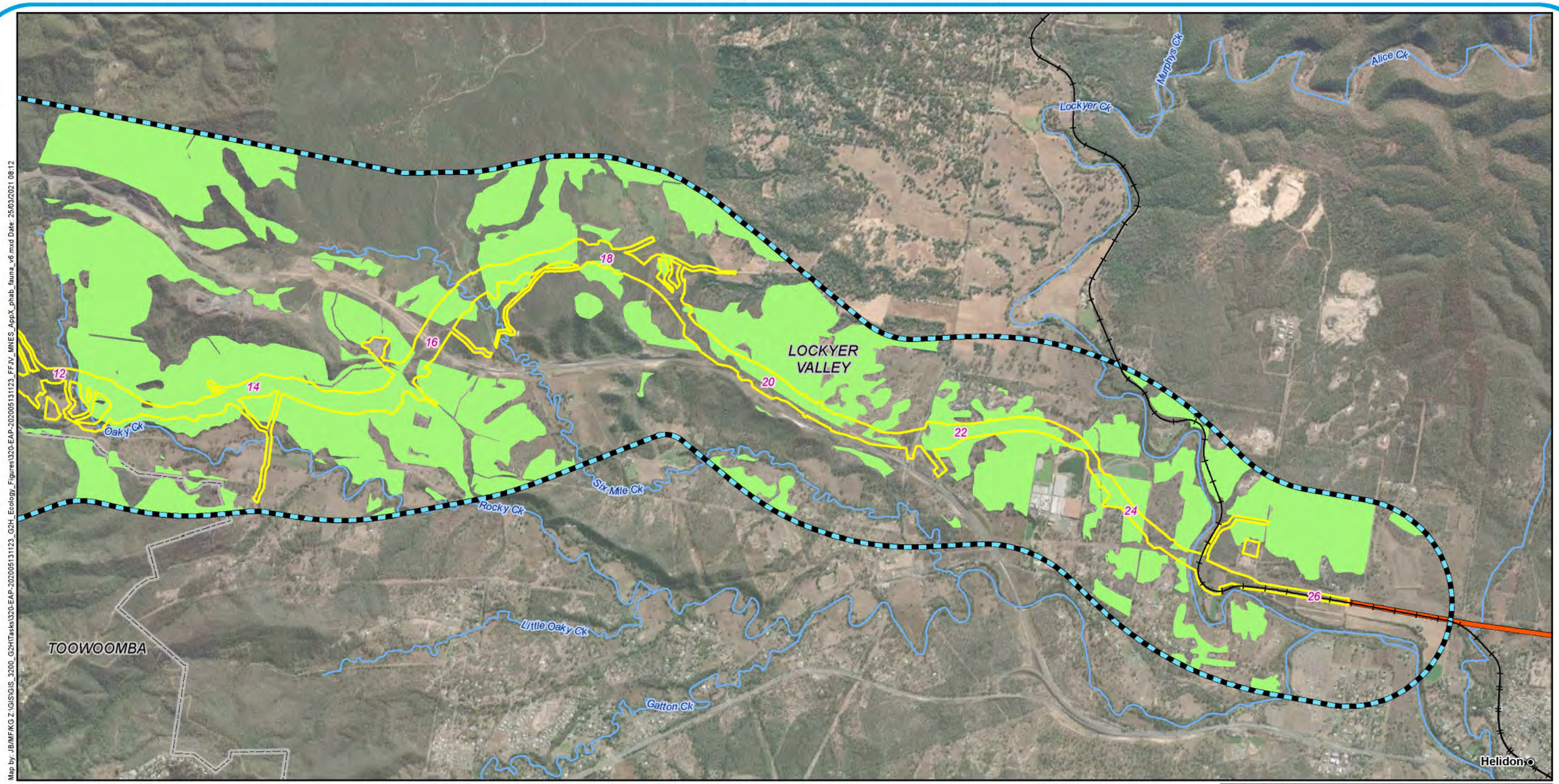

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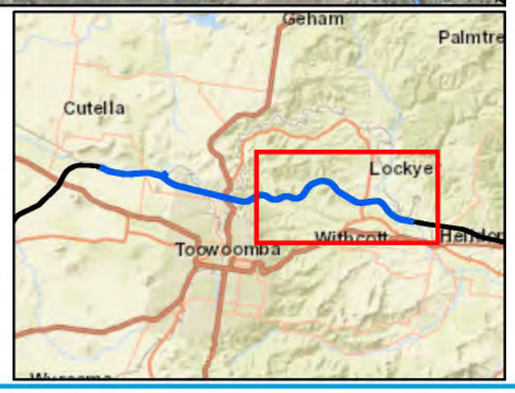
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Potorous tridactylus tridactylus* (Long-nosed potoroo)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:19

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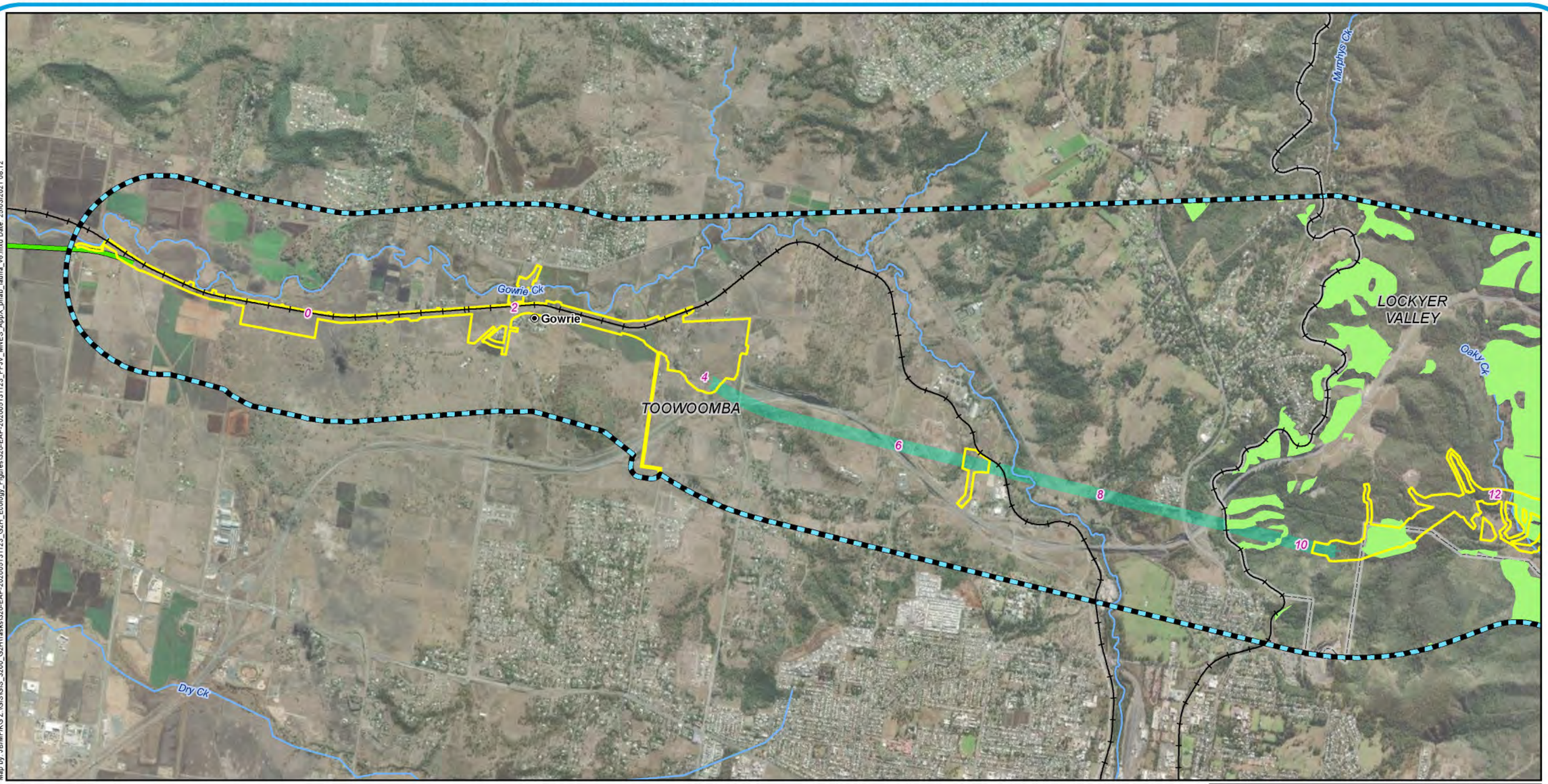

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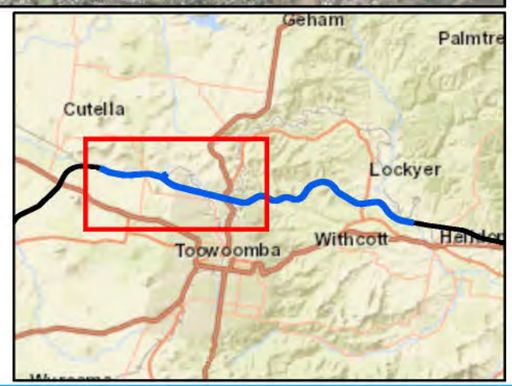
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

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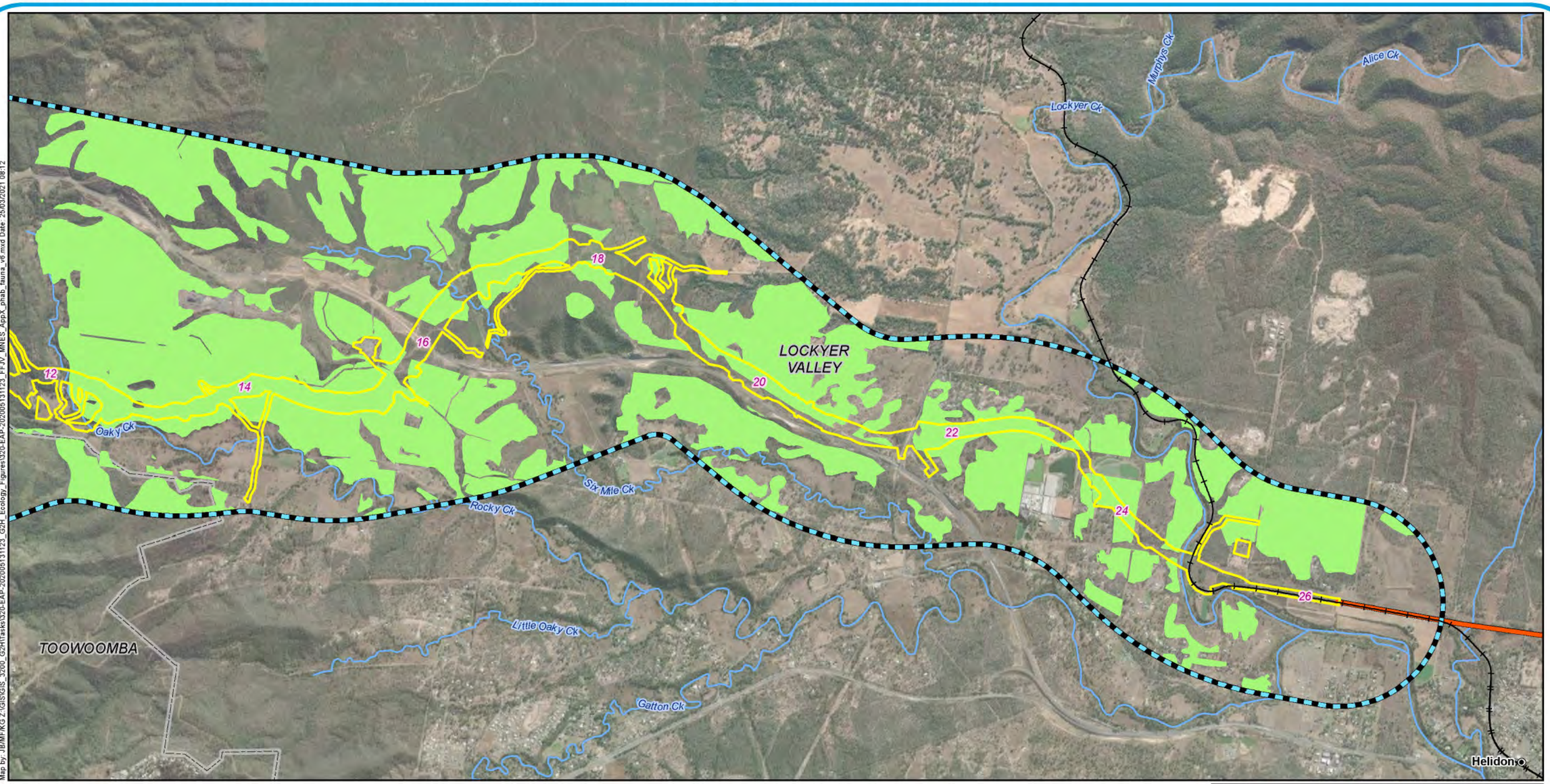
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Pseudomys novaehollandiae* (New Holland mouse)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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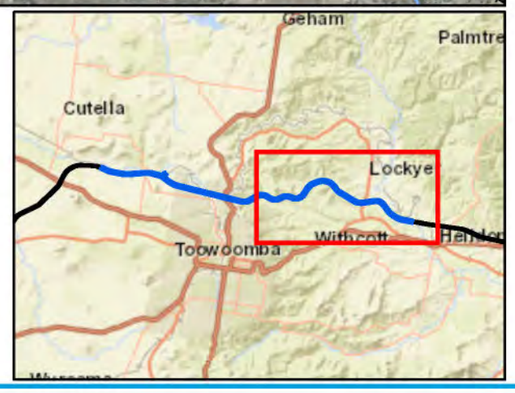
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Pseudomys novaehollandiae* (New Holland mouse)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:20

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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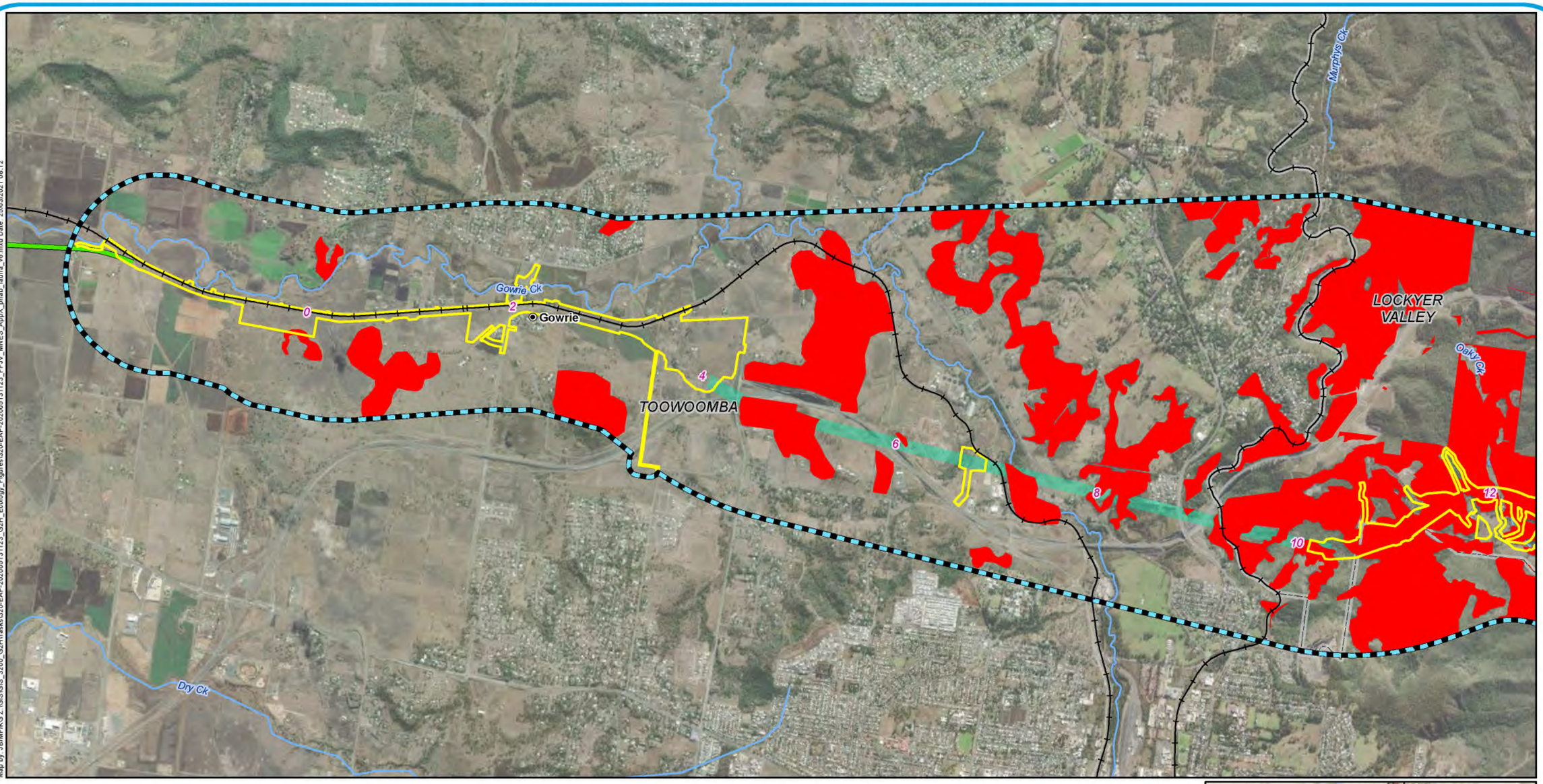

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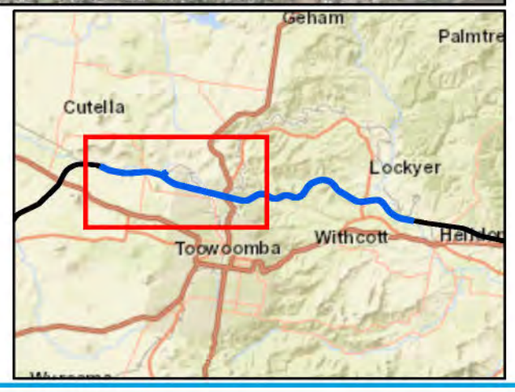
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



A3 scale: 1:40,000

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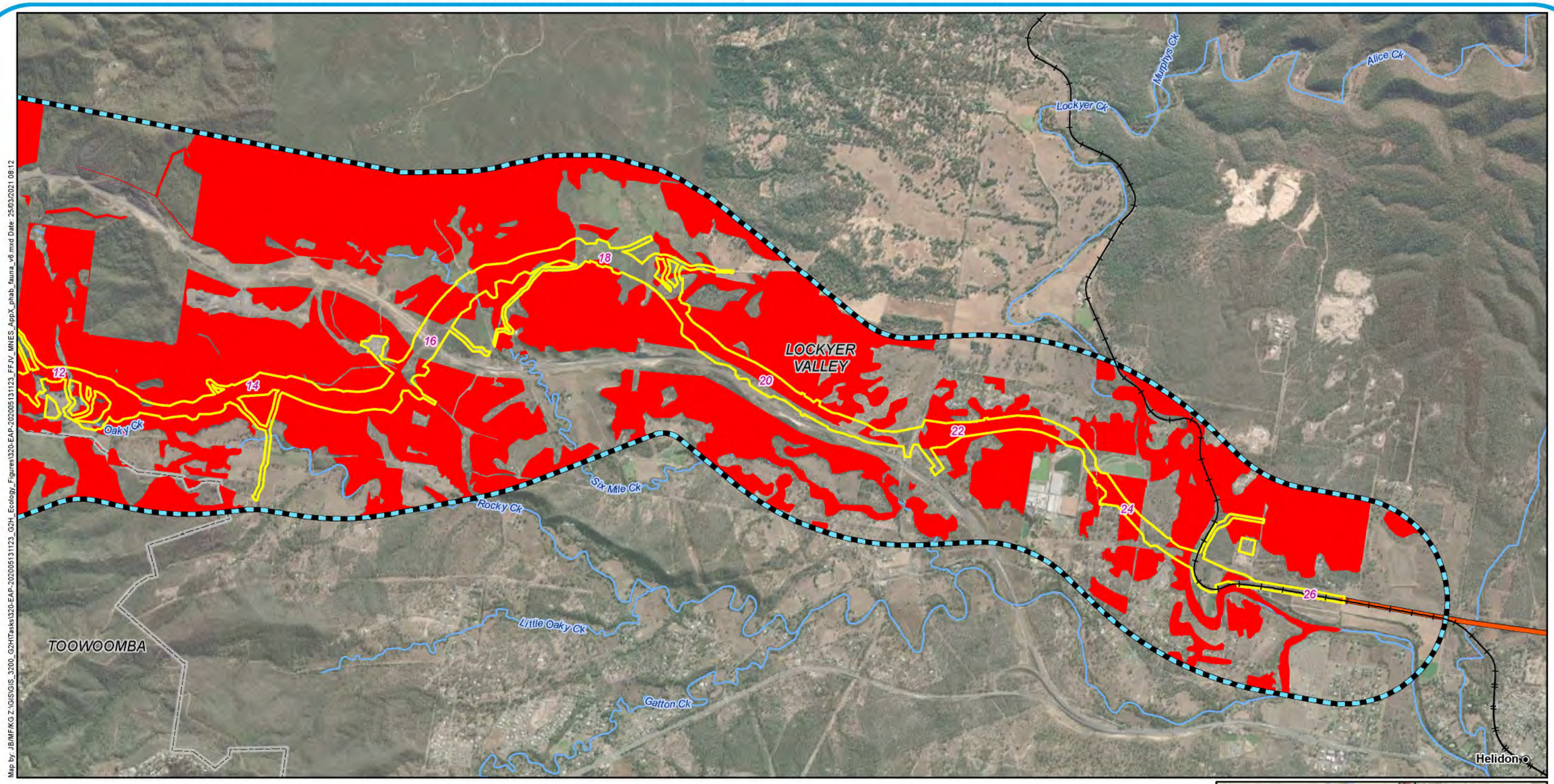
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Pteropus poliocephalus* (Grey-headed flying-fox)

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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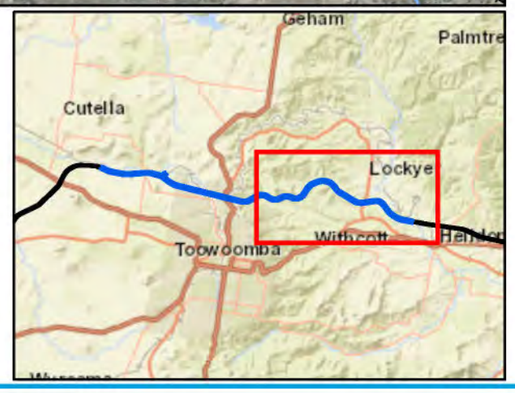
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Pteropus poliocephalus* (Grey-headed flying-fox)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:20

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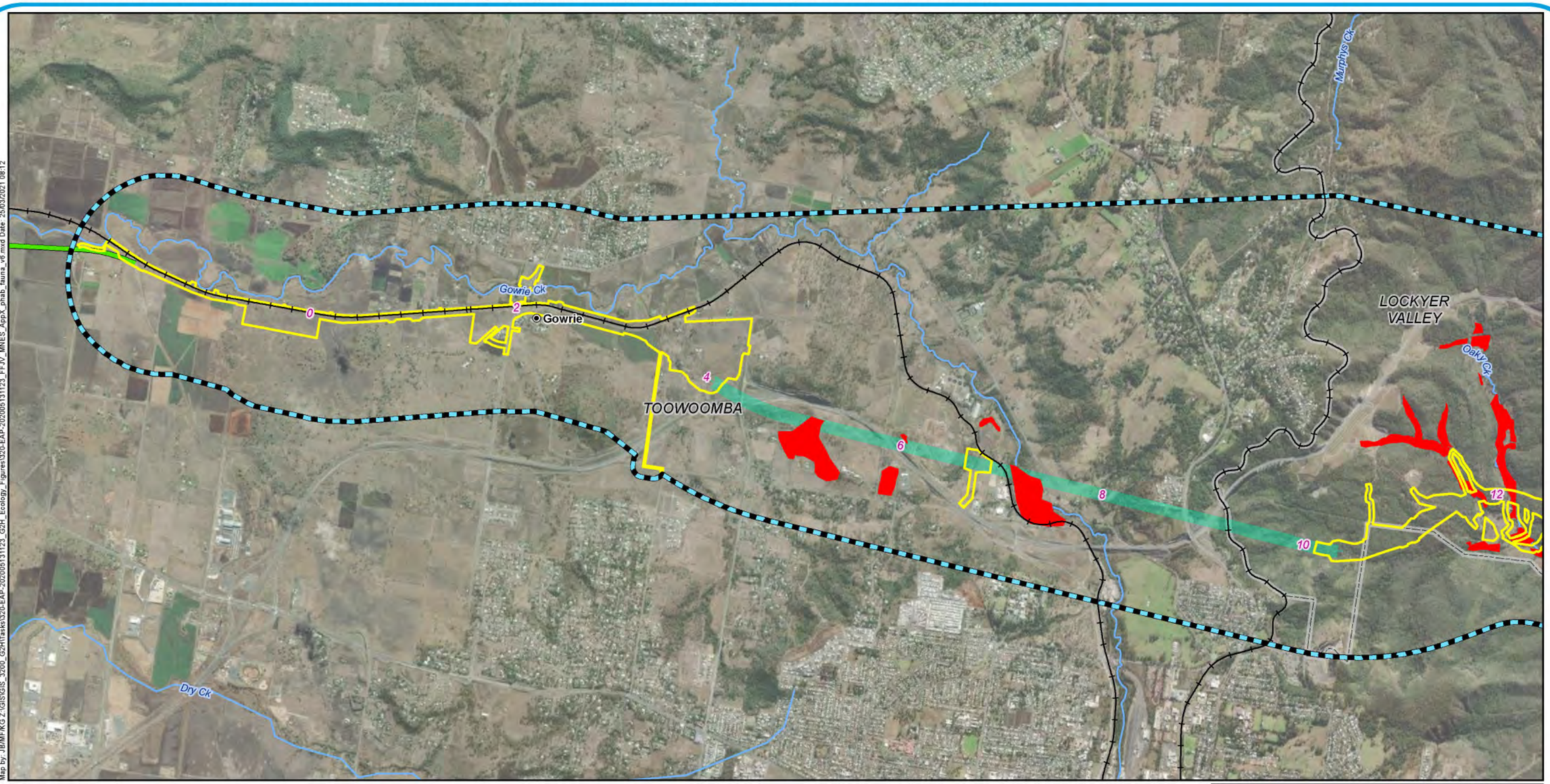
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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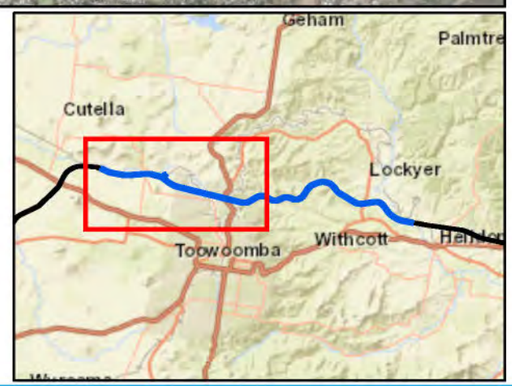
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



A3 scale: 1:40,000

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Future Freight
Integrating Community, Environment and Engineering

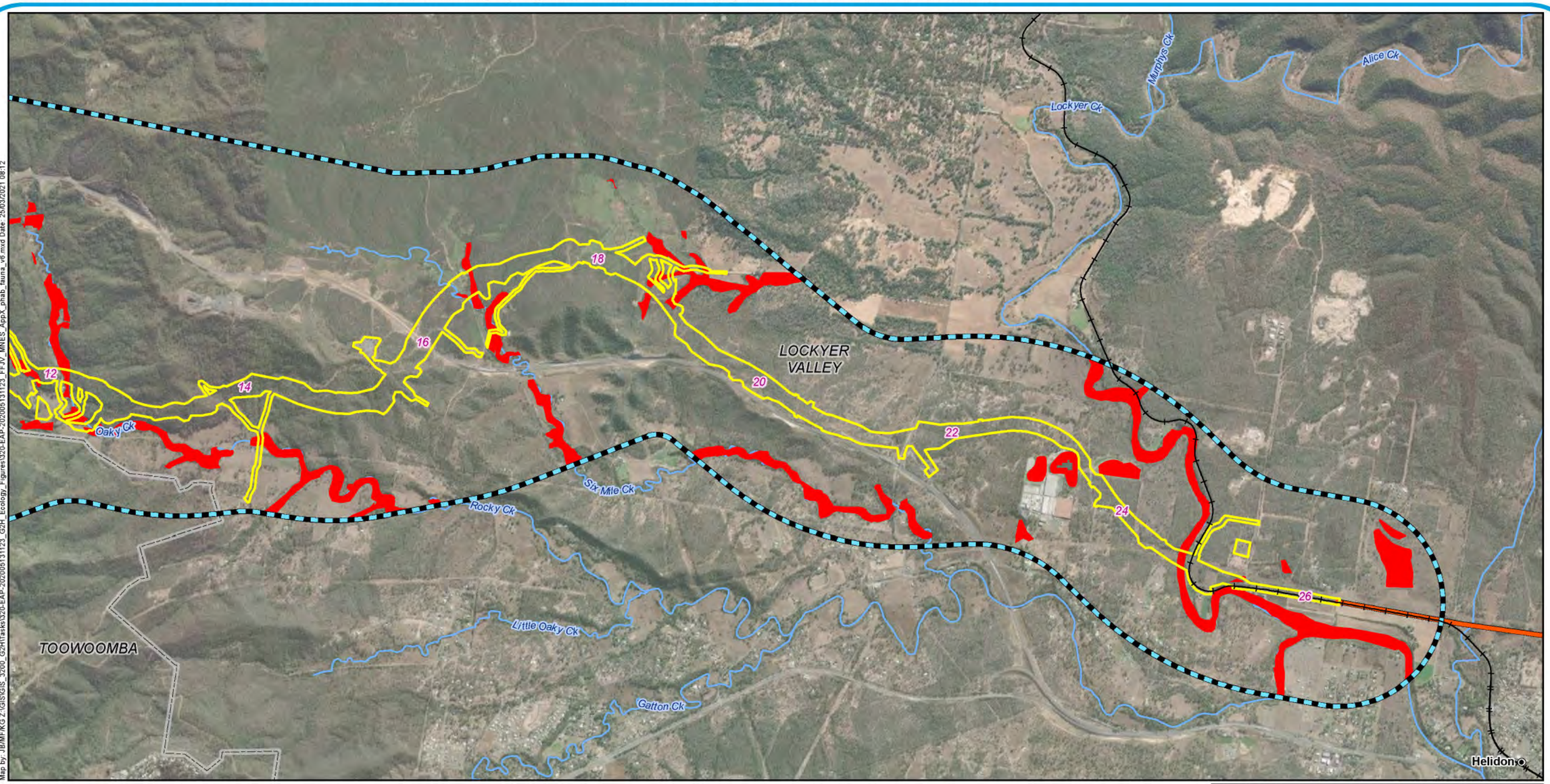
Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Rostratula australis* (Australian painted snipe)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:21

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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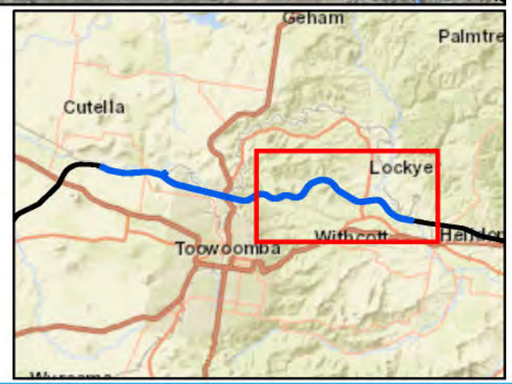
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Rostratula australis* (Australian painted snipe)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:21

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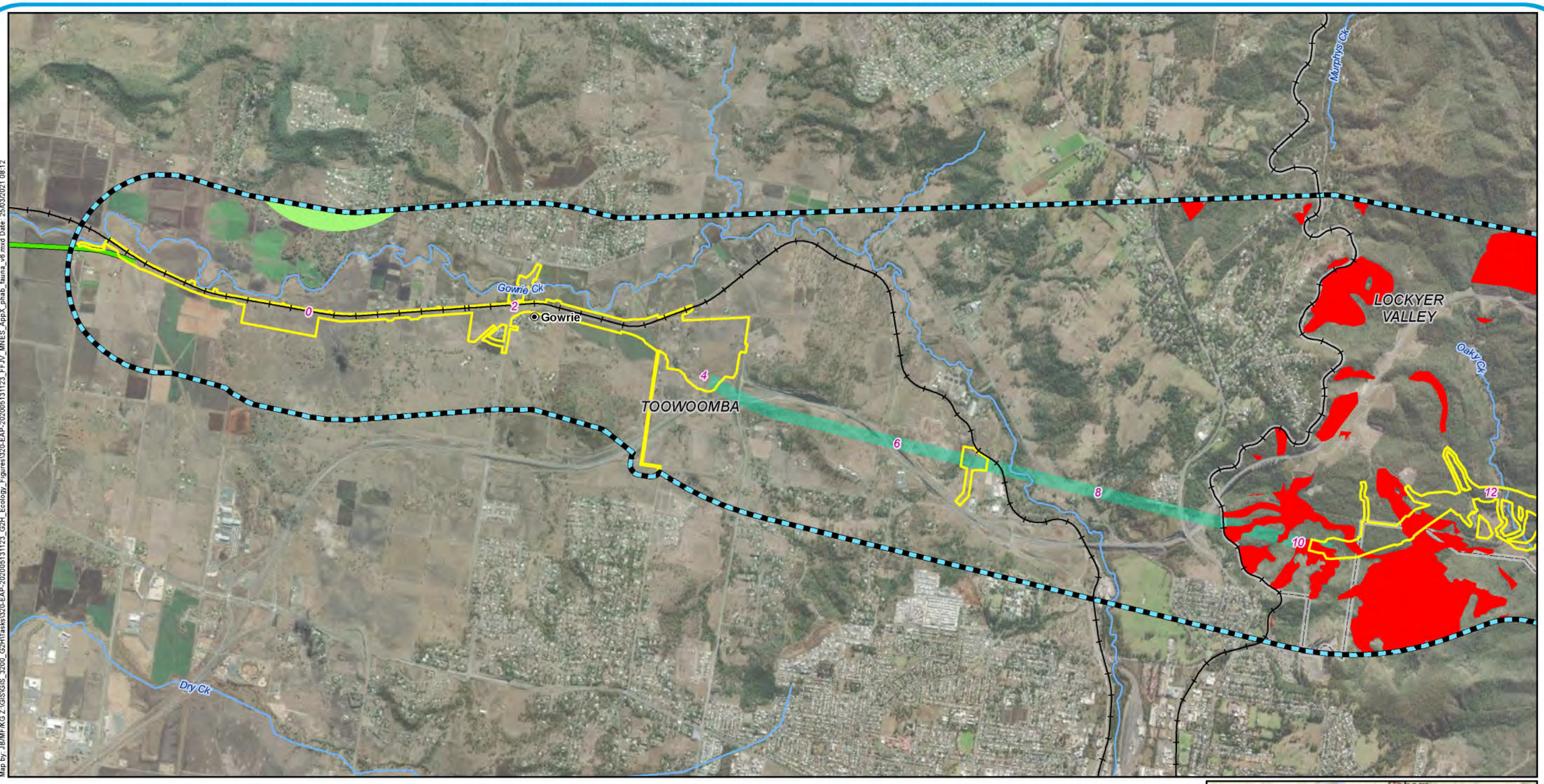

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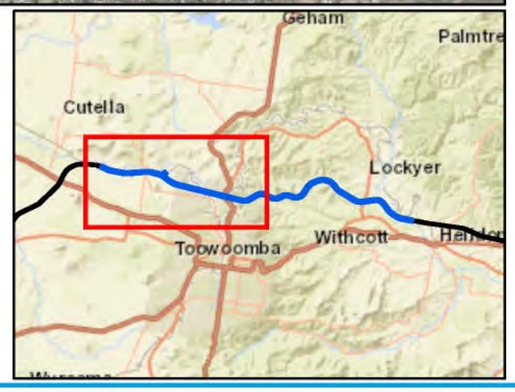
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species
- Potential habitat



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Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Turnix melanogaster* (Black-breasted button-quail)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:21

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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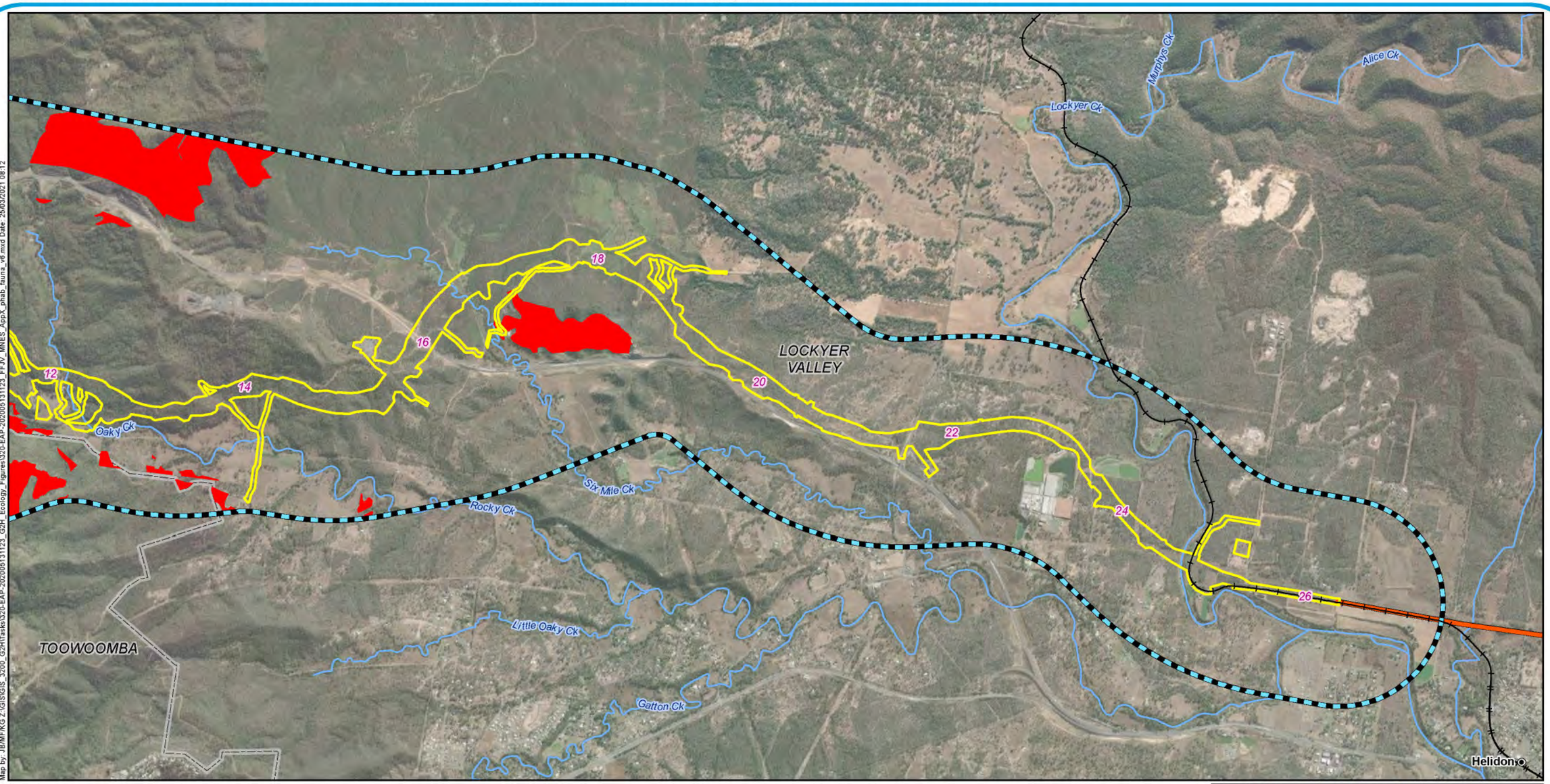

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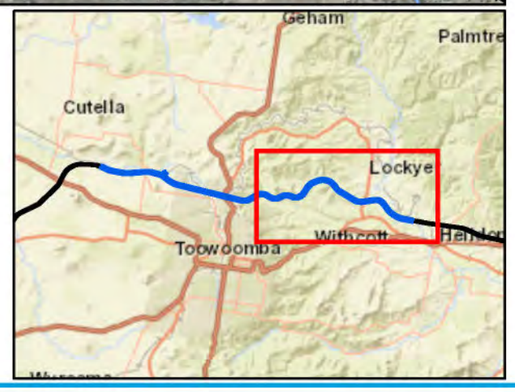
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- H2C project alignment
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Habitat critical to the survival of the species



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Turnix melanogaster* (Black-breasted button-quail)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:21

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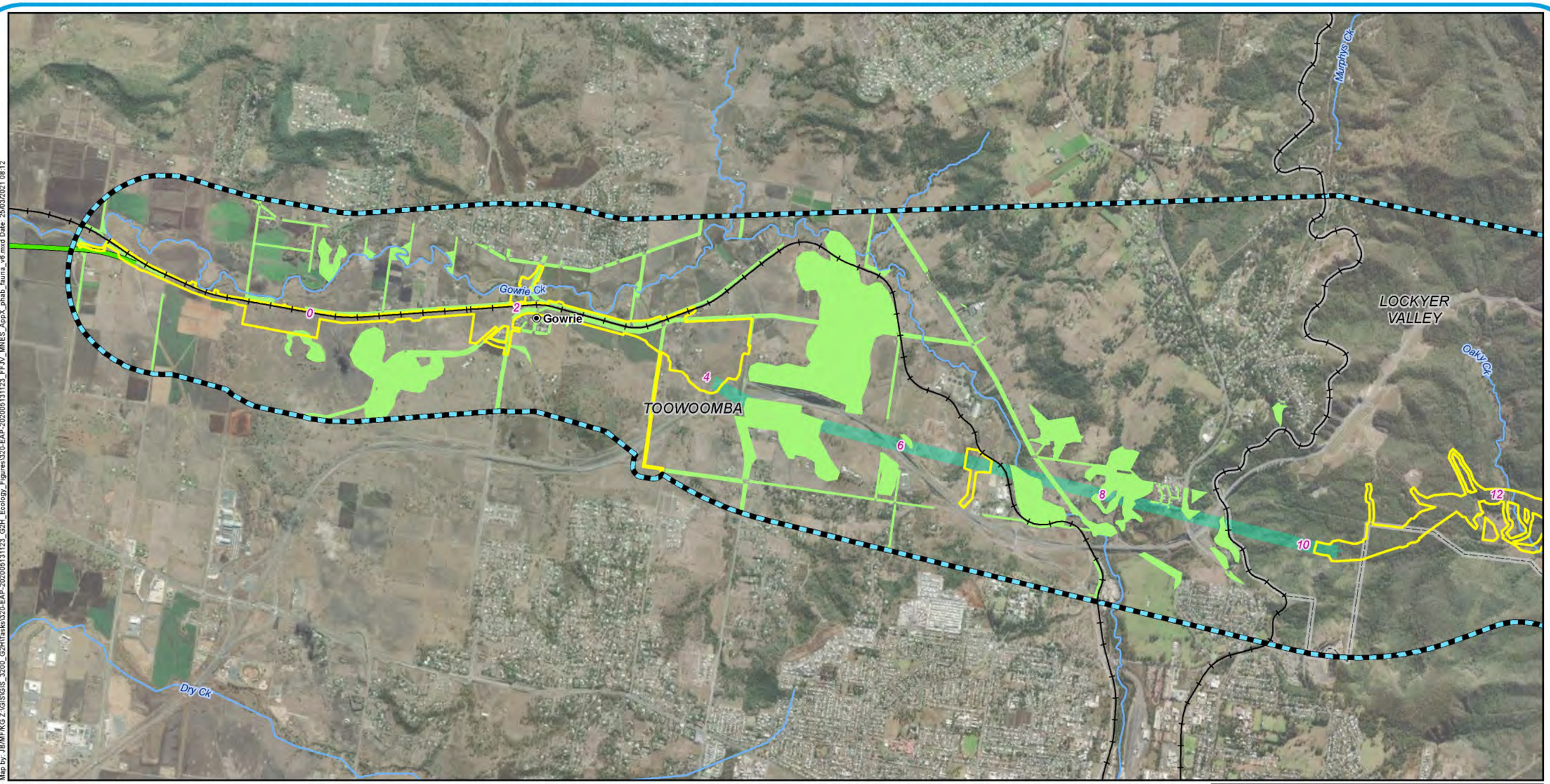

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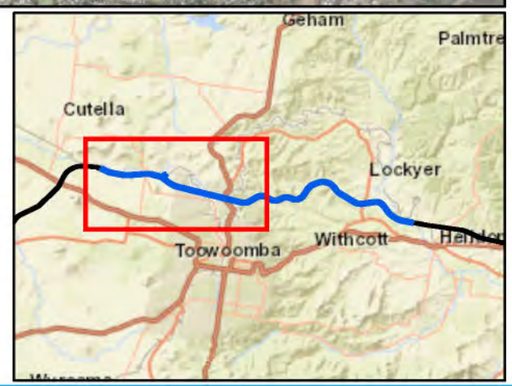
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Watercourses
- B2G project alignment
- Tunnel
- Local Government Areas
- EIS disturbance footprint (surface disturbance only)
- MNES study area

Predicted Habitat

- Potential habitat



A3 scale: 1:40,000

0 0.5 1 1.5 2 2.5km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/01/2021 Version: 6
Coordinate System: GDA 1994 MGA Zone 56

ARTC Inland Rail Study: Gowrie to Helidon

Predicted Habitat: *Tympanocryptis condaminensis* (Condamine earless dragon)

Map by: JB/MF/KG Z:\GIS\GIS_3200_G2H\Tasks\320-EAP-202005131123_G2H_Ecology_Figures\320-EAP-202005131123_FFJV_MNES_AppX_phab_fauna_v6.mxd Date: 25/03/2021 08:21

APPENDIX

J

Matters of National Environmental Significance

Appendix H Completed vegetation and fauna assessment proformas

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT

IR_1536

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

entered CA 26/9/17

Vegetation Proforma

Date: 18/9/17	Future Freight
Observers: CA, SG JS, LL	**Site Name:** 31 S-H

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** 100m

Start point	Zone 56	E 0409591	N 6954872	WP262
End point	Zone 56	E 0409687	N 6954846	WP261

Photo points (numbers): North: 067 East: 068 South: 0670 West: 072.

CAMERA (2).

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	*	Shrub#	*	Ground	*
Height Range (m): 15-18m		**Height Range:** 5-10m		**Height Range:** 1-2.5m		**Height Range:** 0.1-1	
Av. Height (m): 17m		**Av. Height:** 8.5m		**Av. Height:** 2m		**Av. Height:** 0.5	
Cover (%): 31.24.1		**Cover:** 09.6.1		**Cover:** 16.46.		**Cover:** 0-3m	
✓ Spotted gum +5r		✓ Alphitonia excelsa		✓ Lasiona		✓ Dianella	
✓ Narrow leaf Ironbark		✓ Acacia ~~sp~~ leiocalyx		✓ Jacksonia		✓ Arrastida x2	
✓ Corymbia x2.		✓ Petalostigma pub		✓ Persoonia sp - silicola		✓ Lomandra long	
tree spp intermedia.		✓ E tess.		✓ Acacia ~~sp~~ longispicata		✓ Velvety Tree poor	
				✓ Petalostigma sp.		✓ Digitaria sp brownii cubylay.	
				✓ Acacia ~~sp~~ ~~marginata~~ ~~scorpioides~~ carnabae narrow leaf.		✓ Purple arastida	
				✓ Psydrax spodiphylla		✓ Panicum sp.	
				~~Red dooter berry.~~		✓ Eragrostis sp.	
				✓ Pimelea sp. tinifolia		✓ Lomandra sp multiflora	
				> Monotoca scoparia			
						✓ Sadder-laurel	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non-remnant	**Confirmed Regional Ecosystem:** SEE OVER PAGE (sim. to 12.9-10.2) = NON REMNANT
Landform: Gentle slope	
Soils: Brown silty/sandy soil	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): good condition. Small diam fallen timber/sticks. ↑ Leaf litter	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): ↓ 1% cactus.	

termite mounds scaly breast noisy friar rainbow bee
little lorikeets. noisy miner
WHITE WAGTAIL.

Grader pod dalo Still fur. creek bitcher pied

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
100 - 99.61	0.39 m	T2
98.2 - 96.20	2.0 m	S ↓2
98.47 - 93.74	4.73 m	T1
98.27 - 96.00	2.27 m	T2
94.53 - 93.14	1.39 m	S
93.14 - 92.30	0.84 m	T2
88.90 - 81.00	7.9 m	T2
83.58 - 82.0	1.5 m	S
79.35 - 78.03	1.32 m	T2
77.33 - 76.58	0.75 m	S
73.47 - 68.90	4.57 m	T2
66.56 - 58.70	7.86 m	T2
57.16 - 49.29	7.87 m	T2
53.90 - 53.53	0.37 m	S
48.80 - 47.34	1.46 m	T2
47.57 - 46.60	0.97 m	S
41.70 - 38.30	3.4 m	T2
37.00 - 38.73	1.73 m	T2
38.44 - 34.93	3.51 m	T2
38.44 - 15.03	23.41 m	T1
35.61 - 34.87	0.74m	S
34.19 - 23.60	10.59m	S

Summary:	
Minimum height of plants included in the transect table:	1 m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	WOODLAND

Conclusions/notes:

T2 close to being the EDL

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

21m x 0.7 =

		Intercept (m)	
23.50 - 22.20	T2 =	1.3	14.7
23-02 - 22.82	S =	0.2	32%
31.73 - 18.40	T2 =	13.33	
15.08 - 13.03	T2 =	2.05	
12.55 - 8.25	T2 =	4.3	
9.80 - 6.70	T1 =	3.1	
7.55 - 2.05	T2 =	5.5	
1.10 - 0.75	S =	0.35m	
		T1 total % = 31.24%	(15-18m)
		T2 total % = 69.60%	(5-10m)
		Shrub total % = 18.86%	

Confirmed RE: based on 12.9-10.7 RE benchmarks 70% of remnant height = ~14.7m, and 50% of cover = 32% T1 cover.
This site is BORDERLINE REMNANT as is 15-18m tall to cover of 31%.

Entered GA on 26/9/17

Vegetation Proforma

Date: 19/9/2017

Observers: CA & SG

Site Name: G24 15

Future Freight

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** 100

Start point	Zone 56	E 0398477	N 6958231	264 MP
End point	Zone 56	E 0398427	N 6958305	263 MP

Photo points (numbers): North: 86 East: 87 South: 88 West: 89.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m): 25-35	Height Range: 5 – 12	Height Range: 2 – 4	Height Range: ↓ 1m.
Av. Height (m): 30	Av. Height: 8	Av. Height: 2	Av. Height: Eragrostis x2
Cover (%): 55'1	Cover: 58'1.	Cover: 8'1.	Cover: Aristida sepatv
Euc. propinqua (Holland)	* Loph Coyet	Lantana	Heteropogon cont
Erebra	Acacia maideriu	Eu Euc	Red natal Themeda
C intermedia	Allocasuina sp torulosa	Acacia maderii	Wiretch Bregma
Euc Eryglum	Alphitonia excelsa	Leucena	Lomandra long
~~Senopte~~ E saligna.		Bat wing coral	Blady grass Yellow buttons
Top & slope		Alphit excelsa	Wombat berry
eadon x 3sp		Vexocarpos sp.	Dianella sarulia
↓ slope E. prop &		Acacia leacalyx	Viola Verep lantana.
Eryglum dom.		Cassinia	Cyperus Aristida
		~~Dicrpsis kunia~~	passion vine
medlake		Tree pear.	native rasberry
E. citriodora		Strynhonos psilo	Carseria spinosa
			Eragrostis bromu
			Poagon Aca Barbed wire
			Paniceum eff x2

Rats tail native Crotan
Lomandra multi
Hardenbergia sp

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Plectorthus grav.
Smilax, barbed wire grass

Table 2

Mapped Regional Ecosystem: 12.9.10.7	**Confirmed Regional Ecosystem:** Heteropogon sp. 12.9-10.7
Landform: Steep slope.	
Soils: Sandy fine grained	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): No go side veg change in drainage line ↑ lop host.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): medium patches & Lantana more on no-go side of road 10% & cover = lantana.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
99.27 - 96.18	3.09 m	T2
94.67 - 81.62	13.05 m	T1
89.00 - 86.41	2.59 m	T2
80.70 - 50.34	30.36 m	T1
80.09 - 79.06	1.64 m	S
78.00 - 76.85	1.15 m	S
74.47 - 72.92	1.55 m	T2
71.85 - 55.59	15.93 m	T2
54.67 - 53.84	0.83 m	T2
50.34 - 33.58	16.76 m	T2
45.86 - 44.82	1.04 m	S
43.30 - ←	1.48 42.22 m	S
40.46 - 33.58	6.88 m	T1
35.87 - 35.05	0.82 m	S
29.00 - 27.13	1.87 m	S
27.13 - 21.76	5.37 m	T1
13.07 - 10.67	2.4 m	T2
9.00 - 2.13	6.87 m	T2
1.11 - 0.00	1.11 m	T2
-	m	

Summary: T1 = EDL.	
Minimum height of plants included in the transect table:	1 m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	55.66 %
Structural formation	Open forest to tall OF
Conclusions/notes:	
T1 cover 55.66m.	
T2 cover 58.01 m	
Shrub cover. 8m	

nonnatives not recorded.

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

site 15 back to the site 13.
WP265 - non-rem both sides.

WP 266 ~ site 15

→ Non accessible side is dominated by Grey gums (poss. E. saligna) + sub-dom. E propinqua and E crebra.

→ On the accessible side there is some veg. clearing and scattered grey gums

→ Sally wattle and L. suaveolens around drainage line b/w site 13+14

→ RE appears to be correct

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: S2H 15

Date: 19/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

Woodland to Open forest

Regional Ecosystem (mapped): 12.9.10.7 Regional Ecosystem Observed: 12.9.10.7

Remnant / Non-remnant (circle) Old regrowth. +30yrs.

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		As per site 15 flora sheet.
East:		West:		

Ryans whistler

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	0
Clearing	1
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Delma rocks on surface steep slope	North-East facing slope	
some ↓ lantana ↑ leaf litter		
Glossy Black Cockatoo limited native Allocasuarina ∴ fruit	?	
BBBQ Steeper slope possible ↑ lantana	?	
Koala Suitable tree sp.	✓	

✓whistling kite

Incidental fauna observations/scats/traces:

✓pied butcher
✓pied currawong
✓whip bird
✓grey fantail
✓hewins honeyeater
✓Eg shrike thrush
✓variegated wren.
✓Peaceful dove
✓headers ~~flg~~ flycatcher
✓kookaburra
✓Brans honeyeater
✓Superb fairy wren.
✓Rufous whistler
✓spotted pardalote
eastern yellow robin
✓rainbow lorikeet
✓yellow tailed black.
✓little lorikeet ✓rainbow bee eater

Future Freight

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia) termites in Eprop.	>30cm diameter	0
	>15cm, <30cm diameter	1
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		2
Coarse woody debris (<10cm diam.)		4
Decorticating bark		5
Leaf litter (%)		90
Bare ground (%)		10
Grass (%)		15
Soil cracks		–
Soil banks (eg. River banks/road cuttings, etc.)		1
Surface Rocks and/or Boulders		2%
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		Shrub 20%
Rock Crevices		–
Flower Abundance (%)		5%
Fruit Abundance (%)		– <5%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Entered CA 20/9/17. Area 1/ha.

Vegetation Proforma

Road Reserve narrow

Date: 19/9/17	
Observers: SG & CA	Site Name: GH 33

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 56	E 0409766	N 6953686	267 WP
End point	Zone 56	E 0	N	

Photo points (numbers): North: 96 East: 97 South: 98 West: 99

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 18-22		Height Range: 10 - 15		Height Range: 1.5 - 2.5		Height Range: 1.5	
Av. Height (m): 20		Av. Height: 12		Av. Height: 1.5		Av. Height: 0.6	
Cover (%): 30%		Cover: 25%		Cover: 5%		Cover: 80%	
[illegible]	*	√A. salicina		√A maideni		√Rhodes grass	
√E. teret		√E. armenoides		√Lantana		√Bothrichloa	
√Angophora sp rough (slim to summers)		√E tess		√Juv euc		√Lotus sp	
		mostly acacia				√Flea bane [illegible]	
√E. crebra						√Winter apple	
						√Qld hemp	
						[illegible]	
						√Green panic	
						√Dichanthium sericeum	
						√Milk weed	
						√Sida rhomb	
						√Cocus palm	
						√Heteropogon cont	
						√Aristida sp	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem: Non - rem
Landform: base of slope	
Soils: cracking clay	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Cracking soils on edge. Drain through middle along road. some blue grass	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

macropod scat. Black faced monarch pale head. Rainbow lorik noisy friar. finch sp?

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered 26/9/17.

Fauna Proforma

Site Information

Site Name: G2H SHP 33

Date: 19/9/17 Observers: SG + CA

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting:_____ Northing:_____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	
Clearing	
Erosion	

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ tusked frog standing H2O ? ↓ poss 1x dead core food		
✓ koala ↓ but possible food trees ?		

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	
	>15cm, <30cm diameter	
	>10cm, <15cm diameter	
	>5cm, <10cm diameter	
	< 5cm diameter	
Fallen logs (>10cm diam.)		
Coarse woody debris (<10cm diam.)		
Decorticating bark		
Leaf litter (%)		
Bare ground (%)		
Grass (%)		
Soil cracks		
Soil banks (eg. River banks/road cuttings, etc.)		
Surface Rocks and/or Boulders		
Wetlands (Y/N). If yes complete wetland Proforma		
Weeds and non-native species (%)		
Rock Crevices		
Flower Abundance (%)		
Fruit Abundance (%)		
Water present (Y/N)		

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓ Weebill, Little lorikeets, ✓ Peaceful dove, ✓ black faced ~~cockatoo~~ ✓ noisy friar
pale headed rosella
rainbow lorikeet
finch sp?
Cuckoo shrike

entered 26/9/17

No ~~of~~ site access
No access to other suitable sites

Vegetation Proforma

Date: 19/9/2017	
Observers: CA & SG	Site Name: PP 35

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone	5	6	E	0	4	1	1	9	2	0	N	6	9	5	3	8	3	0	268
End point	Zone	5		E	0							N								

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	*	Shrub#	*	Ground	*
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m):		Av. Height:		Av. Height:		Av. Height:	
Cover (%):		Cover:		Cover:		Cover:	
√E. ~~tess~~ tess √E. crebra √E tereti?		√A. salicina She oak in riverbed √Privet					

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem:
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Notes from vehicle with binos Not remnant.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17.

Vegetation Proforma

rainbow bee eater

Date: 20/9/2017	Future Freight
Observers: CA & SG	Site Name: GZH 21

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 100m

Start point	Zone 56	E 0403302	N 6955531 272 NP.
End point	Zone 5	E 0	N

Photo points (numbers): North: 146 East: 147 South: 148 West: 149.

Photos @ 37mts along transect.

South facing slope @ 260m.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
✓C. citriodora	D*	✓E. crebra ✓ citriodora Acacia fine leaf ✓Acacia leiocalyx ✓Eucalyptus melanoph ✓ → Acacia glaucocarpa	✓Lantana Ju Acacia & Euc ✓Spikey sample. ✓Bursaria spinosa. ✓Alphitonia ✓psydrax ✓Exocarpus.	✓Lomandra sp long + multi ✓Aristida sp Panicum sp queensland ✓Wombat berry ✓Alternthera sp. sample ✓Breynia. ✓Dianella long ✓Lomandra long

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 12.9-10.2/10.7.	Confirmed Regional Ecosystem: 12.9-10.2
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.: Woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): ↑historical clearing of citriodora. firewood collection small scale clearing over property.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana 30% of shrub layer as photos. 1x cactus.	

20m distance = 130°(-18) × 0.2
ground - ~~250~~ 18 = 14.8 × 0.2 = 29.6m.
top + 130

Sulfur Creeked

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
99.27 - 97.09	m	T2
99.50 - 89.23	m	T1
95.30 - 92.04	m	T2
91.50 - 89.23	m	T2
88.67 - 78.90	m	T1
88.35 - 86.24	m	S
85.73 - 77.36	m	T2
82.97 - 81.48	m	S
72.81 - 71.74	m	T2
69.84 - 60.19	m	T2
69.38 - 63.56	m	S
66.87 - 56.40	m	T1
60.62 - 56.48	m	S
56.48 - 54.94	m	T2
54.94 - 50.63	m	Track
50.63 - 46.73	m	T1
45.10 - 43.24	m	S
44.65 - 37.27	m	T2
37.67 - 30.13	m	T1
35.34 - 33.10	m	T2

Summary:		
Minimum height of plants included in the transect table:	m	
Intercept of EDL 0 - 50m:		m
Intercept of EDL 50 -100m:		m
Measured crown cover % of EDL 0 -100m:		%
Structural formation		
Conclusions/notes:		

T1 15-30 T2 4-15 S ↓3m

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

23.24 - 18.54	T2		
22.97 - 17.64	T1		
17.10 - 16.47	S		
16.08 - 12.53	T2		
13.24 - 12.53	S		
12.43 - 3.33	T1		
10.04 - 1.60	T2		
8.44 - 7.18	S		
2.73 - 0.00	T1		
1.38 - 0.00	T2		

Entered CH 26/9/17

Fauna Proforma

Site Information

Site Name: SG421

Date: 29.9.17 Observers: CA & SG

LOCATION (GPS reference) See Veg sheet

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	2
Clearing	2
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ Koala tree sp present	✓	
BBBB no platlets		

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	–
	>15cm, <30cm diameter	–
	>10cm, <15cm diameter	–
	>5cm, <10cm diameter	–
	< 5cm diameter	–
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		5
Decorticating bark		1
Leaf litter (%)		90%
Bare ground (%)		10%
Grass (%)		1%
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) lantana		10%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		1
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

~~to~~
less diggings here than on 22
noisy miner ✓, magpie ✓, rainbow bee eater ✓, rufous whistler ✓
leaden flycatcher ✓ sulfur crested ✓, I

Entered A 26/9/17

Vegetation Proforma

Date: 20/9/17	
Observers: CA & SG	Site Name: 22

Future Freight

Integrating Community, Environment and Engineering

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 56 E 0403012 N 6955820 MP271

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____. See fauna sheet

Photos: 128 - 131

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
✓Crebra	*	~~Eucalyptus~~	✓Psychotria	✓Lahonia
✓Spotted gum		✓Juv Euc	✓Montana	✓Hemarthria long
✓Corymbia Intermedia		✓Acacia leiocalyx	✓Exocarpus	✓Grastidia
✓Acacia littoralis		✓" fine leaf.	✓Spikey sample	✓Wombat berry
		L7 A. glaucocarpa.	✓Cassinia	✓Grevillea
			✓Bursaria	✓Montana.
			✓Acacia leiocalyx	✓Wintersweet.
			✓Alocasurina.	✓Passion vine

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem: 12.9.10.7
Landform: Fauna sheet	
Soils: pale pale orange sandy silt ✓ fine small peds.	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Some native grasses in cleared areas.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: GA24_22

Date: 29/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 0403024 Northing: 6955810 Accuracy ___ m

Altitude: 310 m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Open creba woodland regrowth next to road

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

P. Suppressed Spotted gum, * intermedia Slope 15%

Regional Ecosystem (mapped): 12.9-10.2/10.7 Regional Ecosystem Observed: 12.9-10.7.

Remnant / Non-remnant (circle) Just 50/70 rule.

STRUCTURE

Tree canopy present (Y) / N average height 15 m cover 10 %

Dominant species: Crebra

Sub canopy present (Y) N average height 7 m cover 40 %

Dominant species: Acacia * Juv Euc.

Shrub layer present (Y) N average height 2 m cover 50 %

Dominant species: Exocarpus / cassinia / bursaria / psydrax / lantana patch.

Ground layer: cover 10 % weeds <5 % Dominant species Sahonia / Arastida.

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	128	South:	130	below: Finch/wren nest photo.
East:	129	West:	131	scatt collected.

BBB2 Platlet photos? @ 56 0403050 6955782 NP269
Photo N°s 120 + 121 to 0403024 6955810 NP270.
→ 125.

grey fantail termite mounds. black faced woodshrike

rabbit scatt

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	2
Clearing	2 historical
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ BBBQ see photo	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		5
Decorticating bark		2
Leaf litter (%)		5
Bare ground (%)		3
Grass (%)		↓5
Soil cracks		- 0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		0
Weeds and non-native species (%) lantana/cactus		↓5%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%) exocarpus		2
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

lots of diggings small & large termite mounds.

✓grey Fantail ✓weebills ✓wren.

✓Pogona sp sighted barbata

✓Black faced CS

Entered CA 26/9/17

Fauna Proforma

Future Freight

Site Information

Site Name: Incidental near Site 21 (+22) — INCIDENTAL

Date: 20/9/17 Observers: SG + CA

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

can hear road noise clearly... followed drainage line

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

forest spotted gum > grey gum > crebra / melonof: mix some ETess

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

understog lantanon slope Acacia juv Euc. Melaleuca on drainage line

STRUCTURE

Tree canopy present (Y) N average height 20 m cover 50 %

Dominant species: Spotted gum 40→20

Sub canopy present (Y) N average height 10 m cover 30 %

Dominant species: Juv Euc

Shrub layer present (Y) N average height ___ m cover ___ %

Dominant species: Lantana

Ground layer: cover ____ % weeds ____ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		109 - 118
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	2
Clearing	1-2
Erosion	1 where tracks present

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
B.B.B. Quail (Lantana on NEFR slope)	? No plate lets observed.	
Koala Spotted Gum, Grey Gum	Possible.	
GB Cockatoo.		No – no allocas.
Belmia Limited rock, sparse crebra.		No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	1
	< 5cm diameter	1
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		4
Decorticating bark		4
Leaf litter (%)		6
Bare ground (%)		4
Grass (%)		3
Soil cracks		1
Soil banks (eg. River banks/road cuttings, etc.)		4
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		15-20% Lantana ↑
Rock Crevices		1
Flower Abundance (%)		30%
Fruit Abundance (%)		0-1%
Water present (Y/N)		N

*Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces: 8:30am Lewins honeyeater, willie wagtail, Red B'bird, Galah, Cockatiel, flycatcher, ~~Apostle~~, Lewins H eater, whip bird, Grey fantail, Rainbow bee-eaters, whip bird, Yeaden flycatcher, Western gerogone, Crested pigeon, Striated thornbill, Bush turkey, Noisy Friar, Miner, Golden Whistler?, Welcome Swallow, Stri. Pard, Wee bill, Rainbow lorikeet, Variegated Fairen.

For crow

ENTIRED CA 26/9/17

Vegetation Proforma

Date: 20/9/2017	Future Freight — Integrating Communities, Environment and Engineering
Observers: CA & EG	**Site Name:** GRH 26

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** 100m

Start point	Zone 56	E 0406062	N 6956182	273WP
End point	Zone 56	E 0406045	N 6956172	274

Photo points (numbers): North: 176 East: 177 South: 178 West: 179.

U shape transect.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
✓E. crebra	*	✓E. crebra ✓intermedia ✓Acacia ~~fraterna~~ glaucocarpa ✓A. leiocalyx ✓Alphitonia ~~Crebra? sample~~ ✓Melaleuca constricta	✓Canthium ✓Exocarpos ✓Juv T2 ✓Lantana ✓Ac. salicina ✓SPBB. ✓Breynia. ✓Spikey sample	✓Barbed wire ✓Black spear ✓Dichanthium ✓Sida (Qld hemp) ✓Wombat berry ✓Lomandra multi ✓Panicum sp Q101 ✓Aristida ✓Winter apple ✓Kangaroo grass Chloris (comb)? ✓Sida rhomb ✓Eragrostis brown? ✓Creep lantana ✓Grewia ✓Lomandra filiformis

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2 Crebra woodland Regrowth

Mapped Regional Ecosystem: 12.9.10.7	**Confirmed Regional Ecosystem:** 12.9.10.7
Landform: Slope quite steep ⇒ gully	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): V. small & limited soil cracks. V. high level of disturbance fire & clearing & grazing	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Yellow berry bush? red young stems
M. Silvestrus.

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
98·17 - 92·50	m	T2
-	0·1 m	S
92·26 - 90·34	m	S
91·70 - 96·42	m	T2
82·08 - 80·39	m	T2
79·31 - 78·50	m	T2
78·23 - 67·20	m	T2
66·62 - 57·80	m	T2
60·30 - 59·66	m	S
57·80 - 56·27	m	S
56·04 - 55·21	m	S
54·00 - 52·81	m	S
53·05 - 45·20	m	T2
44·92 - 44·55	m	S
39·78 - 36·95	m	T2
35·82 - 35·08	m	S
35·43 - 34·11	m	T2
34·60 - 33·80	m	S
33·64 - 32·45	m	T2
31·57 - 31·10	m	S

TT

Summary:	
Minimum height of plants included in the transect table:	1 m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Photos @ 50m.

T2 3-12.(10). S↓3

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

29·65 - 28·30	S		
28·00 - 24·82	T2		
22·58 - 20·79	S		
18·72 - 18·15	T2		
14·93 - 3·06	T2		
8·00 - 7·40	S		
7·37 - 2·06.	T1		

✓ Alistonia constricta. ✓parsonsia. ✓Flag bane ✓Cassinia ✓passion vine

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: G26 26

Date: 20/9/17 Observers: CA & SG

LOCATION (GPS reference) as per veg sheet

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	176	South:	178	180 creeping lantana 10m² aprox (>182
East:	177	West:	179	

Magpie, little lorikeet.

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	2
Grazing	2
Clearing	2
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓Delma Some rock on soil minimal leaf litter slope suitable	?	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		4
Decorticating bark		2
Leaf litter (%)		45 %
Bare ground (%)		55%
Grass (%)		10%
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		3
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) lantana		5%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓magpie, bronze-wing, ✓beebill. ✓grey fantail, ✓rainbow lorikeet, fuscous honeyeater. ✓little lorikeet

Entered CA 26/9/17.

Vegetation Proforma

Date: 20/9/17	Future Freight
Observers: CA & SG	**Site Name:** 52H 27

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** N/A

Start point	Zone 56	E 0406447	N 6956372	MP 275
End point	Zone 5	E 0	N	

Photo points (numbers): North: 196 East: 197 South: 198 West: 199.

Photos.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 16 - 20		Height Range: 7 - 14		Height Range: 1 - 2m		Height Range: 0.1 - 0.7	
Av. Height (m): 18		Av. Height: 8		Av. Height: 1.5		Av. Height: 0.43	
Cover (%): 40%.		Cover: 15-20%.		Cover: 15%.		Cover: 80%	
E. cit ✓		✓Ac maideni		✓Lantana		✓Dichanthium	
corymbia ✓		✓E. tessellaris.		✓Exocarpus		✓Barbed wire	
Melaleuca						Panicum simile	
E. tereticornis ✓						✓Kangaroo grass	
						Aristida tall calycina	
						✓Enneapogon	
						✓Eragrostis brum	
						✓Native sporobolus.	
						✓Yellow buttons.	
						tall clustered lovegrass E. setifolia	
						bluegrass D. sericeum	
						✓Lomandra filiformis	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2 Cdt woodland O/Forest or Melaleuca Open forest. Regrowth

Mapped Regional Ecosystem: 12.9-10.2/10.3	**Confirmed Regional Ecosystem:** 12.9.10.2
Landform: Plain @ base of slope.	
Soils: Pale grey silty clay	
Structural formation (eg woodland, open-forest etc.: open forest regrowth	
Field Observations/ Notes (eg. Level of disturbance connectivity): Regrowth site history of logging generally healthy.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana 10%.	

20m
-13

80 - (-13) 93 x 0.2

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Thesium potential		
pale grey silty clay ☺		
native grassed.		

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: G24 27

Date: 29/9/17 Observers: CA & SG

LOCATION (GPS reference) See veg sheet.

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 0406447 Northing: 6956372 Accuracy ___ m

Altitude: _____ m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

open area w/in forest. regrowth

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ___ % weeds ___ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		191 – 194 Photos. Scratch marks on tree & diggings
East:		West:		

Pale grey silty clay. med plastic.

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	2 historical
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ Tresirium potential	✓	
✓ Quoll? limited potential	?	✓
Koala limited potential young regrowth.		✓
BBBB no signs. no dope		✓
Delma see site 24.		✓
Glossy black no hollows or feed trees		✓
Gliders no hollows.		✓

Incidental fauna observations/scats/traces:

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		2
Decorticating bark		3
Leaf litter (%)		20%
Bare ground (%)		10%.
Grass (%)		@ 70%.
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) lantana		10%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Entered CA 26/9/17

Vegetation Proforma

Date: 21/9/17	Future Freight
Observers: CA & SG	**Site Name:** 52H 18

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:**

Start point	Zone	5		E	0	3	9	9	2	3	3	N	6	9	5	5	5	4	8	WP283
End point	Zone	5		E	0							N								

Photo points (numbers): North: ____ East: ____ South: ____ West: ____ Cassie IPhone 16.21 → 16.26

no transect as lantana too thick

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
over (%):		Cover:	Cover:	Cover:
✓Aloe litoralis	*	✓Red kamala	✓Lantana	✓Asparagus fern
✓Melaleuca bract		✓Grevilla robusta	✓Spikey vine pea thing Honey Locust	Plectorthus sample
		✓Strangler fig F. wat Rhsiana	✓Native holly	✓Sgt bracken
			✓Castor oil	✓Wondering jew
			✓Solanum (tree tobacco.)	✓Giant sedge?
			✓Tuckeroo sp	✓Wombat berry
			✓Cocaine bush	✓Cats claw
			✓A. maideni	✓Scrambling lilly
			✓Abutalon sp.	✓Maiden hair fern
			✓Alyxia ruscifolia	✓Fish bone fern
			✓Native hibiscus	✓Lomolena.
				✓Tree Fern
				✓Madena vine
				✓Carissa obvata.
				✓Smilax
				✓Dendrobium sp.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2 12.37 /

Mapped Regional Ecosystem: 12.9-10.15	**Confirmed Regional Ecosystem:** 12.3.7a.
Landform: Creek	
Soils: Alluvium & rocks & gravels	
Structural formation (eg woodland, open-forest etc.: Forest	
Field Observations/ Notes (eg. Level of disturbance connectivity): Veg along creek only surrounded by non rem. ↑ weed impact	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): lantana, asparagus fern, madera vine, cats claw, castor oil 30-40% Shrub → Grand layer	

Masked Woodswallow.
black faced cuckoo shrike

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

GPS WP 284		
0399270		
6955597		
↑ blue grass D ranuclus		
on edge of d/line		
poss thesium site.		
also spikey weed.	SAMPLE Honey LOCUST ✓	
✓ silver bark		
Ptema		

Entered CA 26/9/17.

Fauna Proforma

Site Information

Site Name: SHP 18 62N

Date: 21.9.17 Observers: SG + CA

LOCATION (GPS reference)

Datum: ☐ AGD84 ☑ GDA94 (WGS84) OTHER: .....

WP283

Plot Centre: Zone: 56J Easting: 0399233 Northing: 6955548 Accuracy ___ m

Altitude: 348 m Altitude accuracy: +/- 5 m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Creek on Reserve Nearing Land, off easement via Jones Road.

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

Forest on alluvium. Some disturbance due to prev. clearing and weed impact

Regional Ecosystem (mapped): 12.3.7/12.9.10 Regional Ecosystem Observed: RE 3.7

↳ some rine forest spp in understorey

Remnant / Non-remnant (circle) has been cleared @ edges + in some patches.

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover 80% % weeds 30-40 % Dominant species Lantana, Nsp. Fern, Spiky Senna bush

see veg sheet

see vegetation sheet

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		iPhones iphone Time Stamp = 16:21 to 16:26
East:		West:		

NESW @16:26

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	2
Clearing	2
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
POSSIBLE FMB Thesium @	✓	
edge of p'line		

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		3
Decorticating bark		1
Leaf litter (%)		50%
Bare ground (%) ~ rocks.		30%
Grass (%)		0
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		Y - dry river bed with in stream banks S/Nat
Surface Rocks and/or Boulders		Y - in riverbed
Wetlands (Y/N). If yes complete wetland Proforma		Y
Weeds and non-native species (%)		20%
Rock Crevices small only		3
Flower Abundance (%)		15%
Fruit Abundance (%)		↓ 2%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓Brown Cuckoo dove
✓Eastern Yellow robin
✓Lewin's Honeyeater
✓Pied Currawong
✓Little Kingfisher
✓Grey Shrike thrush
✓Black FCS
✓Silver eye
✓~~Painted~~ honeyeater Spiney cheeked
✓Bar shouldered dove
✓Masked wood swallow

Wallaby (possum Swamp)

Native hibiscus

Fauna Proforma

Site Information

Site Name: Site 18 – ANABAT

Date: 22/9/17 Out @ 5:10 pm Observers: SG + CA

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 0399284 Northing: 6955648 Accuracy ___ m

Altitude: _____ m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.): _____

See Site 18 veg + fauna sheet for info

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	409	South:	411	
East:	410	West:	412	

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	
Grazing	
Clearing	
Erosion	

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Incidental fauna observations/scats/traces:

Future Freight

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	
	>15cm, <30cm diameter	
	>10cm, <15cm diameter	
	>5cm, <10cm diameter	
	< 5cm diameter	
Fallen logs (>10cm diam.)		
Coarse woody debris (<10cm diam.)		
Decorticating bark		
Leaf litter (%)		
Bare ground (%)		
Grass (%)		
Soil cracks		
Soil banks (eg. River banks/road cuttings, etc.)		
Surface Rocks and/or Boulders		
Wetlands (Y/N). If yes complete wetland Proforma		
Weeds and non-native species (%)		
Rock Crevices		
Flower Abundance (%)		
Fruit Abundance (%)		
Water present (Y/N)		

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Entered CA 26/9/17.

Wetland Proforma

Future Freight

Site Information

Site Name: G2H 18

Date: 21/9/17 Observers: CA SS

GPS Location 0399233 6955548

Step 1: Mapping datasets.

Is the site mapped as a wetland of High Ecological Significance (HES) of General Ecological Significance (GES) in any of the following datasets?

Dataset	Mapped
• **"Wetlands referable GBR"** – DEHP Map of referable Wetlands in the Great Barrier Reef Catchment • **"Wetlands Referable"** – DEHP Map of referable Wetlands; or • **Any other wetland database** – state source	
Comments	

Step 2: Hydrology.

Are there signs of permanent, periodic or intermittent inundation (tick as appropriate) – <u>If none present do not proceed to Step 3</u>

○ Water saturation	○ Water Inundation	○ Micro relief
○ Debil Debil, Gilgais	○ Algal Mats/flakes	○ Aerial roots
✓ Flood marks	○ Iron staining	○ Mud cracks
○ Surface Staining	○ Salt crusts	○ Indication of inundation on aerial imagery
○ Wetland landforms (eg. Lakes, lagoons, swamps, drainage features	○ Wetland soils (eg. High level of organic matter at surface which is decomposed indicating Organosols present)	○ Wetland drainage patters (eg. Drainage pattern eroded into soil, vegetation matter piled against existing vegetation)

Comments

Wetland Proforma

Future Freight
Integrating Community, Environment and Engineering

Step 3: Flora

Is there >30% cover of wetland indicator species present (visual estimate). Wetland indicator species include aquatic macrophytes such as sedges and rushes.

○ Yes	⊗ No
Comment/ Indicator Species present	See vegetation sheets for comments.

Step 4: Landscape feature

Are there landscape features present that indicate a wetland environment? – <u>If yes, Site is confirmed as a wetland</u>

⊘ Landscape topography conducive to wetland environment (eg. Depressions), area of limited drainage or area in proximity to a waterbody
Comment/ Indicator Species present ~~Cuscfle~~ within drainage line as per photos Cassie iPhone. Cane grass and other species present outside of d/line close to power line.

Species present See vegetation & fauna sheets.

Flora	Fauna

Vegetation Proforma

Entered CA 26/9/17

Date: 21/9/17	
Observers: CA & SG	Site Name: S 17

Future Freight
Integrating Community, Environment and Engineering

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:

Start point	Zone 55	E 0398860	N 6955654
End point	Zone 55	E 0	N

Photo points (numbers): North: 269 East: 270 South: 271 West: 272.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	*	Shrub#	*	Ground	*
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m):		Av. Height:		Av. Height:		Av. Height:	
Cover (%):		Cover:		Cover:		Cover:	
Crebra ✓		✓E. propinqua		✓Alectryon diu		✓Bronellis sp	
Lophost ✓				✓Hortona		✓Dianella	
E. acamenoides ✓				~~Solanum~~		✓thin lomandra Long	
				✓Ac maideniii		✓Asparagus fern	
				✓Jun Ende		✓Cartisa obvata.	
				✓A leiocalyx.		✓Enneapogon	
				~~Alstonia~~		~~Melaleuca~~	
				~~Atchornea~~		✓Harderbegia	
				Acacia. everistii		✓Pandorea pandorana	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

END/END OC/OC

Table 2 HoopSEVT. Crebra

Mapped Regional Ecosystem: 12.9-10.15 / 9-10.7	Confirmed Regional Ecosystem: Confirmed as mapped
Landform: Slope, steep.	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Close to p'line easement to EVC woodland overstorey, grading into SEVT @ drainage line / with SEVT shrubspp	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Asparagus fern	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17.

Fauna Proforma

Site Information

Site Name: G2H 17

Date: 21/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: ..... WP277 / Scat collected

Plot Centre: Zone: 56 Easting: 0398860 Northing: 6955654 Accuracy ___ m

Altitude: _____ m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

..... Open forest .....

Regional Ecosystem (mapped): 12.9-10.7 Regional Ecosystem Observed: ✓

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ___ % weeds ___ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	269	South:	271	Good stags.
East:	270	West:	272.	Koala scratches / 273 - 282 WP278 & other

K

Macropod scat 0398851
Koala scat? 6955617

Rocky outcrop edge of SEVT 0398811
Spec monarch 316 - 325 6955555
Photos 326 → Feathers → 327 → 337
Quoll Caves

Quoll? 298 - 301 WP 280
Quoll? WP283 0398814
695553

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	
Grazing	
Clearing	
Erosion	

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Koala scat collected Suitable trees.	✓	
Glidera Paraful/ suitabe veg % hollows	✓	
Delma no deep leaf litter & some rocks.		✓
BBBQ not open enough		✓
Glossy no food trees.		✓

Incidental fauna observations/scats/traces:

✓Grey fantail ✓Whip bird
Kewins H/Eater ✓kookaburra
✓Rainbow bee eater. ✓Satin flycatcher

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	1
	>15cm, <30cm diameter	2
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	3
	< 5cm diameter	3
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		5
Decorticating bark		4
Leaf litter (%)		90%
Bare ground (%)		10%
Grass (%)		5%
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		3
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) lantana		10%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Vegetation Proforma

Entered CA 26/9/17

Date: 21/9/17	
Observers: CA & SG	Site Name: SEVT G24 17

Future Freight
Integrating Community, Environment and Engineering

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point	Zone	5	6	E	0	3	9	8	8	0	1	N	6	9	5	5	5	2	1
End point	Zone	5		E	0							N							

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
Strangler Fig ✓ Harpullia pend. Melaleuca bract ✓ Silky oak ✓	*	✓Red kamala ~~Syzygium sp (fungi).~~ ✓Alocas sp Alectryon subdentatus ✓Cupaniopsis sp. Elattostachys stylocarpa (white tamarind)	✓Endiandra cocarine bark ✓Native holly ✓Smilax Casuarina ✓Carissa ovata ✓Everistia vaccinifolia ✓Alyxia. ✓Xanthamia pitosporoides ✓Alchornea ilicifolia.	✓Front sedge ✓Maiden hair Necklace fern × ~~Sgt~~ bracken ✓Lady grass ✓Dendrobium sp ✓Peperomia tetra. ✓Cordyline rubra. ✓Conolina diff. ✓Conondra. cal Lindsaea ~~lacisa~~ ↳microphylla. Violet? ↳betonicifolia.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 5el (17)	Confirmed Regional Ecosystem: ✓
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.): SEVT closed forest.	
Field Observations/ Notes (eg. Level of disturbance connectivity):	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Cats claw creeper Lantana Asparagus fern.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17.

Vegetation Proforma

Date: 21/9/2017	Future Freight
Observers: CA & SG	**Site Name:** G2H 16

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** N/A

Start point	Zone 56	E 0398366	N 6955733
End point	Zone 5	E 0	N

Photo points (numbers): North: 228 East: 229 South: 230 West: 231

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Bladdy grass (hairy pointed leaf). Desmodium uthrii?

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
✓E. tereticornis ✓C. intermedia ✓E. crebra		✓Acc leiocalyx ✓Crebra ✓E. tereti. ✓Brach pop. ✓Flindersia ✓Woody pear.	✓Lantana ✓Red kamala ✓Breynia Sample.	✓Wombat berry ✓Green panic ✓Eggsair long Lilsiantha large leaf vine ✓Nut grass ✓Brunella? rubis ✓Goosefoot ✓Asparagus vine ✓Capparis small leaf shrub. Sarmentosa ✓Dianella ✓Enneapogon ✓passion vine ✓panicum ~~tobacco / desmodium~~

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

✓ treefoil ✓ creep lantana.

Table 2

Open Forest Crebra.

Mapped Regional Ecosystem: 12.9-10.2/12.9-10.7	**Confirmed Regional Ecosystem:** 12.9-10.7
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Open forest ✓ high level of lantana Some large standing stags ↑ level of regrowth 20yrs.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

General photos 215 - 226.

✓ Bristly cloak fern.

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

✓Kangaroo grass		
✓Alphitonia T2.		
✓Alectryon diversifolia.		
✓Jamadora multi		
✓Bursaria sp ~~striata~~ changs leaf. ≠ to no spines in canopy		
~~Aster~~ Asteraceae sp.		
✓Ficus Watkinsiana.		

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: Site 16 GZN

Date: 21/9/17 Observers: SG/CA.

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: WP276

Plot Centre: Zone: 56 Easting: 0398366 Northing: 6955733 Accuracy ___ m

Altitude: 444 m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

water course + veg near p'line easement

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ___ % weeds ___ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	228	South:	230	215 – 226 – general
East:	229	West:	231	

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	0
Clearing	2 historical ↑ regrowth.
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ BBBQ Platlets? ↑ lantana.	✓	
✓ Koala suitable trees but ↑ lantana	?	
✓ Gliders ✓ Powerful here limite hollows but	✓	
Glossy black no food tree limited hollows.		✓
Delma no surface rock " slope " creeplantana		✓

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	1
	>15cm, <30cm diameter	2
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	2
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		6
Decorticating bark		3
Leaf litter (%)		80
Bare ground (%)		5
Grass (%)		<5%
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) lantana Shrub		70%
Rock Crevices		0
Flower Abundance (%)		20%
Fruit Abundance (%)		10%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓Rainbow bee-eaters
✓Whip birds
✓Lewins H'eater
✓Torr Crow.
✓Grey Fantail
✓Grey Shrike thrush
✓~~Bowers~~ Shrike thrush LITTLE
✓Shining bronze cuckoo
✓Fan tailed cuckoo
✓Leaden fly catcher
✓Rufous whistler
✓Weigated wren.
✓Red browed finch
✓White throat tree creeper
✓pied currong.
✓singing honeyeater
✓striated Thornbill

Entered CA 26/9/17

Vegetation Proforma

Taken from side road N Binos as no site access due to Nexus.

Date: 22/9/2017	
Observers:	Site Name: G2H 29T

Future Freight

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:

Start point	Zone 56	E 0407446	N 6954525	287 WP
End point	Zone 5	E 0	N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

211m alt. Photo 384+385

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
Av. Height (m):	Av. Height:	Av. Height:	Av. Height:
Cover (%):	Cover:	Cover:	Cover:
E. tessalaris ✓*	✓Alphitonia	✓Lantana.	✓green poric
C. cunninghamii ✓	✓Acacia leiocalyx	✓Pittosp angustifolium	
E. crebra ✓			

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem: 12.3.7
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity):	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Road reserve.		
E. tereticornus.		
Crebra		
Alphitonia		
Sandalwood		
Gumby gumby		
O. salicina		
Pandorea. odorata.		
E. Tessellaris		

Entered CA 26/9/17.

Vegetation Proforma

Date: 23/9/17	
Observers: CA & SG	Site Name: G2H 12

Future Freight

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:
Start point	Zone 56 E 0	N
End point	Zone 56 E 0	N
Photo points (numbers):	North: 568 East: 569 South: 570 West: 571.	
	-27.5182	151.9659

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites) Non remnant

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range: 1-4m		Height Range:	
Av. Height (m):		Av. Height:		Av. Height: 4		Av. Height:	
Cover (%):		Cover:		Cover: 90%		Cover:	
	*	✓		✓Privet thicket	D.	✓Asparagus fern	
				✓Red kamala		✓Carissa ovata.	
				✓Spike leaf sample			

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non rem	**Confirmed Regional Ecosystem:** Non rem
Landform: Gentle slope next to alluvium	
Soils: Dark friable ↑ organics.	
Structural formation (eg woodland, open-forest etc.: Tall closed shrub ↑ to 4m Syn?	
Field Observations/ Notes (eg. Level of disturbance connectivity): pools water in drainage line. ↑ bird numbers Small Mammal	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Privet Asparagus fern 90%.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17

Fauna Proforma

Site Information

Site Name: QG2H 12

Date: 23/9/17 Observers: CA & EG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m -27.5182 151.9659

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Drainage line thrust to Privet thicket

walk from power easement to non rem past SEUT

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

Varied from Crebra woodland → SEUT → non remnant

see photos 12.9-10.7 & 12.9-10.15

Regional Ecosystem (mapped): 12.9-10.15 Regional Ecosystem Observed: non rem

→ non rem mapping out by 100m 12.9-10.7

Remnant / Non-remnant (circle) extends downslope of power easement photos

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species _____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		525 → 573
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	0
Clearing	1 - 3
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
3BBQ on slope from power line	✓	
Delma top of slope no lantana. cracking soil	✓	
Koala		✓
Glider no large hollows		✓
P. Owl no large shallow forest has closed		✓
Bats some small hollows		

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	2
Fallen logs (>10cm diam.)		2
Coarse woody debris (<10cm diam.)		3
Decorticating bark		3
Leaf litter (%)		60%
Bare ground (%) Where diggings occurred.		↓ 20
Grass (%)		↓ 10%
Soil cracks along power easement		4
Soil banks (eg. River banks/road cuttings, etc.)		5
Surface Rocks and/or Boulders		5
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) non rem interpenetrant		→ 50% → 95%
Rock Crevices @ ground level		5
Flower Abundance (%)		10%
Fruit Abundance (%) Privet		50%
Water present (Y/N) small pools in drainage lines		Y

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓Yellow rumped thornbill
✓Spectacled monarch
✓Whip bird
✓Lewins honeyeater
✓Rainbow bee eater
✓Red browed finches
✓Varanus marsupial
✓Grey shrike thrush

Vegetation Proforma

Entered CA ~~2976~~ Hanmans Rd. 26/9/17.

Date: 22/9/2017	
Observers: CA & SG	Site Name: G2H 28

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 100

Start point	Zone	5	6	E	0	4	0	6	4	5	4	N	6	9	5	6	9	8	0	WP285	
End point	Zone	5	6	E	0	4	0	6	5	3	5	N	6	9	5	6	9	7	9	WP 286	

Photo points (numbers): North: 371 East: 372 South: 373 West: 374.

222m elevation @ 367 - 371 site photos

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 22-26		Height Range: 12-18		Height Range: 1-3		Height Range: 0-0.8	
Av. Height (m): 25		Av. Height: 14		Av. Height: 1.5		Av. Height: 0.4	
Cover (%):		Cover:		Cover: 50%		Cover: 80%	
E. ~~tereticornis~~ tereticornis ✓	*	~~Eucalyptus~~		✓Lantana	D	✓Kangaroo grass	
E. orebra ✓	D	Angoph (Rough Apple)		✓Exocarpus		✓Black speargrass	
Ang Rough apple ✓	Sd	✓Eto Tl				✓Eragrostis ~~leptostachya~~ tall culmstreed	
	Sd	✓Acacia ~~fleuteryx~~ glaucocarpa.				✓Twin leaf.	
		✓A leiocalyx				✓Desmodium sp.	
		✓E. tessalaris				Pea sp.	
						~~Paspalum~~	
						✓Cyperus gracilis.	
						✓Aristida	
						✓Rats tail native	
						✓Barbed wire grass.	
						✓Yellow buttons.	
						✓Wombat berry	
						✓Grewia	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2 Narrow-leaf Ironbark, E. tereticornis, Cas cunninghamii

Mapped Regional Ecosystem: 12.3.7	Confirmed Regional Ecosystem: 12.3.3
Landform: Alluvial plain	
Soils: Alluvium	
Structural formation (eg woodland, open-forest etc.: Woodland.	
Field Observations/ Notes (eg. Level of disturbance connectivity): ↑ rhodes grass on edges. Disturbance associated ⇒ tracks & road. ↑ lantana at shrub layer. No water in bed.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana ✓, fireweed, velvety tree pear, Rhodes grass ✓ 50% mostly lantana.	

Thesium → SAMPLED

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)		Intercept	Str./height
0.00	- 1.44	m	S
2.12	- 4.62	m	T2
5.31	- 12.67	m	T1
6.11	- 14.27	m	T2
6.11	- 7.29	m	S
8.71	- 9.36	m	S
13.28	- 13.93	m	S
15.30	- 17.20	m	S
16.40	- 20.88	m	T2
17.97	- 19.00	m	S
21.65	- 37.67	m	T1
23.23	- 24.30	m	S
29.34	- 31.32	m	T2
32.90	- 33.30	m	S
36.95	- 37.85	m	S
40.54	- 42.30	m	S
40.83	- 42.52	m	T1
45.83	- 49.33	m	T1
52.78	- 57.35	m	T2
54.73	- 55.60	m	S

Summary:	
Minimum height of plants included in the transect table:	1 m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Send to HERB for ID. ☆381 + 382 toad flax area. sample.

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

✓Green panic.	83.77 - 87.33	T2	
✓Velvet tree pear	85.87 - 94.08	T1	
✓A. maideni	89.19 - 94.08	T2	
✓A saliana	96.73 - 100.00	T2	
✓Leonotis nepeta			
✓Sida rhomb			
✓Fireweed	✓Hyp lobelia purpurescens		
✓Red natal.			
✓Siratro	✓Cane grass (slender Bamboo grass)		
✓ Wharlenbergia sp.			
✓Cobblers pegs	✓Verbena sp.		
✓ Winter apple	✓Panicum simile		
✓Dicrella	✓Ranaculus sp.		
✓ Rhodes grass on edges near road.			
✓Old hemp	✓pennywort / dichondra repens		
✓malvastrum americanum			
✓Datura stramonium			
✓ Maynes curse			

Fauna Proforma

Future Freight

Entered CA 26/9/17.

Site Information

Site Name: C2H 28

Date: 22/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 0406454 Northing: 6956980 Accuracy ___ m

Altitude: 222 m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

~~Eter~~. 20m @ Harmans Road.

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

E. teret woodland next to drainage line / creek

Regional Ecosystem (mapped): 12.3.7 Regional Ecosystem Observed: 12.3.3

(Remnant) / Non-remnant (circle) Historically cleared + 50yrs?

STRUCTURE

Tree canopy present (Y) / N average height ___ m cover ___ % See veg sheet.

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ___ % weeds ___ % Dominant species ___

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	371	South:	373	367 – 368
East:	372	West:	374	

Shrub layer dominated by Lantana.

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	1
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
BBBB no slope no platlets.		✓
Glider/POwl forage potential	✓	
Delma no slope rock		✓
Glossy black no casuring no hollows.		✓

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	2
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		2
Decorticating bark		4
Leaf litter (%)		10%
Bare ground (%)		↓ 5%
Grass (%)		80%
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		7
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		refer aquatic site 8
Weeds and non-native species (%) lantana shrub layer.		50% cover
Rock Crevices		0
Flower Abundance (%)		50%
Fruit Abundance (%) Euc, mistletoe & lantana		30%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

little lorikeets

✓Red backed Fairy wren. ✓Noisy miner
✓Restles Flycatcher ✓Brown H/Eater
✓Lewins H/Eater ✓Weebill
✓T. crow ✓thornbill (1R)
✓Gerogone ✓Pied butcher

✓zebra finch ✓Sulfur crest
✓spotted pardalote. ✓blackfaced cookoo shrike
✓magpie ✓White cheeked H/Eater
✓rufous whistler

Entered CA 26/9/17

Vegetation Proforma

Done on side of road looking over fence N birds

Date: 21/9/17	
Observers: CA & SG	Site Name: 52H Alt 34A

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point	Zone 56	E 041382	N 6955951	288W
End point	Zone 5	E 0	N	

Photo points (numbers): North:____ East:____ South:____ West:____,

Phot 387 - 391 217 Elevation ±3m.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m): 18-20		Height Range: 8-12	Height Range: 1.5-3	Height Range: 0 - 0.3
Av. Height (m): 18		Av. Height: 10	Av. Height: 1.5	Av. Height: 0.1
Cover (%): 20%		Cover: 60%	Cover: 10 %	Cover: 50%
C Citriodora ✓	*	✓ Alphitonia	✓ A. Bioralyx	✓ Mulga fern
C tracheph ✓		✓ E. helidonica	✓ Lantana	✓ Wallaby buttons
			J. T1	✓ Eragrostis clustered elongata.
			✓ Cassinia	✓ Carissa ovata
			✓ Grevillia sp.	✓ Themeda pogon
			✓ Corsaria	✓ Aristida sp x2
			✓ Velvet tree pear	✓ Barbed wire grass
				✓ Rose grass
				✓ Dichondra filiformis

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 12.9-10.2/10.5a	Confirmed Regional Ecosystem: 12.9.10.5a
Landform: Apex of gentle hill	
Soils: Orange / Grey	
Structural formation (eg woodland, open-forest etc.: Woodland behind regrowth	
Field Observations/ Notes (eg. Level of disturbance connectivity): 20m of dense regrowth looks to thin out away from fenceline	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana & tree pear ↓ 5%.	

Koala scat 100m down road.

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17

Future Freight

Fauna Proforma

Site Information

Site Name: G2H 34A&B

Date: 21/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: NP290

Plot Centre: Zone: 56S Easting: 0411375 Northing: 6955942 Accuracy 5 m

Altitude: 215 m Altitude accuracy: +/- ___ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Road side looking over fences.

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

Woodland see veg 34A & 34B

Regional Ecosystem (mapped): 12.9-10.2/10.5 Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle) Is older regrowth +20yrs.

STRUCTURE

Tree canopy present (Y) / N average height ___ m cover ___ % see veg 34A & 34B

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ___ % weeds ___ % Dominant species ___

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	1
Grazing	1
Clearing	2 historical
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ Koala Scatt collected	✓	
P. Owl no large hollows		✓
✓ Glider few hollows		✓
BBBQ no lantana no slope		✓
Delma "		✓

Incidental fauna observations/scats/traces:

✓ Rainbow bee eaters ✓ noisy miner

✓ Kookaburra ✓ bush turkey

✓ Willy wag tail

Future Freight

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	2
Fallen logs (>10cm diam.)		2
Coarse woody debris (<10cm diam.)		5
Decorticating bark		5
Leaf litter (%)		50%
Bare ground (%)		50%
Grass (%)		10%
Soil cracks		–
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		↓ 1%
Rock Crevices		0
Flower Abundance (%)		10%
Fruit Abundance (%)		10%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Vegetation Proforma

No access
Done from roadside

Entered CA 26/9/17.

Date: 21/9/2017	Future Freight
Observers: CA & SG	Site Name: G2H Alt 34B

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point	Zone 56	E 0411239	N 6954967	289 WP
End point	Zone 5	E 0	N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

179m Alt.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	Shrub#	Ground
Height Range (m): 22-25		Height Range: 8-12	Height Range: 1.5-3	Height Range: 0-0.4
Av. Height (m): 22		Av. Height: 10	Av. Height: 1.5	Av. Height: 0.2
Cover (%): 40%		Cover: 50 %	Cover: 5 %	Cover: 10 %
✓ Citriodora	D	✓ Alphitonia	✓ A. leiocalyx	✓ Aristida
✓ crebra			✓ Jacksonia	✓ Mud grass?
			✓ A. evenstii	✓ Iomandra x2 filiformis multi
			✓ Velvet tree pear	✓ Wiry panic
				✓ Barbed wire grass
				✓ Black speargrass
				✓ Eragrostis brownii
				✓ Small Aristida
				✓ Yellow buttons
				✓ Sorghum effusum
				✓ Rhodes grass
				✓ Laxmania
				✓ Pinellia

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 12.9-10.2 / 10.5	Confirmed Regional Ecosystem: yes 12.9-10.2
Landform: Gentle slope	
Soils:	
Structural formation (eg woodland, open-forest etc.): Woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): ↑ nº of termites in trees. Degraded fence & fauna movement. Trees are not mature very limited hollows	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Velvet tree pear ↓ 0.5%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17

Vegetation Proforma

Roadside assessment

Date: 24/9/17	
Observers: CA & SS	Site Name: G2H 4T

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point Zone 56 E 0391738 N 6958632 293 MP

End point Zone 5 E 0 N

Photo points (numbers): North: 606 East: 607 South: 608 West: 609.

3m accra

53m elevation

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 12-25m		Height Range:		Height Range: 1-3		Height Range: 0.3	
Av. Height (m): 20		Av. Height:		Av. Height: 1.5		Av. Height: 0.1-0.6	
Cover (%): 10-1		Cover:		Cover: 10-1		Cover: 70%	
E tereticornis ✓	*			V A. mäiden		V Montago	
E melodora ✓						V Rhodes grass	
E acica ✓ pilularis?							

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: non rem	Confirmed Regional Ecosystem: non rem
Landform: Alluvial plain + drainage line	
Soils: alluvial	
Structural formation (eg woodland, open-forest etc.: Non rem, scattered Eucs	
Field Observations/ Notes (eg. Level of disturbance connectivity): Veg depth 20m Largely cleared, some Eucs on drainage line. Grazed paddock surrou	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Road reserve.		

Entered CA 26/9/17.

Fauna Proforma

Site Information

Site Name: G2H 4T

Date: 24/9/17 Observers: SG & CA

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 393738 Northing: 6958632 Accuracy 3 m

Altitude: 531 m Altitude accuracy: +/- 3 m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Roadside

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

Dry drainage line w culvert E. tereticornis & Melaleuca

Regional Ecosystem (mapped): non rem Regional Ecosystem Observed: non rem

Remnant / (Non-remnant) (circle)

STRUCTURE

Tree canopy present (Y) N average height 25 m cover ___ %

Dominant species: E. tereticornis

Sub canopy present (Y) N average height ___ m cover ___ %

Dominant species: Juv eucs

Shrub layer present (Y) N average height ___ m cover ___ %

Dominant species: Acacia maidenii

Ground layer: cover 100 % weeds 90 % Dominant species Rhodes grass

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:	606	South:	608	610
East:	607	West:	609	

Site highly disturbed mostly farming country & few remnant trees. Wet area in one paddock not fenced off from stock has sedges etc See wetland sheet

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	3
Erosion in paddock	2

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
✓ Frog maybe water in swampy area	✓	
Koala		✓
BBBQ / Delma no habitat		✓
✓ Glider possible not many hollows		✓
✓ P/owl possible hunting area	✓	
✓ Grey Snake some soil cracks on edges of drainage line	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	1
	>10cm, <15cm diameter	1
	>5cm, <10cm diameter	3
	< 5cm diameter	3
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		1
Decorticating bark		4
Leaf litter (%)		10%
Bare ground (%)		10%
Grass (%)		90%
Soil cracks		2
Soil banks (eg. River banks/road cuttings, etc.)		5
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma Highly disturbed swamp		Y
Weeds and non-native species (%) Rhodes grass		40%
Rock Crevices		N
Flower Abundance (%)		10%
Fruit Abundance (%)		10%
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓ Cocka hels
✓ Galah
✓ Grey butcherbird
✓ Noisy miners
✓ Magpie
✓ Rainbow lorris

Very windy middle of day.

Wetland Proforma

Entered CA/26/9/17.

ASSESSED FROM RD RESERVE ~ 20-30m from area

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: G2H1 HT

Date: 29.9.17 Observers: SG + CA

GPS Location SGJ 0393738, 6958632

see photos 606-610

Step 1: Mapping datasets.

Is the site mapped as a wetland of High Ecological Significance (HES) of General Ecological Significance (GES) in any of the following datasets?

Dataset	Mapped
• **"Wetlands referable GBR"** – DEHP Map of referable Wetlands in the Great Barrier Reef Catchment • **"Wetlands Referable"** – DEHP Map of referable Wetlands; or • **Any other wetland database** – state source	No

Comments Not mapped though possibly wetland due to indicator flora species – HIGHLY DISTURBED not HES VALUES.

Step 2: Hydrology.

Are there signs of permanent, periodic or intermittent inundation (tick as appropriate) – <u>If none present do not proceed to Step 3</u>

○ Water saturation	○ Water Inundation	○ Micro relief
○ Debil Debil, Gilgais	○ Algal Mats/flakes	○ Aerial roots
○ Flood marks	○ Iron staining	○ Mud cracks
○ Surface Staining	○ Salt crusts	✓ Indication of inundation on aerial imagery
✓ Wetland landforms (eg. Lakes, lagoons, swamps, drainage features	○ Wetland soils (eg. High level of organic matter at surface which is decomposed indicating Organosols present)	○ Wetland drainage patters (eg. Drainage pattern eroded into soil, vegetation matter piled against existing vegetation)

Comments Low-lying swamp area assoc w drainage line but road w culvert across it + predominantly cleared + grazed paddocks w few EVCs remaining.

Wetland Proforma

Future Freight

Step 3: Flora

Is there >30% cover of wetland indicator species present (visual estimate). Wetland indicator species include aquatic macrophytes such as sedges and rushes.

☑ Yes	○ No

Comment/ Indicator Species present

Sedges throughout the lower areas

Photo 610.

Step 4: Landscape feature

Are there landscape features present that indicate a wetland environment? – <u>If yes, Site is confirmed as a wetland</u>

☑ Landscape topography conducive to wetland environment (eg. Depressions), area of limited drainage or area in proximity to a waterbody

Comment/ Indicator Species present

Species present

Flora	Fauna
Sedges - unable to confirm species as assessed from road side.	

Entered CA 26/9/17

Vegetation Proforma

Road reserve looking over fence

Date: 24/9/17	Future Freight
Observers: CA & SG	**Site Name:** G2H ST

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:** 0

Start point	Zone 56	E 0395168	N 6954520	NP
End point	Zone 5	E 0	N	291

Photo points (numbers): North: 579 East: 580 South: 581 West: 582.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m): 20m		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
✓E tereticornis ✓Ang floribunda on gully	D	Juv Eucalypts ✓Acacia sp. Lei07	✓Lantana ✓Chinese elm? ✓Tree pear.	✓Rhodes grass ✓Plantain ✓Sida rhomb. ✓Stinking roger ✓Thistle scotch. ✓Cobblers pegs. ✓Ranunculus.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.8.5	**Confirmed Regional Ecosystem:** 11.8.2a in gully
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.: Open woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Some lantana present Unable to ID tree species on hill due to lack of access. May be yellow box? E. crebra	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana along gully & on slopes in patches 40%. Some privet, Rhodes grass dominates on road reserve 80% g/cover.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Entered CA 26/9/17.

Fauna Proforma

Site Information

Site Name: G2H ST

Date: 24/9/17 Observers: CA & SG

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: 56 Easting: 395168 Northing: 6956520 Accuracy 4 m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

Road reserve

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	2
Clearing	
Erosion	

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Koala suitable trees.	✓	
BBB2 ↑ plantation on slope	✓ poss.	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	1
	>15cm, <30cm diameter	1
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	3
	< 5cm diameter	3
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		3
Decorticating bark		5
Leaf litter (%)		
Bare ground (%)		
Grass (%)		50%?
Soil cracks		
Soil banks (eg. River banks/road cuttings, etc.)		1
Surface Rocks and/or Boulders		3
Wetlands (Y/N). If yes complete wetland Proforma		
Weeds and non-native species (%)		40%
Rock Crevices		0
Flower Abundance (%)		10%
Fruit Abundance (%)		10%
Water present (Y/N)		

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

✓Brown snake

✓Superb Fluren
✓Pee wee
✓Sulfur crested C
✓Yeggona (white throat)
✓Black kite
✓T. crow
✓Rewins H/eater
✓Rainbow lorikeet
✓Laughing kook
✓Sacred kingfisher
✓Striated pardalote
✓Rabbit
✓Red browed finch
✓galah

Entered CA 26/9/17

Vegetation Proforma

no site access

Date: 24/9/17	
Observers: CA & SG	Site Name: G2H 5T

Future Freight

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:
Start point	Zone 56 E 0393197 N 6957496	292 m
End point	Zone 5 E 0 N	
Photo points (numbers):	North: 598 East: 599 South: 600 West: 601.	595m alt
Site photos from	592 → 604	4m accuracy.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites) Non remnant

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m):		Av. Height:		Av. Height:		Av. Height:	
Cover (%):		Cover:		Cover:		Cover:	
E. Crebra	D	Juv Eucs		Lantana		Rhodes grass	
E. melliodora		Acacia leiocalyx		Velvet tree pear		Mayne cuba	
E. terretic				African box thorn.		Eragrostis	
						Balloon cotton bush.	
						Milkweed	
						Stinking roger	
						Scotch thistle	
						Plantago	
						Qld hemp	
						Red natal.	
						Blue grass Qld	
						Big digitaria/ Divan?	
						Qld hemp	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

1/2e/4

Table 2

Mapped Regional Ecosystem: 11.8.5	Confirmed Regional Ecosystem: 11.8.2 non rem
Landform: Mid slope	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Histric logging, GPS in cleared point Digitaria Seedhead Sample here → Not D. porrecta.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Unable to determine % rhodes grass too dry	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

✓Chloris pectinata ventricosa ?		
✓Paspalum sp		
✓Panicum effusm		
✓Aristida spp		
✓Eriachne sp		
✓Malvastrum americanum		
✓Verbena sp.		

Entered CA 9/10/17

Assessed from road reserve.

Vegetation Proforma

6

Date: 27/9/2017	
Observers: SG + CA	Site Name: G2M Site 2T

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point	Zone 56	E 0388726	N 6958758	
End point	Zone 5	E 0	N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____. WP304

Alt: 498m. Photo #'s: 804 - 811

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m):		Av. Height:		Av. Height:		Av. Height:	
Cover (%):		Cover:		Cover:		Cover:	
Eucalyptus plantation ie "Not in the wild"	*	Weeping myall (planted on road side) As in aerials, clearly a plantation		Gumbi gumbi Santalum lanceolatum		Rhodes grass Eustrephus.	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non rem	Confirmed Regional Ecosystem: Non rem
Landform: Flat	
Soils: Brown, high O.M.	
Structural formation (eg woodland, open-forest etc.: PLANTATION	
Field Observations/ Notes (eg. Level of disturbance connectivity): Having dev across street and plantation ∴ no conn + little habitat value.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Incidentals: Noisy miners, Crested pigeons, Pied Currawong, T. Crow

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Vegetation Proforma

Road reserve — Entered CA 9/10/17.
Search for Thesium australe + Digitaria porrecta

Date: 27/9/17

Observers: SG + CA

Site Name: G2M Site 1T

Future Freight

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: 0

Start point	Zone	5	6	E	0	3	8	9	7	2	4	N	6	9	5	7	4	9	1					
End point	Zone	5		E	0							N												

Photo points (numbers): North: 815 East: 816 South: 817 West: 818.

WP 305

Elev/Alt = 494m Accuracy = 3m

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	*	Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
Ground ✓Rumex sp ✓Burr medic		Ground ✓Rosmo sp smooth ✓Hydrocotyl ✓Club rush ✓Shepherds purse ✓Oxalis sp ✓Parthenium sp?	✓Tagetes min. ✓Tall verbena ✓Opuntia rem Ground ~~Wild turnip~~ ✓Pinsida ? ✓Dig div... ✓Chloris sp tall. ✓Chloris virgata	✓Plantago ✓Maynes curse ✓Mal. amerie. ✓Sepidium - vicon. ✓Burr daisy / weed ✓Panicum Qld ✓Fire weed ✓Johnson grass ✓Canola. ✓Vetch. ✓Yellow daisy thistle ✓Cannon ns smooth

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

✓Desmo - tomen.
✓Dichanthium.
✓Scotch thistle.
✓Rhodes grass
✓Schlolachna brigiograss

Table 2

Mapped Regional Ecosystem: Non rem	Confirmed Regional Ecosystem: Non rem.
Landform: Flat	
Soils: Brown cracking soils.	
Structural formation (eg woodland, open-forest etc.: Cleared, paddocks adj.	
Field Observations/ Notes (eg. Level of disturbance connectivity): Cleared gravel RR adj to paddock crops	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

For crows
Macro scats
Rooster.

✓Ree wee
✓Masked Lapwing
✓R'bow lorikeet
✓Magpie

✓Galahs Cockatiel. Hare
✓Nail tail.
✓Corcal

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Potential habitat for		
Thesium + D. porrecta		
but none identified in searches.		

Assessed from Road Reserve Entered CA 9/10/17 THESIUM? CONF. or JAS?

Vegetation Proforma

Date: 27/9/17

Observers: SG + CA

Site Name: 62H 3T

Future Freight

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:
Start point	Zone 56 E 0390399 N 6956865	
End point	Zone 5 E 0 N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____. NP306

529m elev.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
v. Height (m):	Av. Height:	Av. Height:	Av. Height:
ver (%):	Cover:	Cover:	Cover:
1 ubark - cannot inform ID as on private property Smooth bark EUC	* C. tess Alph. excelsa Ground Tall hig Dig. ~~div~~ sample Barbed wire grass Tall chloris	Groundsel N. tree pear Lantana Dod. viSC Tageles min Tall setaria sp Forest Bwc grass Tall verb Cobblers Pegs	Dianella caer Rhodes grass THESIUM ? or poss Jasminum suavi Paricum sp. Wahlenbergia sp. Rubus Dianella caerulea Maytenus cuse Verbena

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

E. melano +/- crebra +/- orgado +/-

Table 2

Mapped Regional Ecosystem: 11.8.4	**Confirmed Regional Ecosystem:** 11.8.?
Landform: Plug in gentle foot slopes.	
Soils: Brown	
Structural formation (eg woodland, open-forest etc.: Woodland on slopes / Grassland (closer to Rd)	
Field Observations/ Notes (eg. Level of disturbance connectivity): Disturbed, grazing	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Kookaburra. Galah, Noisy miner, Indian myna.

Fauna: Magpie, Pale-headed rosella, Grey B'bird, Wed. goshawk, Torr. Crow, Grey fantail, Wedge tail, masked lapwing, Dove

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

POSSIBLE:
Thesium located in RR on Ganzer Road SAMPLE COLLECTED.
Photos

WP307
56J 0390421
6956663

Area is approx. 28x2m

Not surveyed.

Vegetation Proforma

LEESA has assessed this site

Date: 27/9/2017	Future Freight
Observers: SG + CA	**Site Name:** G2H site 7T

↳ Alternative location

Transect Details (required for all sites)

GPS coordinates:	**Datum:**	**Transect length:**	
Start point	Zone 56 E 0395674	N 6955690.	
End point	Zone 5 E 0	N	
Photo points (numbers):	North: ____ East: ____ South: ____ West: ____.		WP308

Elev. 560m.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m):		Av. Height:		Av. Height:		Av. Height:	
Cover (%):		Cover:		Cover:		Cover:	
E. tereticornis.	*	Small leafed privet A. maidenii	→			Rhodes grass Dianella sp	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non-rem	**Confirmed Regional Ecosystem:** Non-rem.
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity):	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Fauna: Black kites, BFCS

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

No access – assessed from end of Hi-Winds Road.

Entered CA 9/10/17

Vegetation Proforma

Date: 26/9/17	Future Freight
Observers:	**Site Name:** 9T G2H

Transect Details (required for all sites)

GPS coordinates:	**Datum:**		**Transect length:** 0	
Start point	Zone 56	E 0395694	N 6957208	WP303
End point	Zone 5	E 0	N	
Photo points (numbers):	North: ____	East: ____	South: ____	West: ____

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range:
Av. Height (m):		Av. Height:	Av. Height:	Av. Height:
Cover (%):		Cover:	Cover:	Cover:
Emergent Eucs	✓	Eucs in understorey of SEVT species on gently undulating slopes. Appears to be a series of unmapped drainage lines.		
G robusta	✓			
F watkinsiana	✓			

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

SEVT in Emerg Eucs. Either

Mapped Regional Ecosystem: 11.8.2a	**Confirmed Regional Ecosystem:** 11.8.3 or 11.8.13
Landform: Gently undulating hills.	
Soils: Red, heavy.	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Seeing through broadleaf maybe vereland vine thicket. Large figs + noap pine on drive up some tall eucalyptus in distance – may be terrestrial	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Lantana	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
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-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Bottle trees } opposite side of road		~~-electric~~
Silky oak		black kite,
privet (large amount)		bunny rabbits x10
narrow leaved kurrajong		horses
		Pied butcher bird
fig		lorikeet
hoop pine		

1 of 3

Sunday 24/9/17
62H Weall Street
off Old Boomburgee
Rd SG+CA
Creekline

-> Anabat, 6:00pm-6:20
-> motion camera
-> Bird list + Inc. Fauna:
Whistling Kite
: Silver eye

2 of 3

Torr Crew
Brown Honeyeater
Galah
Hare
Water dragon
Cane toad
SC Cockatoo
Pacific Black ducks
Whistling treefrog (H)

@ 6:17 fishing boat
seen on reef

3 of 3

Weare Rd up in tree line
18:30 - 18:48

5T

Williams Rd 19:00 - 20:00

✓Carpet python
✓Tawny frogmouth owl
✓Brushtail possum.
+ Call playback for Powerful, Barking + Sooty owls, Masked owl (No response or seen)

APPENDIX

J

Matters of National Environmental Significance

Appendix I Environmental offset delivery strategy

GOWRIE TO HELIDON ENVIRONMENTAL IMPACT STATEMENT

IR_1536

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

INLAND RAIL

Environmental Offset Delivery Strategy - QLD

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Document Control

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Revision History

REVISION	REVISION DATE	DESCRIPTION
1	02/11/2020	Revision 1 – Incorporate offset site information
2	26/03/2021	Revision 2 – Incorporate updated offset information Approved for Use
3	21/05/2021	Revision 3 – additional clarification in response to State Government (OCG / Dept of Resources) comments on G2H dEIS. Amendments as follows: Section 2.1 – Updated approval pathway for K2ARB Section 3.2 – Updated to provide clarification around the interaction between Commonwealth and State Government offset policies including colocation of prescribed matters and relevant SRI guidelines Section 3.2.2 – Updated to provide clarification concerning the appropriate use of State Government based SRI guidelines for relevant prescribed matters Section 4 – Updated offset impact tables (3 and 4) to reflect colocation of MSES within MNES according to Commonwealth and State Government offsetting policies including predicted residual MSES offsets New Section – 7 – Offset delivery. This section explains the offset delivery options and ARTC's approach

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Glossary

Specific terms and acronyms used throughout this strategy are listed and described in the table below.

TERM	ACRONYM	DEFINITION
Conditions of Approval	CoA	The Conditions of Approval include the Coordinator-General's Imposed Conditions and, the EPBC Act Conditions of Approval, and any other relevant State approvals.
Environmental Offset		Environmental offsets are measures that benefit biodiversity by compensating for the residual adverse impacts elsewhere of an action, such as clearing for development.
Primary Approval Document		The term 'Primary Approval Document' is used throughout this Strategy to collectively refer to the Environmental Impact Statements for each of the Projects.
Queensland Projects		B2G, G2H, H2C and C2K
Border to Gowrie	B2G	
Broad Vegetation Group	BVG	
Calvert to Kagaru	C2K	
Direct Benefit Management Plan	DBMP	
Department of Environment and Science (Qld)	DES	New Qld department as at 2018 (refer Dept of Environment and Heritage Protection pre 2018)
Department of Agriculture, Water and Environment (Cmwth)	DAWE	
Environmental Impact Statement	EIS	An EIS is a tool the government uses to assess: ▸ the current environment in the area of the project ▸ potential environmental, economic and social impacts of the project ▸ proponent proposals to avoid, minimise, mitigate and/or offset those potential impacts. An EIS is also used to consider alternative ways to carry out the project in order to limit its impact
Environmental Protection Act 1994 (Qld)	EP Act	
Environment Protection and Biodiversity Conservation Act 1999 (Cmwth)	EPBC Act	Queensland State Legislation governing treatment of the environment during development.
Environmental Offsets Act 2014 (Qld)	EO Act	
Endangered Regional Ecosystem	ERE	Identified as a prescribed regional ecosystem under the EO Act.
Gowrie to Helidon	G2H	
Helidon to Calvert	H2C	
Kilometres	km	
Kagaru to Acacia Ridge and Bromelton	K2ARB	
Matters of National Environmental Significance	MNES	
Matters of State Environmental Significance	MSES	

Nature Conservation Act 1992 (Qld)	NC Act	Queensland State Legislation that allows for the protection of natural areas through the management practices of Aboriginal and Indigenous peoples with an interest in the protected area.
New South Wales	NSW	
Of concern Regional Ecosystem	OCRE	Identified as a prescribed regional ecosystem under the EO Act.
Offset Area Management Plan	OAMP	The approved plan of agreed management for each offset area.
Regional Ecosystem	RE	
State Development and Public Works Organisation Act 1971 (Qld)	SDPWO Act	
South East Queensland	SEQ	
Queensland Environmental Offsets Policy	QEOP	
Queensland	Qld	

1 Executive Summary

ARTC's Inland Rail Program will generate environmental offset obligations within Queensland across Commonwealth and State jurisdictions due to unavoidable significant residual impacts on Matters of National, State and Local Environmental Significance (MNES, MSES and MLES).

Within Queensland, the Inland Rail Program is divided into five separate projects: Border to Gowrie (B2G); Gowrie to Helidon (G2H); Helidon to Calvert (H2C); Calver to Kagaru (C2K) and Kagaru to Acacia Ridge and Bromelton (K2ARB). The B2G, G2H, H2C and C2K projects are being progressed through the Environmental Impact Statement (EIS) process where, in relation to environmental offsets, environmental impacts will be assessed, and those significant residual impacts on MNES, MSES and/or MLES will be determined and quantified.

The K2ARB project does not currently form part of the Environmental Offset Delivery Strategy – Qld (Strategy). Initial assessments on MNES, MSES and MLES for the K2ARB project indicate that significant residual impacts to MNES, MSES and MLES are unlikely. If a significant residual impact on MNES, MSES and/or MLES is identified, this Strategy will be amended to include the project.

Environmental impact assessments to date have informed the preparation of this overarching Strategy recognising that each project EIS is being delivered according to separate yet inter-related schedules. Consequently, this Strategy will remain dynamic while project-wide environmental impact information is further progressed and better understood.

The overarching offset strategy for the Inland Program is to deliver a strategic, primarily land-based, offset portfolio that will seek to deliver a conservation outcome that improves or maintains the viability of impacted MNES, MSES and/or MLES.

The purpose of this Strategy is to identify an appropriate offset strategy in response to project impacts on MNES, MSES and/or MLES which could not be otherwise avoided or minimised by the relevant Inland Rail projects for Queensland.

The primary aim of the Strategy will be to identify a portfolio of offset properties that have potential to meet MNES, MSES and/or MLES offset obligations that are strategically located in proximity to the future rail corridor (impact area) and demonstrate offset availability. The Strategy will also identify offset properties that preferentially adjoin protected area estates, conservation reserves and / or large intact remnants and/or are located within proximity to bioregional corridors. Ongoing land management will be conducted according to Offset Area Management Plans which will seek to maximise landscape conservation outcomes by increasing habitat quality and availability of vegetation communities and habitats, reducing threats (such as weeds, feral animals, fire and clearing) while providing improved habitat and connectivity for MNES, MSES and/or MLES species within the region.

A high-level desktop offset feasibility assessment has been undertaken with the aim of identifying potential strategic offset sites that can meet the environmental offset requirements, at a Commonwealth and State level, as they are currently understood. A combination of eight potential offset sites for the Brigalow Belt bioregion and eleven potential offset sites for South east Queensland bioregion have been identified as having potential to meet all of the project's MNES and a large proportion of MSES offset requirements (as summarised in Tables 2 and 3).

The offset desktop analysis and selection of priority offset sites under this initial feasibility assessment demonstrate the availability of particular ecosystems and habitats in the chosen study area for the impacted species. It also demonstrates feasibility of offset co-location across a variety of Commonwealth and State Government prescribed matters. Subsequent steps to finalise offset sites will include landholder engagement, ground-truthing to validate presence of MNES and MSES, and habitat quality assessments to confirm total offset areas needed and habitat quality gains that can be achieved.

Offset area management will depend on the final offset portfolio and will include weed control, feral animal control, fire management and restoration/revegetation activities. These actions may be implemented by landholders, service providers, accredited community based not for profit conservation organisations,

established conservation management entities, or a government based or supported organisations or a combination of these. Ongoing management of the offset portfolio will seek to foster community engagement and collaboration while achieving offset objectives and conservation outcomes under enduring arrangements. This provides avenues for community engagement, education as well as training around environmental conservation and restoration.

Environmental offsets for Inland Rail's Queensland components will recognise the environmental offset framework and hierarchy developed under the Environmental Offsets Act 2014 (Qld) (EO Act), while delivering co-located offsets for MNES under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Environmental Offsets Policy. Accordingly, those remaining residual impacts to MSES and MLES identified by the State and Local Governments, will be delivered in consultation with the Office of the Coordinator General (OCG) and the Department of Environment and Science (DES), the Department of Agriculture and Fisheries (DAF) and the Department of Natural Resources, Mines and Energy (DNRME) in consideration of the Queensland Environmental Offset Policy (QEOP).

2 Introduction

2.1 Inland Rail Program in Queensland

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane. The Inland Rail Program (Inland Rail) involves the design and construction of a new inland rail connection, about 1,700 kilometres (km) in length, between Melbourne and Brisbane. The Australian Rail Track Corporation (ARTC) is the proponent for Inland Rail.

Inland Rail has been divided into 13 separate projects, five of which are located in Queensland as described in Table 1 Qld Inland Rail Overview and illustrated in Figure 1. Four of these projects, being; Border to Gowrie (B2G), Gowrie to Helidon (G2H), Helidon to Calvert (H2C) and Calvert to Kagaru (C2K), are presently being assessed by the Queensland Coordinator-General under the State Development and Public Works Organisation Act 1971 (SDPWO Act) as coordinated projects for which an EIS is required. These same four projects have also been referred under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and determined to be controlled actions. They are being assessed under the Bilateral Agreement between State and Commonwealth governments, and separate approvals from the Commonwealth Environment Minister will be required.

The fifth project, K2ARB, is an enhancement project, and works will be primarily located within the existing rail corridor. ARTC is seeking an approval pathway under the Transport Infrastructure Act 1994 (TI Act), preliminary assessments show that the Project will not have a significant impact on MNES or MSES. .

Based on current information, it is likely four coordinated projects (B2G, G2H, H2C and C2K) will require environmental offsets due to significant residual impacts on Commonwealth and State MNES and MSES. Collectively, these four coordinated projects are referred to as the Queensland projects Therefore, this strategy provides an assessment of these values, as they are currently understood, as well the offset framework relevant to offset regulation in Queensland, the proposed delivery options, and the proposed approach that ARTC will adopt for the Queensland projects.

2.2 Purpose

This Strategy is an overarching document that applies to the Queensland projects and sets a high-level direction on how environmental offsets will be assessed and delivered. The Strategy demonstrates ARTC's commitment to delivering environmental offsets in accordance with relevant Commonwealth, State and Local Government (if applicable) offset requirements in a manner that allows for strategic alignment of the Queensland projects.

The coordination of offsets across the Queensland projects will deliver landscape scale outcomes and provide efficiencies in securing and managing offset sites. The Strategy outlines the proposed offset delivery pathway, the estimated biodiversity values required to be offset for each project based on impact assessments completed to date, and a preliminary offset portfolio feasibility assessment based on current offset assumptions. The Strategy is intended to set out a road map outlining future steps that will be taken to confirm and deliver environmental offsets for the Queensland projects of Inland Rail.

2.3 Scope

The scope of the Strategy incorporates:

Present (included in this Offset Strategy)

- An initial estimation of residual impacts on MNES and MSES based on current information as part of the Queensland project's EISs and offset requirements in response to those impacts.
- Evaluation of the environmental offset frameworks applicable to Inland Rail in Queensland and available offset delivery options.

- Preliminary identification of strategic offset sites that could be used to deliver the Queensland Project's offset obligations in order to demonstrate high-level offset strategy feasibility.
- Detail the measures that will be implemented during different project phases to finalise and deliver the environmental offset requirements for the Queensland projects.

Medium term goals (prior to project approvals)

- Refinement and finalisation of environmental offset requirements for each project following additional field ecology surveys, refinement of significant impact assessments, and habitat quality assessments throughout the proposed alignment.
- Outline a preferred offset delivery package for each relevant Inland Rail Queensland project and the justification for this approach.
- Commencement of offset site negotiations including due diligence investigations.
- Confirmation of suitable offset sites based on updated, field verified information and habitat quality assessments, including application of EPBC Act offsets assessment guide for MNES.

Considerations in the development of the offset delivery approach for the Queensland projects have included:

- Applicable legislative and policy requirements.
- Staged nature of the Queensland projects and approvals.
- Detailed design and construction phases.
- The prescribed environmental matters at a Commonwealth, State and Local level, and extent of project significant, residual impacts.
- Availability of viable offsets and opportunities to improve conservation outcomes including through co-location of offset values.

Further information on each Queensland project is provided in Table 1.

Table 1 Queensland Projects Overview

QUEENSLAND PROJECT	OVERVIEW	APPLICABLE APPROVALS & EPBC ACT REFERRAL NUMBER (WHERE RELEVANT)
Border to Gowrie (B2G)	Consists of approximately 216.2 km of new single-track railway, consisting of: ▸ 7.0 km of standard gauge rail (1,435 mm) and ▸ 209.2 km of dual gauge rail (standard (1,435 mm) and narrow (1,067 mm) gauge). The B2G project will consist of approximately 145.0 km of new rail corridor and approximately 71.2 km of existing rail corridor. A preferred alignment has been confirmed and environmental and planning approval processes commenced.	Coordinated Project EIS under SDPWO Act and Bilateral assessment under the EPBC Act (2018/8165). Controlling provisions for threatened species and communities.
Gowrie to Helidon (G2H)	Approximately 28km in length comprising sections of new track and upgraded track. A tunnel is proposed which will be approximately 6km in length, 13 bridges and viaduct structure. The topography of the Great Dividing Range crossing from Gowrie on the Toowoomba plateau to Helidon in the Lockyer Valley provides significant challenges.	Coordinated Project EIS under SDPWO Act and Bilateral assessment under the EPBC Act (2017/7882). Controlling provisions for threatened species and communities.

QUEENSLAND PROJECT	OVERVIEW	APPLICABLE APPROVALS & EPBC ACT REFERRAL NUMBER (WHERE RELEVANT)
	The proposed corridor connects to the existing rail line, with tie-in points designed to enable the project to proceed independently of the Helidon to Calvert and the Qld/NSW Border to Gowrie Inland Rail Projects. The preferred alignment is generally contained within the corridor protected under the *Transport Planning and Coordination Act* 1994.	
Helidon to Calvert (H2C)	Approximately 48km in length comprising sections of new track, upgraded tracks and tie-ins. New track goes through Gatton and the existing Gatton rail station, through Forest Hill and then deviates from the existing rail corridor to just north of Laidley Township. It then traverses east going through Little Liverpool Range (with steep topography) and on to Calvert. The preferred alignment is generally contained within the Gowrie to Grandchester Study corridor which was reserved as a future public passenger transport corridor.	Coordinated Project EIS under SDPWO Act and Bilateral assessment under the EPBC Act (2017/7883). Controlling provisions for threatened species and communities.
Calvert to Kagaru (C2K)	Approximately 53km of new dual gauge track. Will provide access to major proposed industrial development at Ebenezer and at Bromelton. The project was previously referred to as Southern Freight Rail Corridor and the rail corridor gazetted for future rail investigations. The preferred alignment is largely contained within the Southern Freight Rail Corridor protected as future railway land.	Coordinated Project EIS under SDPWO Act and Bilateral assessment under the EPBC Act (2017/7944). Controlling provisions for threatened species and communities.

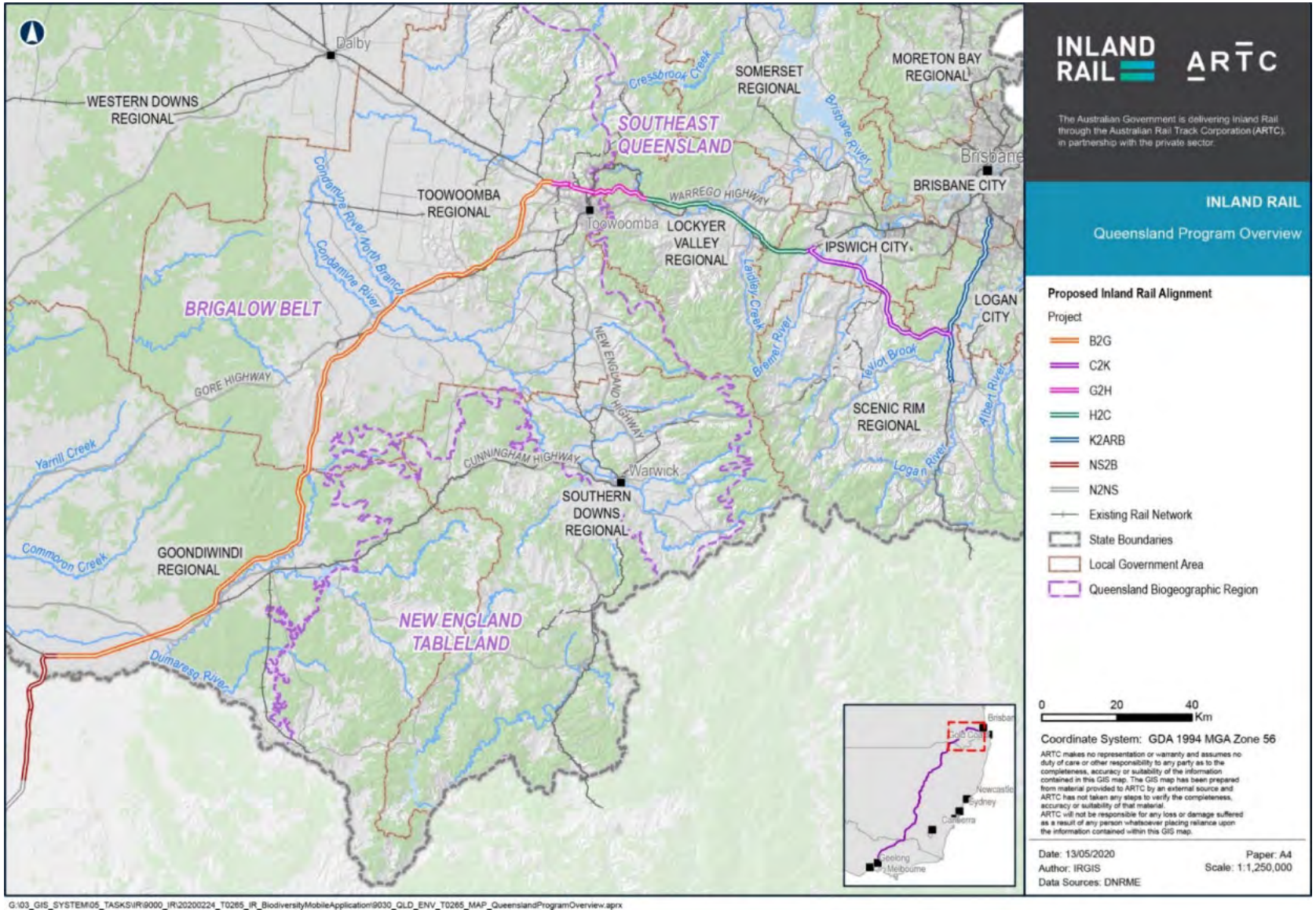

Figure 1 Inland Rail Project Location Overview for Queensland

3 Queensland offset legislative requirements and delivery options

The Queensland projects are being assessed and approved under both State and Commonwealth legislation including; EPBC Act and the SDPWO Act.

The following sections provide an overview of the Commonwealth and State environmental offset frameworks that will apply to the Queensland projects, and options available for the provision of environmental offsets.

3.1 Commonwealth

As part of the EIS process, ARTC will assess whether the Inland Rail Projects are likely to have a significant impact on MNES. If a significant residual impact is still predicted following the application of avoidance and mitigation measures, an environmental offset will be required to compensate for this loss. Offsets for significant residual impacts to MNES are determined and delivered in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012).

The EPBC Act Environmental Offsets Policy may only be applied to those projects that are designated a controlled action under section 75 of the EPBC Act. The Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (the 'Significant Impact Guidelines') (DoE, 2013) will be applied to assess the significance of impacts to MNES. The Offsets Assessment Guide, which accompanies the EPBC Act Environmental Offsets Policy, has been developed in order to give effect to the requirements of that policy, utilising a balance sheet approach to measure impacts and offsets. It applies where the impacted protected matter is a threatened species or ecological community.

The Queensland Environmental Offsets Framework operates so that EPBC Act Environmental Offsets will take precedence over MSES and MLES, to avoid duplication of environmental offsets requirements. This allows a "packaging" approach to offsets to be adopted for MSES and MLES.

3.1.1 Matters of national environmental significance

The relevant controlling provisions subject to each EPBC Act referral decision for the Queensland projects are listed threatened species and ecological communities (sections 18 and 18A).

3.1.2 EPBC Act Offset Delivery Options

The EPBC Act Environmental Offsets Policy requires that offsets are built around direct, land-based solutions that protect and enhance threatened ecological communities and species habitats that are subject to significant residual impacts. At least 90% of a total offset requirement should deliver a conservation gain to the impacted MNES (i.e. like for like) through direct measures that are additional to what is already required, including improving condition of existing habitat and reducing threats or creating new habitat. The remaining 10% of an offset obligation can be indirect or supplementary measures that also relate to the impacted MNES such as research or threat abatement.

Deviation from the minimum of 90% direct offset requirement will only be considered where:

- It can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package, or
- Scientific uncertainty is so high that it isn't possible to determine a direct offset that is likely to benefit the protected matter. For example, this can be the case in some poorly understood ecosystems in the Commonwealth marine environment (DSEWPaC, 2012).

All land-based offsets need to be legally secured for conservation purposes for at least the duration of the impact (which in this case will be in perpetuity due to permanent nature of impacts). The offset land must be actively managed to improve ecological condition and provide a conservation gain for the impacted matter.

A conservation gain may be achieved by:

- Improving existing habitat for the protected matter
- Creating new habitat for the protected matter
- Reducing threats to the protected matter
- Increasing the values of a heritage place
- Averting the loss of a protected matter or its habitat that is under threat.

The offset must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain. For instance, if the proposed action is likely to have impacts on foraging habitat for a particular protected matter, then the offset should create, improve, protect and/or manage foraging habitat.

Offsets that deliver social, economic and/or environmental co-benefits will be encouraged.

The Department of Agriculture, Water and Environment (DAWE) require that an offset proposal is provided during the decision-making stage which is considered in deciding whether the proposed action should be approved. There are two key types of information utilised in planning an offset proposal – determining what types of activities would be appropriate as offsets for a given impact and determining the specific size and scope of an offsets package. Matters to be assessed include specific attributes of the protected matter at the impact site including quality of habitat, duration of the impact and matters at the offset site such as conservation gain to be achieved, land tenure, time to achieve the specified conservation gain, and suitability of the location of the offset site (DSEWPaC, 2012).

The offset proposal is one of many considerations that are weighed at the decision stage in determining the overall acceptability of the proposed action, including economic and social matters. If approved, offset requirements may be included as a condition of approval under section 134 of the EPBC Act.

3.2 Queensland

While the EO Act does not affect or limit the functions and powers of the Coordinator-General under the SDPWO Act, ARTC plan to deliver offsets consistent with those provisions under the EO Act in conjunction with those provisions under the EPBC Act. Accordingly, the EO Act (section 15) restricts an administering agency from imposing an offset condition if either of the following has been assessed under the EPBC Act:

- the same, or substantially the same, impact
- the same, or substantially the same, prescribed environmental matter

Therefore, where matters or impacts assessed by the Commonwealth are the same or substantially the same as those at the State level, offsets will not be a requirement under the EO Act. Offsets for any remaining state-based matters that are not the same or substantially the same will be assessed under Queensland legislation. This largely relates to listed threatened species and communities, which may be listed under both State and Commonwealth legislation, and the details of key overlaps between Commonwealth and State matters are included in Table 2, and further detail is provided in Table 3 and Table 4.

Table 2 Overlap of MNES and MSES

MNES	MSES	Elements that are the same or substantially the same	Elements that constitute remaining MSES
Threatened Ecological Communities	Regulated Vegetation: ERE, OCRE, Wetland, Watercourse	A vegetation community may be both a TEC and regulated vegetation such as an ERE or OCRE. Where aligned these will be assessed under the EPBC Act.	Any regulated vegetation prescribed under the EO Act where the vegetation community does not directly align with a TEC.
Threatened Species (Flora or Fauna)	Regulated Vegetation: Essential Habitat Protected Wildlife Habitat	Species listed as threatened species under the EPBC Act that are also listed as EVNT or SLC under the NC Act	Any species listed as MSES under the NC Act that are not also listed as an MNES under the EPBC Act, except where the species habitat is directly proportionate to an MNES assessed for the project.

ARTC is committed to providing environmental offsets for significant residual impacts to MNES, and those MSES and MLES that are not assessed under the Commonwealth framework. The EO Act does not affect or limit the functions and powers of the Coordinator-General under the SDPWO Act, however ARTC will have regard to the principles of the QEOP in determining and implementing offset requirements for MSES and MLES.

For a prescribed activity, an environmental offset may be required as a condition of approval where, following consideration of avoidance and mitigation measures, the activity is likely to result in a significant residual impact on a prescribed environmental matter. For Inland Rail, applicable prescribed environmental matters to be assessed are referred to as MSES and MLES and are defined in the *Environmental Offsets Regulation 2014* (EO Regulation).

To counterbalance this loss, offsets, which can include improvement and protection of alternative sites and/or actions that improve environmental viability, can provide a conservation outcome that is equivalent to the environmental value being lost at the impact site. If a state or local administering agency decides to impose an offset condition on an authority, the offset must be delivered in accordance with the Queensland environmental offsets framework.

There is potential for environmental offsets to be conditioned by the Coordinator-General under the Primary Approval, and subsequently under various secondary State approvals including; clearing permits under the *Nature Conservation Act 1992* (NC Act) for unavoidable impacts to threatened flora species, impacts to fish passage under *Fisheries Act 1994* and clearing of remnant vegetation under *Planning Act 2016*. All of these prescribed biodiversity matters will be assessed as part of the primary and secondary approval processes and the offset delivery requirements are governed by the Queensland environmental offset framework.

The framework consists of:

- EO Act
- EO Regulation
- Queensland Environmental Offsets Policy (QEOP) (Version 1.8) (DES, 2020)
- Queensland Environmental Offsets Policy Significant, Residual Impact Guideline (DEHP, 2014)
- Queensland Environmental Offset Policy Significant Residual Impact Guideline (DSDIP 2014)

Pursuant to QEOP, all Queensland offsets will have regard to the following seven offset principles:

1. Offsets will not replace or undermine existing environmental standards or regulatory requirements or be used to allow development in areas otherwise prohibited through legislation or policy

2. Impacts must first be avoided, then mitigated, before considering the use of offsets for any remaining impact
3. Offsets must achieve a conservation outcome that counterbalances the significant residual impact for which the offset was required
4. Offsets must provide environmental values as similar as possible to those being lost
5. Offset provision must minimise the time-lag between the impact and delivery of the offset
6. Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values
7. Where legal security is required, offsets must be legally secured for the duration of the impact on the prescribed environmental matter.

3.2.1 Matters of state environmental significance

MSES are prescribed in Schedule 2 of the EO Regulation and include:

- Endangered and vulnerable flora and fauna species under NC Act and their habitats
- Special least concern fauna species under NC Act and their habitats
- Endangered and of concern REs under Vegetation Management Act 1999 (VM Act)
- Essential habitat (that has been mapped by DES)
- REs that intersect with wetlands and watercourses
- Connectivity areas for REs
- Wetlands in a wetland protection area, or of high ecological significance
- Wetlands or watercourses in high ecological value waters
- Protected areas (including nature refuges)
- Highly protected areas of a relevant Queensland marine park
- Marine plants within the meaning of the Fisheries Act 1994
- Declared fish habitat areas and waterways providing for fish passage
- Legally secured offset areas.

3.2.2 State Development and Public Works Organisation Act 1971

The Queensland projects are being assessed by the Coordinator-General as coordinated projects under the SDPWO Act. The EO Act does not affect or limit the functions or powers under the SDPWO Act of the Coordinator-General. In making decisions about environmental offset requirements under the SDPWO Act, the Coordinator-General may consider the environmental offsets framework but is not bound by its requirements.

To guide ARTC in how it will assess and identify a particular project's State environmental offset requirements, it is proposed the Queensland Environmental Offset Framework and overarching principles and delivery options will be considered, as outlined in the QEOP. However, given the size and scale of the Queensland projects, ARTC will seek a tailored offset delivery approach, in consultation with the Coordinator-General, in order to achieve a strategic offset settlement.

Qld Environmental Offsets Policy

Under the QEOP, an offset is required where a prescribed activity is likely to result in a significant residual impact (SRI) on a MSES. There are two QEOP SRI guidelines that support a determination as to whether an impact is 'significant':

- Department of Environment and Heritage Protection 2014: applies to development that requires an approval under *Environmental Protection Act 1994* (EP Act), *Nature Conservation Act 1992* (NC Act) or *Marine Parks Act 2004* (DEHP, 2014); and
- Department of State Development, Infrastructure and Planning 2014: applies to development that requires an approval under the *Planning Act 2016* (Planning Act).

While these guidelines may not specifically apply to coordinated projects, they will be used to support an assessment of whether impacts from the project are likely to be 'significant' and require offsetting, as appropriate. This guideline would be applicable for secondary approvals (where required) under NC Act and EP Act.

To avoid duplication of offset conditions between State and Commonwealth, the Queensland State and Local Governments can only impose an offset condition in relation to a prescribed activity, if the same, or substantially the same impact and the same, or substantially the same matter, has not been subject to assessment under the EPBC Act for a controlled action.

Therefore, when developing a preferred offset delivery approach for the Queensland projects, preference will be to identify a process and tailored approach that will ensure MNES offsets comply with the EPBC Act Environmental Offsets Policy, and any remaining MSES (not directly associated with MNES) will be assessed and delivered in general accordance with the QEOP.

State Offset Delivery Options

Under the QEOP offset requirements can be satisfied through one or a combination of options which include:

- Proponent driven offset (primarily land-based and/or delivery of actions in a Direct Benefit Management Plan (DBMP))
- Financial settlement offset or
- A combination of the above.

Proponent-driven offsets

Land-based offsets

- Like the EPBC Act Offset Policy, QEOP specifies direct land-based offsets should make up 90% or more of the total offset requirement, unless otherwise agreed.
- Direct land-based offsets are to provide environmental values as similar as possible to those being lost and may consist of remnant or non-remnant vegetation.
- Where remnant vegetation is used, management actions are required to demonstrate additional habitat quality outcomes can be achieved. For example, Endangered and Of Concern Regional Ecosystem (RE) offsets must be of the same Broad Vegetation Group (BVG) as the impacted RE, of the same RE status, and within the same bioregion.
- For flora and fauna species, the offset must contain or be capable of containing a self-sustaining population of that same impacted species.
- The size of a land-based offset is governed by a range of factors including the quality of habitat impacted. Offset site size is generally determined through use of the Land-based Offsets Multiplier Calculator, which is habitat quality based, or using a rapid assessment, which caps the offset at a ratio of 1:4 (impact site only). Rapid assessment assumes an impact site quality score of 7 out of 10 which may not accurately reflect the actual habitat quality of the impact site and may present challenges in fulfilling offset obligations on an offset site.
- Site-based habitat quality assessments for both the impact and offset sites are highly recommended where time permits.
- The offset site is preferably located in a strategic offset investment corridor closest to the impacted site, and risks of a conservation outcome not being achieved are identified and mitigated.

Direct Benefit Management Plan

- Proponent-driven offsets can also be delivered through priority actions identified in a Direct Benefit Management Plan (DBMP).
- DBMPs are pre-approved packaged investments that outline priority actions to address threats to and provide substantial benefits for prescribed matters.

Financial Settlement

- A financial settlement payment can be used to meet an offset requirement for any MSES impacted by a development.
- The required payment is calculated by applying the Financial Settlement Offset Calculation Methodology set out in the QEOP.
- A financial settlement must be paid prior to project commencement.
- Financial payments are made up of costs associated with on-ground land management, administration and landholder incentive payment.
- Financial payments can be staged. The staging of offset delivery will need to be described and approved in an Offset Delivery Plan prior to project commencement.

4 Queensland Environmental Offset Requirements

Environmental impact assessments are being prepared for all Queensland projects. To date, there has been a range of targeted ecological surveys completed within the corridor to inform each Project's draft EIS. The assessments have included threatened species habitat modelling, informed by initial field ecology survey results, to predict habitat extent, disturbance and offset obligation.

For the purposes of this Strategy, environmental offset assessment information has been drawn from each draft EIS in order to identify those MNES and MSES values which may incur significant residual impacts and require offsets. Based on the MNES and MSES assessment methodology presented within each draft EIS, the extent of impacts presented within this Strategy should be considered as maximum potential extents as a number of species and communities have been identified as likely to be present in the absence of further field validation. As such, potential species and community habitats for the purpose of preliminary offset site identification have been extrapolated using regional ecosystem (RE) mapping until further field validation can be completed.

To better inform each project's impacts and offset requirements, ARTC will conduct further detailed ecological surveys which are scheduled to be finalised mid-2021. Information collected as part of these detailed investigations will support the confirmation of biodiversity values within the corridor, including their extent and ecological condition. Significant impact assessments for MNES, MSES and MLES will be subsequently refined and offset obligations quantified to establish a validated ecological impact / offset baseline.

Habitat quality assessments will be conducted according to the Department of Environment and Science (DES) *Guide to determining terrestrial habitat quality (Version 1.3, 2020)* (DES 2020b) for impact and offset site comparison as part of the planned detailed ecological surveys. Ecological impact and offset information derived from these investigations will also be used to inform the EIS assessment process as well as the development of the Preliminary Offset Delivery Plan. Accordingly, detailed offset calculations using the EPBC Act's Offset assessment guide have not been considered in this Strategy. However, the EPBC Act's Offset assessment guide will be applied following further detailed field assessments and will be included in a Preliminary Offset Delivery Plan scheduled for development mid-2021.

On this basis, those MNES and MSES values that may be required to be offset for each Queensland project is summarised in Table 2 and Table 3 for the Brigalow Belt and South East Queensland (SEQ) bioregions respectively. MNES are summarised in Table 2 with a breakdown of impacts for each project. MSES are summarised in Table 3 with a breakdown of impacts for each project. The information has been used to identify the type and number of ecological communities and species habitat that may require offsetting to inform ARTC's approach to offset delivery. It should be noted these values are preliminary and potential impact quantification will be refined following further detailed ecological assessments within the project alignment.

To maintain the intent of QEOP and avoid duplication of offset conditions between jurisdictions, MSES values which are also listed under EPBC Act are only presented in Table 2 as MNES. Vegetation communities and species which are State listed only, or are specific biodiversity values under QEOP, such as watercourse vegetation, are summarised in Table 3 and will be offset as MSES.

4.1 Identifying potential offset sites

ARTC has performed an assessment of offset availability and identification of potential offset sites that will deliver the Queensland project's offset requirements, as they are currently understood. The offset analysis has included identification of RE's that are known or likely to provide suitable habitat and were subsequently mapped using certified RE mapping (v11). Targeted RE's associated with remnant, high value regrowth (HVR) and unmapped regrowth were identified across a chosen study area of 100km either side of the project footprint and spatially clipped to the Brigalow Belt and South East Queensland bioregions. The results have provided a broad overview of offset availability for each of the offset values.

The potential to co-locate MNES and MSES values was then evaluated. This is shown in Table's 4 and 5 where 'offset groupings' have been categorised according to broad vegetation community associations, such as Brigalow TEC, which also provide habitat for a number of listed flora and fauna species. Priority offset properties were then selected through a process of ranking those which displayed collective characteristics such as; largest patch sizes of selected habitats, connectivity to existing protected areas and biodiversity corridors, proximity to records and availability of remnant, HVR and unmapped regrowth.

Table's 4 and 5 also present preliminary offset obligations recognising that baseline habitat and condition assessments for impact and offset sites have yet to occur. Adoption of a 1:4 ratio across all MNES and MSES to determine offset area obligation represents a conservative approach and final offset areas will be determined once habitat quality scoring has been completed.

Table 3 Potential MNES values impacted within Brigalow Belt and South East Queensland Bioregions

Anticipated MNES Significant Residual Impact (ha) within the Brigalow Belt and South East Queensland Bioregions							
MNES	**EPBC Act Status**	**NC/VM Act Status**	**B2G**	**G2H**	**H2C**	**C2K**	**Total significant, residual impact area across the Queensland projects (ha)**
TEC's							
Swamp tea-tree (*Melaleuca irbyana*) forest of Southeast Queensland*	Endangered	ERE	-	-	-	30.46	30.46
Brigalow (*Acacia harpophylla* dominant and co-dominant)*	Endangered	ERE	62.89	-	-	-	62.89
Weeping Myall Woodlands*	Endangered	OCRE	81.92	-	-	-	81.92
Poplar Box Grassy Woodland on Alluvial Plains*	Endangered	OCRE	81.92	-	-	-	81.92
Threatened Flora Species							
Dichanthium queenslandicum (King blue- grass)*	Endangered	Vulnerable	5.29	-	-	-	5.29
Homopholis belsonii (Belson's panic)*	Vulnerable	Endangered	3.19	-	-	-	3.19
Lepidium monoplocoides (Winged peppercress)	Endangered	Least Concern	40.91	-	-	-	40.91
Notelaea lloydii (Lloyd's olive)*	Vulnerable	Vulnerable	-	-	21.26	26.77	48.03
Picris evae (A hawkweed)*	Vulnerable	Vulnerable	18.68	-	-	-	18.68
Rhaponticum australe (Austral cornflower)*	Vulnerable	Vulnerable	2.29	-	-	-	2.29
Sophora fraseri (Brush sophora)*	Vulnerable	Vulnerable	-	2.36	-	-	2.36

Anticipated MNES Significant Residual Impact (ha) within the Brigalow Belt and South East Queensland Bioregions							
MNES	**EPBC Act Status**	**NC/VM Act Status**	**B2G**	**G2H**	**H2C**	**C2K**	**Total significant, residual impact area across the Queensland projects (ha)**
Threatened Fauna Species							
Anomalopus mackayi (Five-clawed worm-skink)*	Vulnerable	Endangered	16.68	-	-	-	16.68
Dasyurus maculatus maculatus (Spotted-tailed quoll)*	Endangered	Endangered	15.49	24.46	1.59	6.92	48.46
Delma torquata (Collared delma)*	Vulnerable	Vulnerable	295.76	197.41	85.33	9.56	588.06
Erythrotriorchis radiatus (Red goshawk)*	Vulnerable	Endangered	-	84.79	4.15	77.25	166.19
Furina dunmalli (Dunmall's snake)*	Vulnerable	Vulnerable	298.85	-	-	-	298.85
Lathamus discolor (Swift Parrot)*	Critically Endangered	Critically Endangered	243.54	8.54	13.34	11.74	277.16
Petrogale penicillata (Brush-tailed rock-wallaby)*	Vulnerable	Vulnerable	-	-	4.88	-	4.88
Phascolarctos cinereus (Koala)*	Vulnerable	Vulnerable	481.15	189.01	98.66	124.31	893.13
Pteropus poliocephalus (Grey-headed flying-fox)	Vulnerable	Least Concern	-	201.19	99.46	71.44	372.09
Rostratula australis (Australian painted snipe)*	Endangered	Endangered	-	8.9	15.43	34.55	58.88
Turnix melanogaster (Black-breasted button quail)*	Vulnerable	Vulnerable	-	9.18	-	-	9.18
Tympanocryptis condaminensis (Condamine earless dragon)*	Endangered	Endangered	17.93	-	-	-	17.93

* Federal and State matters that are the same or substantially the same and will not require an offset under the NC Act.

Table 4 Potential MSES values impacted within Brigalow Belt and South East Queensland Bioregions (Impacts identified in this table represent the remaining MSES impact following assessment under the EPBC Act for matters that are the same or substantially the same.)

Anticipated MSES Significant Residual Impact (ha) within the Brigalow Belt and South East Queensland Bioregions						
MSES	**NC / VMA Act Status**	**B2G**	**G2H**	**H2C**	**C2K**	**Total impact area across the Queensland projects (ha)**
Regulated vegetation						
Prescribed RE	Endangered	62.74	9.8	-	10.56	83.1
Prescribed RE	Of Concern	151.50	89.62	-	9.02	250.14
Watercourse RE	-	43.88	4.3	0.77	16.09	65.04
Wetland RE	-	-	-	-	13.40	13.40
Essential Habitat	-	117.31	112.36	95.66	25.89	351.22
Connectivity areas						
Landscape fragmentation tool	-	560.51	122.87	-	27.29	710.67
Wetlands and watercourses						
No impact anticipated	-	-	-	-	-	
Designated precinct in a strategic environmental area						
No impact anticipated	-	-	-	-	-	
Protected wildlife habitat						
Acanthophis antarcticus (Common death adder)	Vulnerable	540.87		-	-	540.87
Anomalopus mackayi (Five-clawed worm-skink)*	Endangered	-	-	-	-	
Calyptorhynchus lathami lathami (Glossy black-cockatoo)	Vulnerable	480.86	21.58	45.11	50.63	598.18
Caustis blakei subsp. macrantha (Caustis)	Vulnerable	-	10.41	-	-	10.41
Cyperus clarus (a sedge)	Vulnerable	106	-	-	-	106
Dasyurus maculatus maculatus (Spotted-tailed quoll)*	Endangered	-	-	-	-	
Delma torquata (Collared delma)*	Vulnerable	-	-	-	-	

Anticipated MSES Significant Residual Impact (ha) within the Brigalow Belt and South East Queensland Bioregions						
Dichanthium queenslandicum (King blue- grass)*	Vulnerable	-	-	-	-	
Erythrotriorchis radiatus (Red goshawk)*	Endangered	-	-	-	-	
Furina dunmalli (Dunmall's snake)*	Vulnerable	-	-	-	-	
Homopholis belsonii (Belson's panic)*	Endangered	-	-	-	-	
Lathamus discolor (Swift Parrot)*	Critically Endangered	-	-	-	-	
Marsdenia coronata (Slender milkvine)	Vulnerable	-	51.02	-	61.85	112.87
Melaleuca irbyana (Swamp tea-tree)	Endangered	-	-	128.78	237.73	366.51
Ninox strenua (Powerful owl)	Vulnerable	-	99.05	28.63	21.54	149.22
Notelaea lloydii (Lloyd's olive)*	Vulnerable	-	-	-	-	
Petrogale penicillata (Brush-tailed rock-wallaby)*	Vulnerable	-	-	-	-	
Phascolarctos cinereus (Koala)*	Vulnerable	-	-	-	-	
Picris barbarorum (Tall hawkweed)	Vulnerable	567.49	-	-	-	567.49
Picris evae (A hawkweed)*	Vulnerable	-	-	-	-	
Ornithorhynchus anatinus (Platypus)	Special Least Concern	-	-	47.77	-	47.77
Rhaponticum australe (Austral cornflower)*	Vulnerable	-	-	-	-	
Rostratula australis (Australian painted snipe)*	Endangered	-	-	-	-	
Sophora fraseri (Brush sophora)*	Vulnerable	-	-	-	-	
Tachyglossus aculeatus (Short-beaked Echidna)	Special Least Concern	-	-	75.71	-	75.71
Turnix melanogaster (Black-breasted button quail)*	Vulnerable	-	-	-	-	
Tympanocryptis condaminensis (Condamine earless dragon)*	Endangered	-	-	-	-	
Koala Habitat Areas (*Nature Conservation (Koala) Conservation Plan 2017)*	-	81.73	213.73	-	-	295.46

Anticipated MSES Significant Residual Impact (ha) within the Brigalow Belt and South East Queensland Bioregions						
Protected areas						
No impact anticipated	-	-	-	-	-	
Highly protected zones of state marine parks						
No impact anticipated	-	-	-	-	-	
Fish habitat areas						
No impact anticipated	-	-	-	-	-	
Waterways providing for fish passage						
No impact anticipated	-	-	-	-	-	
Marine plants						
No impact anticipated	-	-	-	-	-	
Legally secured offset areas						
No impact anticipated	-	-	-	-	-	

* State matter that is the same or substantially the same as that assessed under the EPBC Act

5 ARTC's Environmental Offset Delivery Strategy for Queensland

ARTC's overarching strategy is to deliver a strategic land-based offset portfolio that will contribute to an overall conservation outcome to improve the protection, management and viability of impacted MNES, MSES and MLES values. Community consultation and collaboration to ensure these values are managed and maintained is central to this strategy. ARTC propose to combine environmental offset requirements across each Queensland project, within the relevant bioregion, and pool offset values to enable larger strategic environmental offset sites to be delivered.

The primary aim of the Strategy will be to identify a portfolio of offset properties that meet MNES, MSES and MLES offset obligations that are strategically located in proximity to the future rail corridor (impact area). The Strategy will also aim to secure offset properties that preferentially adjoin protected area estates, conservation reserves and / or large intact remnants which are located within prioritised offset hubs and / or bioregional corridors. Ongoing land management will be conducted according to approved Offset Area Management Plans which will seek to maximise landscape conservation outcomes by increasing resilience of self-sustaining communities and populations whilst also seeking to achieve habitat quality gains at the offset site and improved connectivity within the region.

Offset area management will depend on the final offset portfolio, however, may include management by a landholder, service provider, an accredited community based not for profit conservation organisation, an established conservation management entity, government based or supported organisation, or a combination of these. Management actions will include weed control, feral animal control, fire management, restoration and/or revegetation. Ongoing management of the offset portfolio will seek to foster community collaboration while achieving offset objectives and conservation outcomes under enduring arrangements such as covenants bound on title.

This Strategy recognises that the EIS and detailed design phase for each Queensland project is operating under progressive delivery schedules however offset site optimisation and determination will be performed collectively based on the best quantitative and qualitative information available at the time. As a result, land-based offsets may be generated that can be drawn down by each project progressively.

ARTC is seeking to avoid, minimise and mitigate environmental impacts to the greatest extent possible when identifying a preferred alignment, locating ancillary infrastructure and undertaking construction and operation for each project. For example, in sections of C2K, a realignment of the rail corridor was undertaken to avoid impacting significant biodiversity values including koala habitat. However, this also presented challenges for other threatened species and communities, resulting in unavoidable impacts to the *Melaleuca irbyana* TEC.

ARTC has identified opportunities to further minimise the impact footprint through design innovation on the Queensland projects. While there are opportunities to minimise impacts, there are also challenges as ARTC is constrained to the proposed rail alignment, as well as topographical and engineering constraints. Consequently, there are fewer opportunities to avoid impacts on biodiversity values in some areas. These avoidance and mitigation strategies are outlined within each draft EIS.

The following sections summarise the key offset delivery principles ARTC will be looking to achieve.

5.1 Application of Hierarchy and Confirmation of Offset Framework

ARTC propose that environmental offsets be assessed so that the offset requirements for the EPBC Act approval take precedence over State approvals, and offsets are rationalised for the same or substantially the same matter and the same or substantially the same impact assessed by the Commonwealth. On this basis, delivering offsets for MNES will also deliver conservation outcomes for State MSES and Local prescribed MLES values.

In line with this approach, ARTC will initially assess each project's offset requirements under the EPBC Act Significant Impact Guideline for MNES. An assessment of MSES and MLES will follow, in accordance with QEOP's Significant Residual Impact Guideline, to identify those MSES and MLES values that will be significantly impacted by a project, and which of those are relevantly associated with MNES. Matters of environmental significance that are only identified as MSES and MLES values will be delivered in consultation with the Coordinator-General, DES, DAF and DRNME where relevant. ARTC may consider financial settlement for these residual matters in accordance with the QEOP.

5.2 Risk mitigation for offset delivery

There are challenges and risks in delivering environmental offsets. These will be evaluated by ARTC and mitigation measures put in place at key stages and decision-making points. Risks include:

- Delivering offsets that accurately reflect the significant residual impacts on MNES, MSES and MLES
- Being able to identify suitable offset sites that support biodiversity values and areas required, particularly within the nominated offset hubs and corridors by DES
- Liaising with landholders and successfully securing offset arrangements
- Finalising legal security in a timely manner
- Addressing refinements to the offset requirements as the projects progress through the design phase and ensuring that offset sites identified earlier in the process have adequate representation including offset quantum and condition
- Achieving the set conservation outcomes for a particular matter over the agreed management timeframes.

Risk mitigation measures will include that ARTC commence offset site identification early in the process and do so in liaison with a number of stakeholders and land managers. A number of offset site options will be explored to ensure there are adequate contingencies should one or more sites not progress. ARTC will also ensure the refined impact assessments based on ground validation are informing offset site selection process and regular consultation occurs with regulators to ensure the offset process is discussed and agreed to as far as practicable. ARTC will look to secure land-based offsets that are known to support the relevant matters and the conservation gains proposed will be achieved through sound management measures tailored to the species and/or community with regular monitoring, and clear performance outcomes set. Offset sites will be legally secured as soon as practically possible, though acknowledging that elements of tenure negotiation and related administrative aspects may be beyond the control and influence of ARTC.

5.3 Staging Offset Assessment and Delivery

There are three main phases of delivery for each project; approvals phase, detailed design phase, and construction phase.

The approvals phase predominantly relates to the primary approvals such as EPBC Act and Coordinator-General's evaluation report for each EIS. Secondary approvals, which may also trigger offset obligations for MSES, such as the NC Act for listed flora species, will generally be obtained after the primary approvals have been granted. Therefore, the process of confirming significant residual impacts and environmental offset requirements will occur in a progressive manner, and there will need to be some flexibility to allow for impacts to be refined as ARTC work to confirm the footprint once a construction contractor is appointed and detailed design occurs.

ARTC propose a tailored approach to finalising and delivering the environmental offset requirements due to the scale and complexity of the project and delivery. This approach will also enable ARTC to maximise environmental outcomes that can be achieved through combining the Queensland project's offset requirements into two main bioregions (Brigalow Belt and SEQ).

For transparency, separate Environmental Offset Proposals will accompany each project to identify the likely environmental offset requirements for each relevant project. Once the full offset package is understood an Environmental Offset Delivery Plan will be prepared outlining the offsets to be delivered for all the Queensland projects. This approach is described below and summarised in Figure 2.

5.3.1 Prior to Project Primary Approval – Development of Environmental Offset Proposal – January 2021

- The impacts presented within each Environmental Offset Proposal will be subsequently refined and verified through supplementary field ecology surveys and condition assessments and consolidated within the Preliminary Environmental Offset Delivery Plan.
- Each Environmental Offset Proposal will summarise predicted offset values at a Commonwealth, State and Local level, upper disturbance limits, outlining the preferred offset approach, identifying offset site availability and timing for offset delivery. While each project will be evaluated separately, the offset delivery approach will take into consideration a coordinated offset package for Queensland as a whole.
- Land-based offset site options will be further refined, identified and discussed with regulators.
- ARTC will initiate the landholder engagement process and undertake preliminary assessment of potential offset sites to understand offset site suitability.

5.3.2 Post detailed ecological investigations – Development of the Preliminary Environmental Offset Delivery Plan – mid-2021

- As a result of subsequent field survey and verification, the extent of significant residual impacts will be refined for MNES, MSES and MLES prior to and including early detailed design phases. Depending upon detailed design, the total extent of impacts may be reduced, and some biodiversity values avoided altogether.
- Revised clearing limits and environmental offset requirements will be confirmed for each project.
- ARTC will confirm shortlisted offset site/s to meet a project's requirements, and any other supplementary measures proposed for the relevant project.
- Detailed ecological surveys will commence on the shortlisted offset sites to confirm presence of targeted biodiversity values, assess habitat quality and determine management actions required.
- Landholder discussions including seeking in-principle agreement will continue and be ongoing throughout the offset delivery program.
- Offset calculator assessments will be prepared (assessing impact site and offset site), using applicable assessment tools, to confirm final offset areas needed (ratios).
- During offset site analysis, ARTC will look to combine environmental offset requirements across the Queensland projects to increase conservation outcomes that can be achieved to optimise offset delivery. This may for example, include all koala habitat impacts are pooled and ARTC seeks to meet these offset requirements across a small number of larger offset sites. Co-location of offset values may also occur, for example, offsetting an Of Concern RE with Koala and Collared Delma habitat where the vegetation community provides the required habitat values for the species.
- The above information will be outlined in a preliminary Environmental Offset Delivery Plan (EODP).
- The preliminary EODP will be provided to DAWE, Coordinator-General, DES, DAF and DNRME for consultation.
- Offset Area Management Plan preparation will commence.
- MSES and MLES offset financial payments, where applicable, will be made prior to construction.

5.3.3 Prior to Construction Commencement – Submission and approval of Final Environmental Offset Delivery Plan and Offset Area Management Plan/s

- Seek approval of the finalised Environmental Offset Delivery Plan from Commonwealth and State Government.
- Environmental Offset Delivery Plan will include details of conservation outcomes to be achieved, management actions to be undertaken, risks and corrective actions, ecological monitoring and reporting.
- Offset Area Management Plan/s will be finalised and submitted for Commonwealth and State Government approval.
- Offset site negotiation will be finalised and conservation covenanting processes will commence.
- Offset site management has commenced.

5.3.4 Within 1 year of Construction Commencement – Offset Site Legally Secured

- All offset sites identified in the approved Environmental Offset Delivery Plan and Offset Area Management Plan/s will be legally secured under a legally binding mechanism within one year of construction commencement. Additional time may be needed for formal conservation covenanting and related administrative processes to occur. For example, enactment under a statutory instrument.
- There are a number of options for legally securing an offset site, including offset protection area under the EO Act, voluntary declaration under the *Vegetation Management Act 1999*, protected area under the NC Act, statutory covenants under the *Land Title Act 1994* or provisions under the EPBC Act. All options will be considered, and the final instruments chosen will depend on circumstances for each offset site.
- Due to the nature of the impacts and operational environment, legal security will be for at least the duration of the impact and the type of enduring covenants will be negotiated depending on the circumstances for each offset site.

5.4 Co-location of Offset Requirements on Strategic Offset Sites

ARTC's overarching objective is to deliver the Queensland project's environmental offset requirements through strategic land-based offsets. The primary focus will be identifying strategic offset sites that contain the required MNES, MSES and MLES values, based on bioregions, proximity to the rail corridor and are prioritised in offset hubs and corridors identified by DES in the Brigalow Belt and SEQ bioregions.

This approach should result in fewer but larger offset sites to be protected and managed and preferably will build resilience within the protected area estate and enhance biodiversity corridors. This approach will allow ARTC to pool offset requirements across Queensland projects, maximise conservation outcomes that can be achieved across the Inland Rail Program and increase efficiencies for delivery and management.

As the Queensland projects may progress across slightly different timeframes for construction commencement, when identifying offset sites, it will be ensured that a site or sites can cater to the upper disturbance limits that have been predicted. On this basis, the offset portfolio will be available for each relevant project to draw down their environmental offset obligations in accordance with the Environmental Offset Delivery Plan.

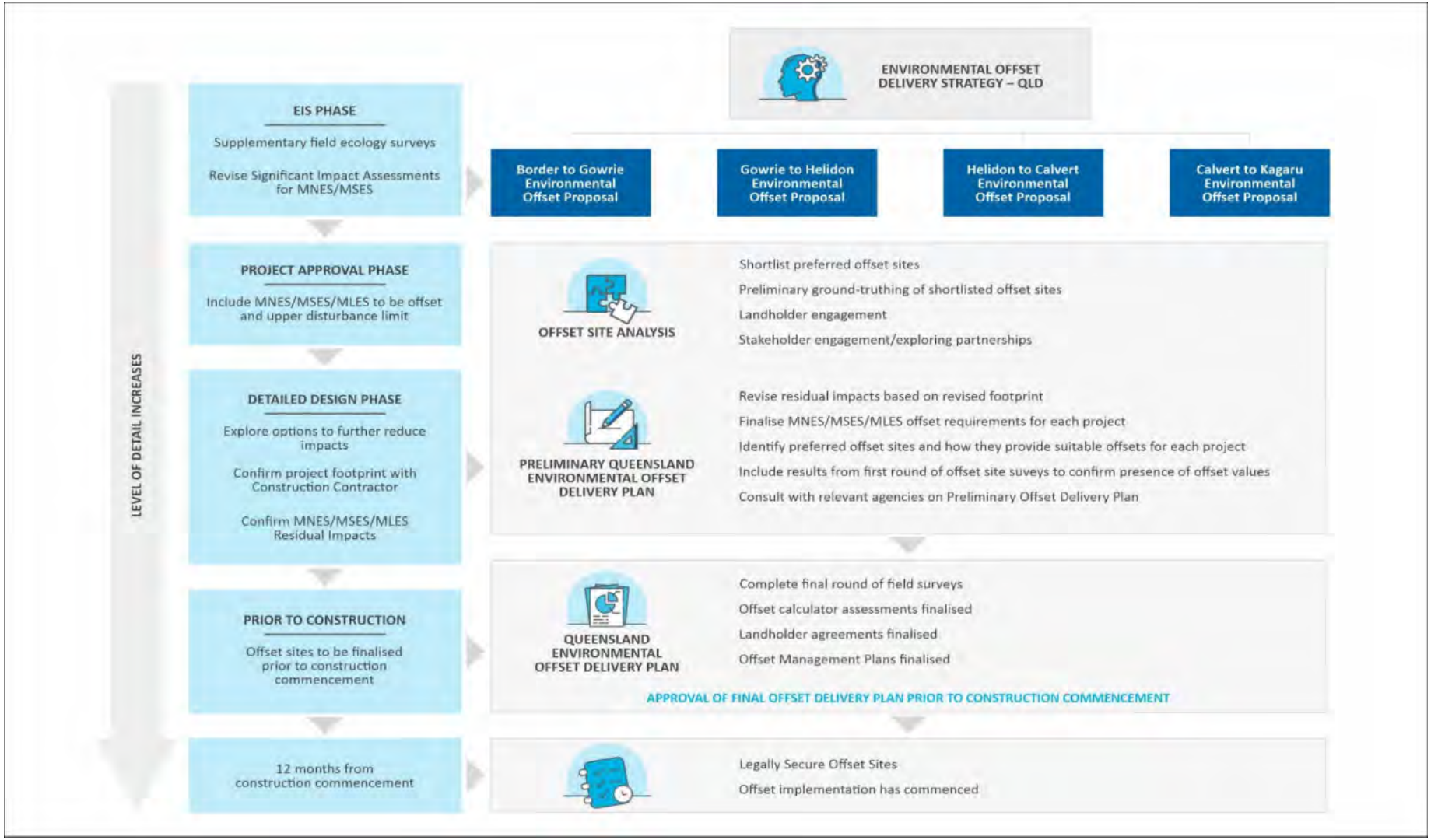

Figure 2 Staging Offset Assessment and Delivery

6 Strategic offset site identification

6.1 Methodology

An initial desktop assessment has been undertaken with the aim of identifying potential strategic offset sites that can meet the Queensland project's environmental offset requirements as they are currently understood. The intent of this initial investigation was to assess land-based offset feasibility as well as offset portfolio optimisation. Offset portfolio optimisation was initially established to identify areas where maximum co-location of offset values may be achieved, and preference given to patches of threatened species habitat and ecosystems that are of a large size and strategically located to ensure connectivity such as adjoining protected area estates, conservation reserves and / or bioregional corridors.

For some values a combination of properties may be required to meet the total offset area needed. Further offset portfolio optimisation will occur as assessments progress to include landholder engagement and ground-truthing to validate suitability of properties.

Specific property address and lot on plan details have been withheld for the purpose of this offset feasibility assessment to preserve landholder privacy during this early stage of the assessment process.

6.2 Preliminary Offset Site Identification Results

Eight preliminary offset sites for the Brigalow Belt bioregion and eleven preliminary offset sites for the South East Queensland bioregion have been identified through initial desktop offset analysis and optimisation assessments. The combination of these 19 sites are expected to meet all MNES offset requirements and a large proportion of the estimated MSES offset requirements as they are currently understood. The properties summarised have been shortlisted due to containing large areas of the required offset values, in a number of instances there are records on the property or nearby, they are strategically located, and provide opportunities to co-locate a number of MNES and MSES values within the same areas of bushland or property. The offset analysis and properties shortlisted demonstrate that there are large areas of suitable vegetation and habitats available in the landscape, not too far from impact areas, and the offset areas can be placed on strategically located properties to maximise conservation outcomes and connectivity.

While certain impacted vegetation communities are more geographically restricted in their distribution, and some species are specialised in their habitat requirements, offset groupings have been adopted to assist locate suitable offset sites. Considerations have included RE's that have the potential to support a number of species, locations where a species or community is known to occur, size of potential habitat areas available and connectivity in the landscape.

The offset sites identified under this assessment do not necessarily represent the final offset sites or definitively reflect all MNES, MSES and MLES offset requirements however demonstrates the feasibility of offset co-location across a variety of prescribed matters. Each offset site may contain several cadastral parcels however would be assessed as one 'offset site' as they are located adjacent to each other and databases suggest are owned by the one landowner.

Further offset site optimisation on revised MNES, MSES and MLES impact information will be subsequently undertaken in order to generate an up to date offset feasibility property portfolio. Results of the updated offset property feasibility assessment will be discussed with relevant Commonwealth and State Government departments which will facilitate the development of the Preliminary Environmental Offset Delivery Plan.

A high-level summary of the 19 shortlisted offset sites, offset values they contain, and area available, is provided in Table 4 and Table 5.

Based on the selected offset properties, and habitat areas estimated as available, there are some MSES values which have not been fully acquitted by the chosen properties. Desktop analysis across the broader study area has demonstrated that there is more than adequate availability for each offset value, but due to the nature of some values, such as RE's which are restricted in range, or fauna species with specialised habitat requirements, based on a desktop assessment, they don't currently occur in shortlisted properties chosen at present.

The following offset values are currently showing a shortfall:

- Powerful owl
- Platypus
- Slender milkvine
- Endangered RE12.3.18
- Of Concern RE12.3.8
- Of Concern RE12.9-10.16.

There are a number of steps that will address where shortfalls are currently showing. These are:

- Supplementary field ecology surveys of impact areas may identify a reduced extent of the MNES and/or MSES values. Supplementary field ecology surveys for the Queensland projects are due for completion mid-2021;
- Ground-truthing of offset sites may identify additional suitable areas of ecological communities and/or species habitats are present;
- Habitat quality scoring on impact and offset areas may determine less area is required (currently 1:4 ratio has been applied across all values);
- Additional offset properties may be added to the offset portfolio to make up any identified shortfalls;
- Indirect offsets may be considered where less than 10% of the total offset requirement needs to be made up; and
- For MSES shortfalls ARTC will consider financial payments to DES.

MSES wetlands, watercourse vegetation, connectivity and essential habitat will be co-located across the offset property portfolio with other suitable MNES and MSES values. For example, under QEOP connectivity offsets are to be provided at a 1:1 ratio utilising regrowth vegetation. Regrowth vegetation that provides important connections between other remnant tracts, along watercourses, or may be adjacent to an existing protected area, will be used to offset connectivity. All nominated offset properties contain stream orders and there will be watercourse vegetation that can be used, particularly where offset values include riparian RE's such as 11.3.2, 12.3.3 etc. Confirmation of which properties these MSES values will be offset on, and how much area is required, will be provided post ground-truthing being undertaken of preferred offset sites and habitat quality scoring completed.

6.3 Offset site selection and management principles

Offset sites identified through the offset property feasibility assessment process will be assessed to meet the principles of the EPBC Act Environmental Offset Policy and to be consistent with the QEOP.

Each proposed offset property will be assessed against the following criteria and an initial assessment of the identified potential offset sites under the policy principles is provided below.

6.3.1 Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matters detailed in the Environmental Offset Delivery Plan.

ARTC's overarching strategy is to deliver a strategic land-based offset portfolio that will contribute to an overall conservation outcome to improve the protection, management and viability of impacted MNES, MSES and MLES values. Offset properties will support those ecological communities and species habitats that have been impacted providing a 'like for like' conservation outcome. The properties will deliver an overall conservation outcome for those MNES (Table 2) and/or MSES values (Table 3) required to be offset through:

- Improving ecological condition of vegetation communities and species habitats through land management activities such as weed control, pest animal management, grazing management and fire management;
- Restoration of degraded vegetation and habitats including areas affected by erosion, fragmentation, and/or lack of microhabitats such as native groundcover and fallen woody debris;
- Revegetation of vegetation communities and species habitats increasing their extent;
- Removal and/or reduction of threats such as preventing clearing of regrowth, managing the risk of wildfires, limiting the cropping of native grasslands; and
- Monitoring and research to improve knowledge and understanding of habitat restoration techniques; and species utilisation of habitats or other compensatory measures tailored to the particular MNES or MSES.

Preference will be given to offset properties that adjoin protected area estates, conservation reserves and / or large intact remnants which are located within prioritised offset hubs and / or bioregional corridors. Offset sites will preferentially include a diverse range of offset requirements such as TEC's and endangered or of concern ecological communities that also support threatened species habitats and may include ecological values such as watercourse vegetation, wetlands and improve connectivity. Offset areas will be targeted to consist of a combination of remnant and regrowth vegetation and historically cleared land that can be restored/revegetated to improve habitat quality, connectivity and functionality. These habitat quality gains will be measured by applying the *Guide to determining terrestrial habitat quality* (DES, 2020).

The chosen potential offset sites were selected as they support functional vegetation communities (remnant, high value regrowth (HVR) and unmapped regrowth) that can be managed to build resilience, improve connectivity and achieve habitat quality gains. Habitat quality gains may include human induced restoration of non-remnant communities (regrowth management) through to replanting programs depending upon the targeted impacted matters. Ongoing land management will be conducted according to approved Offset Area Management Plan/s which will seek to maximise landscape conservation outcomes by increasing resilience of self-sustaining communities and populations while providing improved habitat and connectivity for impacted MNES, MSES and MLES species within the region. Offset management on the properties will include weed control, fire management including managing fuel loads to prevent hot bushfires, pest animal control, fencing, grazing management, revegetation (where this is suitable such as koala habitat or seeding of native grasses), erosion management etc.

Ground-truthing of each proposed offset property will occur to validate suitability of vegetation communities and species habitats, to assess starting habitat quality, confirm management actions required and ascertain habitat quality gains that can be achieved.

The covenanting mechanism will be tailored to the relevant protected matter/s and property and will be established to limit, to the extent possible, future adverse development potential. The protection of the offset area will remain on title to bind any future landowners.

6.3.2 Suitable offsets must be built around direct offsets but may include other compensatory measures

ARTC's overarching strategy is to deliver a strategic land-based offset portfolio that will contribute to an overall conservation outcome to improve the protection, management and viability of impacted MNES, MSES and MLES values. Currently it is expected that direct offsets will meet 100% of MNES offset requirements and deliver over 90% of the project's MSES offset requirements.

The potential offset properties presented within this Strategy support those ecological communities and species habitats that have been impacted providing a 'like for like' conservation outcome. The properties will deliver an overall conservation outcome for those MNES and/or MSES values required to be offset through:

- Improving ecological condition of vegetation communities and species habitats;
- Restoration of degraded vegetation and habitats;
- Revegetation of vegetation communities increasing their extent;
- Removal and/or reduction in threats such as from weeds, fire, pest animals;
- Removal of ear-marked development pressure; and
- Monitoring and research to improve knowledge and understanding of habitat restoration techniques, a species utilisation of habitats or other compensatory measures tailored to the particularly MNES or MSES.

Opportunity for indirect offsets will be explored, consistent with the EPBC Act Environmental Offset Policy, particularly around research opportunities for key threatened species such as Koalas or species such as Condamine earless dragon where research is required to identify more about its distribution and population size, habitats and breeding. These measures may be proposed should land-based offsets not quite meet 100% of total obligation under calculator. Indirect offsets will be informed by key priority actions defined in approved recovery plans, threat abatement plans, conservation advice, ecological character descriptions or approved Commonwealth / State management plans.

6.3.3 Tenure for direct offsets

There are a number of options to legally secure an offset site, including an offset protection area under the EO Act, voluntary declaration under the *Vegetation Management Act 1999*, a protected area under the NC Act, statutory covenants under the *Land Title Act 1994* or provisions under the EPBC Act. All enduring options that are governed by legislation will be considered, and the final instrument chosen will depend on circumstances for each offset site including land tenure, landowners, and the MNES and MSES subject to management and protection.

Offset sites will be selected on the basis of ecological characteristics, opportunity for maintaining and/or improving the viability of the protected matter and those threatening processes which may undermine the future resilience of those matters if not managed and protected under an offset arrangement. Any land use or tenure inconsistent with delivering conservation outcomes will be considered during offset site selection process such as mining or petroleum leases and excluded from consideration where possible.

The Offset Area Management Plan/s will be linked to the agreed offset securing mechanism which will drive monitoring, assessment, compliance and reporting requirements.

A landowner will have a legal obligation to manage their property in accordance with the approved management plan. This may include stopping activities that could degrade the offset values (e.g. logging in bushland) or reduction of stocking rates and pulse grazing.

6.3.4 Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter

The land-based offsets proposed will meet the EPBC Environmental Offsets Policy and Offsets Assessment Guide which considers the status of the impacted MNES being offset. The status of the MNES is considered by the calculator in determining the extent of offset area required.

For MSES the offsets will comply with the Qld Environmental Offsets Policy.

Habitat quality of the impact areas and offset site will be determined using the Queensland State Government's Guide to determining terrestrial habitat quality - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy (Version 1.3 February 2020) (DES, 2020b). Habitat quality values derived from the impact areas and offset sites will form an important component in determining the extent of offset area required through application of the EPBC Act's Offsets assessment guide.

6.3.5 Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter

Offset sites will be assessed proportionate to the size and scale of the residual significant impacts determined by detailed field-based ecological assessments in order to maintain and/or improve the viability and resilience of the protected matter/s. The assessment will consider:

- The level of statutory protection applied to the protected matter
- Particular attributes of the protected matter (for example site condition, context and type of habitat for species i.e. breeding habitat or foraging habitat)
- Quality or importance of the nature of the impacts on the protected matter and their future viability
- Temporal nature of the impacts
- Confidence in the habitat quality gains proposed
- Predicted time to generate a conservation gain.

Preference will be given to offset properties that adjoin protected area estates, conservation reserves and / or large intact remnants which are located within prioritised offset hubs and / or bioregional corridors. Offset sites will preferentially include a diverse range of offset requirements such as TEC's and endangered or of concern ecological communities that also support threatened species habitats and may include ecological values such as watercourse vegetation, wetlands and improve connectivity. Offset areas will also likely consist of a combination of remnant and regrowth vegetation and cleared land that can be restored or revegetated to improve habitat quality.

The EPBC offsets calculator inputs will determine the final size of offset area needed to satisfy the policy requirements. To support an initial assessment of the extent of offset areas that may be needed for each MNES and MSES value, a 1:4 ratio was applied.

6.3.6 Suitable offsets must effectively account for and manage the risks of the offset not succeeding

A risk-based approach incorporating the precautionary principle will form an integral component in the offset site selection process and offset area management principles, objectives and outcomes which articulate clear and definable acceptance criteria. A risk matrix will be developed for each offset site that will identify the risks of the offset not succeeding including protection of the offset and habitat quality gains.

Relevant actions to manage risk include:

- Selecting sites that avoid conflicts with future development including mining leases;
- Selecting sites which are not isolated to maximise connectivity potential in the landscape;
- Utilising functioning ecosystems including a combination of remnant and regrowth;
- Legally securing the offset area on title;
- Restricting access;
- Weed monitoring and control;
- Grazing management;
- Pest fauna management; and
- Fuel load management and fire management.

6.3.7 Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs

Offset sites will be selected on the basis that they will generate conservation outcomes for the protected matter/s impacted, acknowledging the nature and scale of the proposed action, which would generate beneficial species specific or vegetation community outcomes above and beyond existing statutory and planning requirements associated with the land parcel. This includes existing State and Local Government laws and planning regulations associated with the land parcel and its associated ecological values and threat abatement measures (including biosecurity obligations).

The land-based offsets will provide significant ‘additionality’ to what is required by law or planning regulation. Currently the proposed offset properties include unprotected regrowth which can be lawfully cleared. Agricultural practices also occur such as grazing and cropping which have the potential to degrade the offset values. A number of weeds and pest animals are also not required to be managed under Qld legislation and therefore would continue to degrade ecological condition of the sites.

In Queensland there are no existing land management obligations that prescribe or exclude fire. Hot fires and too frequent fires have the potential to degrade and destroy MNES and MSES habitat values including brigalow, hollow-bearing trees and regenerating trees.

‘Additional’ actions that may be implemented include protecting and managing unmapped regrowth, removing or reducing grazing levels, actively improving condition of remnant vegetation through weed control, undertaking supplementary tree plantings and reducing feral animals and fuel loads.

6.3.8 Links with Australian and State approval processes

ARTC is committed to providing environmental offsets for residual significant impacts to MNES and those MSES and MLES that are not assessed under the Commonwealth framework. The EO Act does not affect or limit the functions and powers of the Coordinator-General under the SDPWO Act, however ARTC will have regard to the principles of the QEOP in determining and implementing offset requirements for MSES and MLES.

Land-based offsets that comply with the EPBC Act Environmental Offsets Policy will form the initial focus for delivering the project's Queensland environmental offset requirements. Land-based offsets will be strategically located and co-locate a number of the project's MNES, MSES and MLES offset requirements. Financial settlement payments may be considered for those residual MSES and MLES matters that cannot be co-located with MNES matters according to the QEOP. Any financial settlement payment for MSES and/or MLES will be calculated by applying the Financial Settlement Offset Calculation Methodology set out in the QEOP. Financial settlement will be paid prior to the commencement of the relevant impact.

6.3.9 Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable

The proposed offset package and governance framework will be efficient, effective, timely, scientifically robust and transparent in design and implementation.

ARTC will seek approval of the Environmental Offset Delivery Plan and associated Offset Area Management Plan/s prior to construction commencement. Offset area management will be initiated prior to construction commencement to reduce the time lag between project impacts and agreed offset objectives. The Offset Area Management Plan/s will be scientifically robust, based on ground truthed surveys consistent with applicable and relevant Australian and State Government survey guidelines specific for the protected matter/s. Monitoring and management measures associated with the Offset Area Management Plan/s will be outcome driven with definable acceptance / completion criteria to minimise risk of failure.

This Strategy represents a cost-effective approach to providing a direct offset, achieved through implementing widely applied and verified management strategies that are consistent with Conservation Advice statements as to threats which require intervention.

The offset outcomes will be delivered progressively over 20 years and maintained an agreed period of time. Legal security of the offsets will occur within 12 months of offset management plans being approved.

Implementation of the offset management plans will be monitored and reported in annual compliance reports. There is strong evidence to demonstrate the likelihood of the offset achieving improvement in TEC and MNES habitat condition (DoE 2013; Ponce-Reyes et al. 2016).

There will be annual monitoring and reviews of the offset activities and annual reports prepared.

6.3.10 Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced

The Offset Area Management Plan/s will define appropriate and transparent governance arrangements which will include defining roles and responsibilities of all responsible and accountable parties associated with offset delivery including on-ground management, monitoring and reporting.

The Offset Area Management Plan/s will define:

- Conservation outcomes and associated management actions;
- Monitoring activities and timeframes;
- Performance criteria to be achieved for each MNES and interim milestones;
- Corrective actions and triggers for corrective actions; and
- Auditing and reporting.

The approved Environmental Offset Delivery Plan and Offset Area Management Plan/s will be made available on ARTC's Inland Rail Program website for public viewing.

Table 5 Summary of potential offset sites for Brigalow Belt bioregion impacts

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
Brigalow grouping													
Brigalow TEC	251.56	[redacted]	[redacted]	1,260	The property is located in the Brigalow Belt bioregion, [redacted], Qld. The property contains patches of brigalow vegetation including approx. 370 ha of remnant RE11.9.5 Acacia harpophylla and/ or Casuarina cristata open forest on fine-grained sedimentary rocks and RE11.4.9 Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains. There are also large areas of unmapped regrowth (>800ha) which are likely to support brigalow communities (aligned with RE11.9.5). Preference would be to offset those areas of remnant and regrowth brigalow which are [redacted] or have connections along creeklines and to existing intact bushland areas to maximise connectivity. The property is strategically located [redacted]								
Dunmalls snake	1,195.4	[redacted]	[redacted]	1,260	The property is located in the Brigalow Belt bioregion and within the species modelled distribution. Dunmall's Snake is found in open forest, particularly brigalow Acacia harpophylla forest and woodland growing on floodplains of deep-cracking black clay and clay loam soils. The property contains large areas of brigalow woodland both remnant and regrowth. There is likely to be suitable micro-habitat for the species in remnant patches and more advanced regrowth areas. The property is strategically located [redacted] Preference would be those areas of habitat which are [redacted] connections along creeklines and to existing intact bushland areas to maximise connectivity.								
Belson's panic	12.76	[redacted]	[redacted]	1,485.90	The property is likely to support suitable habitat for Belson's panic including *Casuarina cristata* and *Acacia harpophylla* woodlands. The species has a preference for shady areas in these communities. *Acacia harpophylla* and/ or *Casuarina cristata* open forest on fine-grained sedimentary rocks (RE11.9.5) is known to support the species. *Eucalyptus populnea*, *Callitris glaucophylla*, *Allocasuarina luehmannii* shrubby woodland on alluvium (RE11.3.18) is also mapped on the property which provides suitable habitat. There is a record of the species directly to the north [redacted] within a small patch of RE11.9.5. The property is strategically located [redacted] Preference would be those areas of habitat which are [redacted] connections along creeklines and to existing intact bushland areas to maximise connectivity, such as south-west region near Wyaga State Forest.								

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
Grassland grouping													
King bluegrass	21.16	[redacted]	[redacted]	751.97	The property is large and made up of a number of land parcels. It is located in the Brigalow Belt bioregion, [redacted] Qld. It is likely to support suitable habitat for King bluegrass as it contains native tussock grasslands and open grassy woodlands on moderately shallow to deep cracking clay soils associated with RE11.8.5, 11.8.5a and 11.8.11. These grasslands and open grassy woodlands are known to provide suitable habitat for the species. The property is mapped as containing remnant and regrowth open grassy woodlands as well as non-remnant grasslands with potential for restoration. The area is within the species known distr bution.								
Hawkweed	74.72	[redacted]	[redacted]	748	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property is likely to support suitable habitat for Hawkweed as it supports eucalypt open woodlands on alluvial plains with a grassy understorey associated with RE11.3.2, 11.3.18, 11.3.21,11.8.5 and 11.8.5a which are known to support the species. The property contains patches of remnant and regrowth communities. Records of the species exists to the north and east of the property.								
Austral Cornflower	9.16	[redacted]	[redacted]	729.13	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property is likely to support suitable habitat for Austral Cornflower as it occurs in woodland and grasslands associated with various eucalypt species on varying soil textures ranging from alluvium through to heavier textured clay soils associated with RE11.3.4 and 11.8.5 which are mapped on the property. The property contains patches of remnant, high value regrowth and regrowth communities. Records of the species exist [redacted] and also to north, east and south.								
Tall Hawkweed	2269.96	[redacted]	[redacted]	3025.53	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property is likely to support suitable habitat for Tall Hawkweed as it occurs on floodplains on heavier alluvial soils. RE11.3.2, 11.3.4 and 11.5.1 are known to support the species. The property supports large areas of remnant woodlands including patches of 11.5.1, 11.3.2 and 11.3.4 adjacent to watercourses.								
***Cyperus clarus* (a sedge)**	424	[redacted]	[redacted]	729.43	The property is located in the Brigalow Belt bioregion [redacted], Qld. The property is likely to support suitable habitat for *Cyperus clarus* as it occurs in grassland and open woodland. RE11.8.5 and 11.8.11 are known to support the species. The property contains patches of remnant, high value regrowth and regrowth communities. [redacted]								

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
Condamine Earless Dragon	71.72	[redacted]	[redacted]	23.02	The property is located in the Brigalow Belt bioregion, [redacted]. The property is likely to support suitable habitat for Condamine Earless Dragon as it occurs in native grasslands and open grassy woodlands on a range of soil textures including heavier textured clay soils associated with RE11.3.21, 11.3.4 and 11.8.11. The property contains patches of remnant, high value regrowth and non-remnant grasslands with potential for restoration. The southern portions of the property are located in [redacted] There is a record of the species [redacted]	[redacted]	[redacted]	145.92	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property is likely to support suitable habitat for the species as it can occur in communities including RE11.3.2, 11.3.4 and 11.3.25 which are associated with native grasslands and open grassy woodlands on a range of soil textures including heavier textured clay soils				
Five-clawed Worm Skink	66.72	[redacted]	[redacted]	720.55	The property is located in the Brigalow Belt bioregion, [redacted]. The property is likely to support suitable habitat for Five-clawed Worm Skink as it occurs in grasslands and eucalypt woodlands on alluvium and clay loams generally associated with RE11.3.21, 11.3.25 and 11.8.5. The property contains patches of remnant, high value regrowth and regrowth communities. There is likely to be suitable microhabitat for the species particularly in those remnant and advanced regrowth areas. The southern portions of the property are located in [redacted]								
Common death adder	2,163.48	[redacted]	[redacted]	780.68	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The species is found in a wide variety of habitats in association with deep leaf litter, including wet sclerophyll forests, woodlands and grasslands. The property supports large tracts of woodlands including 11.8.5, 11.8.5a, 11.3.21. The southern portions of the property are located in [redacted]	[redacted]	[redacted]	1,763	The property contains large areas of remnant woodlands and some regrowth vegetation that have potential to provide suitable habitat for the species. The species is found in a wide variety of habitats in association with deep leaf litter, including wet sclerophyll forests, woodlands and grasslands. The property is strategically located [redacted]				
Eucalypt woodland grouping													
Poplar Box/Weeping Myall TEC	327.68	[redacted]	[redacted]	3.18	This is a large property situated in the Brigalow Belt bioregion, [redacted], Qld. The property contains large areas of remnant eucalypt woodlands [redacted] unmapped regrowth eucalypt woodlands [redacted] This includes riparian areas with potential to support *Eucalyptus populnea* woodland on alluvial plains (RE11.3.2) which are associated with Poplar Box TEC and Weeping Myall TEC. The larger watercourses are [redacted] consist of managing regrowth RE11.3.2 and potentially revegetation. The property is strategically located [redacted]	[redacted]	[redacted]	44.24	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property contains areas of Poplar Box (*Eucalyptus populnea*) including approximately 44.24 ha of remnant RE11.3.2 *Eucalyptus populnea* woodland on alluvial plains. Preference would be those areas of Poplar Box which are [redacted] have connections along creeklines and to existing intact bushland areas to maximise connectivity.	[redacted]	[redacted]	157	The property is situated [redacted]. The property is mapped as containing large areas of HVR and unmapped regrowth of 11.3.2. There are large areas on land zone 3 and a stream order 4 through the [redacted] The property is located directly [redacted]

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
Poplar Box/Weeping Myall TEC (continued)		[redacted]	[redacted]	146.2	This is a large property situated in Brigalow Belt bioregion, in the [redacted] Qld. The property contains large areas with potential to support unmapped regrowth and restoration of RE11.3.2. This RE is associated with Poplar Box and Weeping Myall TEC. These potential TEC areas are adjacent to [redacted].	[redacted]	[redacted]	5.86	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property is mapped as containing areas with potential for restoration of RE11.3.2. This RE is associated with Poplar Box and Weeping Myall TEC.				
Of Concern RE11.3.4	56.96	[redacted]	[redacted]	91.44	The property supports small patches of remnant 11.3.4. It is also mapped as containing mixed polygons 11.3.2/11.3.4/11.9.7 as HVR and unmapped regrowth. Ground-truthing would need to occur to determine extent of 11.3.2, 11.3.4 and 11.9.7 on the property. The property is situated [redacted]								
Of Concern RE11.5.14	198.84	[redacted]	[redacted]	974	The property is situated in the Brigalow Belt bioregion, [redacted]. The property contains large areas of remnant RE 11.5.14 and non-remnant grasslands associated with this RE. The remnant areas are connected to other large areas of these grasslands to the south and west. Restoration of these grasslands is likely to be required based on current land uses in the area which include cropping and grazing.								
Of Concern RE11.9.7	21.32	[redacted]	[redacted]	16.44	The property supports areas of RE11.9.7 as HVR and unmapped regrowth. The RE is within mixed polygons of 11.3.2/11.3.4/11.9.7. Ground-truthing would need to occur to determine extent of 11.3.2, 11.3.4 and 11.9.7 on the property.	[redacted]	[redacted]	211.10	The property is located in the Brigalow Belt bioregion, [redacted] The property supports large areas of RE11.9.7 including remnant and unmapped regrowth. The property is strategically located [redacted]				
Koala	1924.20	[redacted]	[redacted]	1,763	Koala habitat on the property consists of large areas of remnant and regrowth eucalypt woodlands including RE11.3.2, 11.3.25, 11.5.4 and 11.5.20. The vegetation communities being 11.3.2 Eucalyptus populnea woodland on alluvial plains and 11.3.25 Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines occur on alluvial areas adjacent to watercourses and consist of regrowth vegetation. These regrowth habitats would be managed and potential revegetation of koala habitat trees undertaken to improve connectivity. Remnant woodlands are dominated by RE11.5.20 Eucalyptus moluccana and/or E. microcarpa and/or E. woollsiana +/- E. crebra woodland or RE11.5.4 Eucalyptus chloroclada, Callitris glaucophylla, C. endlicheri, Angophora leiocarpa woodland on Cainozoic sand plains. These are known to support the species. There are koala records directly [redacted] connected through remnant patches of woodland.	[redacted]	[redacted]	448	The property is located in the Brigalow Belt bioregion, [redacted], Qld. The property contains areas of Poplar Box (*Eucalyptus populnea*) including approximately 44.24 ha of remnant RE11.3.2 *Eucalyptus populnea* woodland on alluvial plains. The property contains areas of open woodland associated with RE11.3.4 and 11.3.25 which occur on the property are known to support the species. The riparian vegetation communities on the property will provide preferred foraging resources and movement corridors for the species. Preference would be those areas of Poplar Box which [redacted] connections along creeklines and to existing intact bushland areas to maximise connectivity.				

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
Swift Parrot	974.16	[redacted]	[redacted]	1,763	Swift parrot habitat on the property consists of large areas of remnant and regrowth eucalypt woodlands. Remnant woodlands are dominated by RE11.5.20 *Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana +/- E. crebra* woodland or RE11.5.4 *Eucalyptus chloroclada, Callitris glaucophylla, C. endlicheri, Angophora leiocarpa* woodland on Cainozoic sand plains.								
Spotted tail quoll	61.96	[redacted]	[redacted]	101.68	The property is located in the Brigalow Belt bioregion, [redacted], Qld. The property contains areas of open woodland to forests on alluvium Associated with RE11.3.4 and 11.3.25 which occur on the property are known to support the species. The property contains patches of remnant communities. There is likely to be suitable denning habitat for the species.								
Collared delma	1183.04	[redacted]	[redacted]	676.84	The property is located in the Brigalow Belt bioregion, [redacted]. The property supports woodlands on land zones 3 and 9 with potential to support the species including 11.3.2 and 11.9.7 which contain a range of soil types including soils which are predominantly deep loamy red earths with sparse superficial ferruginous gravel, or deep texture contrast soils with thin sandy or loamy surfaces over strongly alkaline subsoils associated with rocky outcrops. This species predominately inhabits eucalypt-dominated woodlands and open forests on land zones 3, 9 and 10. The presence of terrestrial microhabitat is critical for this species occurrence. Microhabitat attributes of which it shows strong associations with include rocky substrates, woody debris, and deep leaf litter (DAWE 2020). There is a collared delma record [redacted]	[redacted]	[redacted]	448.00	The property is located in the Brigalow Belt bioregion, [redacted] Qld. The property contains areas Poplar Box woodland. RE11.3.2 is known to support the species. The property contains patches of remnant communities. There is likely to be suitable microhabitat present for the species.	[redacted]	[redacted]	151.89	The property is situated [redacted] The property is mapped as containing large areas of HVR and unmapped regrowth of 11.3.2. There are large areas on land zone 3 and a stream order 4 [redacted] The property is located [redacted]
Glossy black cockatoo	1923.44	[redacted]	[redacted]	1,756	This is a large property situated in the Brigalow Belt bioregion, [redacted] The species is known to be associated with RE11.5.4. This community supports foraging species including *Callitris glaucophylla*, *Angophora leiocarpa*, *+/- A. floribunda* with a low tree layer dominated by species such as *Allocasuarina luehmannii*, *A. inophloia* and *Callitris endlicheri*. There are records of Glossy black cockatoo [redacted] An additional biodiversity value of the property is it [redacted]	[redacted]	[redacted]	1,053.06	The property is located in the Brigalow Belt bioregion, [redacted] The property supports vegetation communities that provide suitable foraging resources for the species including RE's 11.3.14, 11.3.18, 11.5.1, 11.9.5. The property contains large areas of remnant, HVR and unmapped regrowth which are likely to provide foraging and denning habitat for the species. The property is strategically located [redacted]	[redacted]	[redacted]	974	The property is situated in the Brigalow Belt bioregion, [redacted] The property contains large areas associated with RE 11.5.14 including remnant and regrowth. The remnant areas are connected to other large areas of these grasslands/shrublands to the south and west. The community includes scattered trees and shrubs or patches of shrubland to low open woodland of *Allocasuarina luehmannii* which are used by the species. Restoration of these grasslands is likely to be required based on

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	ESTIMATED AREA AVAILABLE (HA)	COMMENTS
													current land uses in the area which include cropping and grazing.
Winged Peppercress	163.64	[redacted]	[redacted]	1,756	This is a large property situated in the Brigalow Belt bioregion, [redacted], Qld. The species is known to be associated with RE11.5.4. *Eucalyptus chloroclada*, *Callitris glaucophylla*, *C. endlicheri*, *Angophora leiocarpa* woodland on Cainozoic sand plains and/or remnant surfaces. There are large areas of remnant eucalypt woodlands on Cainozoic sand plains mapped on the property and unmapped regrowth that are I kely to provide suitable habitat for the species.								

Table 6 Summary of potential offset sites for South East Queensland bioregion impacts

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
***Melaleuca irbyana* grouping**													
Swamp tea-tree (*Melaleuca irbyana*) forest of Southeast Queensland (TEC)	121.84	[redacted]	[redacted]	91.49	[redacted] South east Queensland bioregion. The property is situated within an area where *M. irbyana* TEC areas are known to occur. The property supports vegetation communities that consist of *M. irbyana* on lower slopes and elevated flats with impeded drainage on Mesozoic sediments associated with RE12.9-10.11 and 12.9-10.27 and 12.3.19. These areas of vegetation include remnant, HVR and unmapped regrowth. These patches of vegetation would be managed to enhance habitat quality and ensure the vegetation meets TEC criteria. The property is strategically located [redacted]	[redacted]	[redacted]	69.74	[redacted] the South east Queensland bioregion. The property is situated within an area where *M. irbyana* TEC areas are known to occur. The property supports vegetation communities of *M. irbyana* on lower slopes and elevated flats with impeded drainage on Mesozoic sediments associated with RE12.9-10.11 and 12.9-10.27 and 12.3.19. These areas of vegetation include remnant, HVR and unmapped regrowth. The property is strategically located [redacted]	[redacted]	[redacted]	111.56	[redacted] South east Queensland bioregion. The property is situated within an area where *M.irbyana* TEC areas are known to occur. The property supports areas of remnant, HVR and regrowth consisting of *M. irbyana* on lower slopes and elevated flats with impeded drainage on Mesozoic sediments associated with RE12.9-10.11, 12.3.19 and 12.9-10.27 which may support the TEC. The property is strategically located [redacted]
***Melaleuca irbyana* (Swamp tea-tree)**	1,466.04	[redacted]	[redacted]	257.78	The properties are located in South east Queensland bioregion [redacted] The properties contain mapped essential habitat for the species. Vegetation communities include remnant, HVR and unmapped regrowth patches of 12.9-10.27 and 12.9-10.11. These are a range of properties that occur together in an area where there is potential for large areas of the individual species to occur.	[redacted]	[redacted]	707.00	The properties are located in South east Queensland bioregion [redacted] The properties contain vegetation communities including RE12.3.19, 12.9-10.27 and 12.9-10.11. There are large patches of HVR, some remnant patches and unmapped regrowth. Some properties contain mapped essential habitat for *M. irbyana*. These are a range of properties that occur together in an area where there is potential for large areas of the individual species to occur.	[redacted]	[redacted]	229.11	These properties are located in the local region [redacted] The properties are mapped as supporting RE's 12.9-10.11 and 12.9-10.27 known to provide suitable habitat for the species. These are a range of properties that occur together in an area where there is potential for large areas of the individual species to occur.

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
***Melaleuca irbyana* (Swamp tea-tree)** (continued)		[redacted]	[redacted]	91.49	[redacted] in the South east Queensland bioregion. The property is situated within an area where *M. irbyana* is known to occur. The property supports large areas of suitable habitat including RE12.9-10.11 and 12.9-10.27 and 12.3.19. These areas of vegetation include remnant, HVR and unmapped regrowth. The species is likely to be present across the property. The property is strategically located [redacted]	[redacted]	[redacted]	69.74	[redacted] the South east Queensland bioregion. The property is situated within an area where *M. irbyana* populations are known to occur. The property supports large areas of suitable habitat for the species including RE12.9-10.11, 12.9-10.27 and 12.3.19. Areas of vegetation include remnant, HVR and unmapped regrowth. The species is likely to be present across the property. The property is strategically located [redacted]	[redacted]	[redacted]	111.56	[redacted] South east Queensland bioregion. The property is situated within an area where populations of *M.irbyana* are known to occur. The property supports areas of remnant, HVR and regrowth RE12.9-10.11, 12.3.19 and 12.9-10.27 which are known to support the species. The species is likely to be present across the property. The property is strategically located [redacted]
Endangered RE12.3.19	42.68	[redacted]	[redacted]	1.78	[redacted] South east Queensland bioregion. The property supports small patches of RE12.3.19. The property is strategically located [redacted]	[redacted]	[redacted]	1.2	[redacted] South east Queensland bioregion. The property is situated within an area where *M. irbyana* populations are known to occur. The property supports small patches of RE12.3.19 which are unmapped regrowth. The property is strategically located [redacted]	[redacted]	[redacted]	41.38	[redacted] South east Queensland bioregion. The property is situated within an area where populations of *M.irbyana* are known to occur. The property supports areas of remnant, HVR and regrowth RE12.3.19. [redacted]
Endangered RE12.9-10.11	45.2	[redacted]	[redacted]	40.33	[redacted] South east Queensland bioregion. The property supports large areas of RE12.9-10.11, including remnant, HVR and unmapped regrowth. The property is strategically located [redacted]	[redacted]	[redacted]	11.39	[redacted] South east Queensland bioregion. The property is situated within an area where *M. irbyana* populations are known to occur. The property supports patches of RE12.9-10.11. Areas of vegetation include remnant, HVR and unmapped regrowth. The property is strategically located [redacted]				
Endangered RE12.9-10.27	120.48	[redacted]	[redacted]	102.52	[redacted] South east Queensland bioregion. The property is situated within an area where *M. irbyana* is known to occur. The property supports large patches of RE12.9-10.27, including remnant, HVR and unmapped regrowth. The property is strategically located [redacted]	[redacted]	[redacted]	58.22	[redacted] South east Queensland bioregion. The property is situated within an area where *M. irbyana* populations are known to occur. The property supports large areas of 12.9-10.27. Areas of vegetation include remnant, HVR and unmapped regrowth. The property is strategically located [redacted]				

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
					[redacted]				[redacted]				
Vine scrub grouping													
Brush sophora	9.44	[redacted]	[redacted]	126.35	[redacted] South east Queensland bioregion south-[redacted] The property supports suitable habitat for the species associated with low microphyll vine forest and semi-evergreen vine thicket associated with RE12.8.21. Vegetation communities consist of remnant and unmapped regrowth. The property is strategically located [redacted]								
Black-breasted button quail	36.72	[redacted]	[redacted]	221.18	[redacted] the South east Queensland bioregion [redacted] The property provides suitable habitat for the species associated with low microphyll vine forest and semi-evergreen vine thicket associated with RE12.8.21 and 12.9-10.15. Vegetation communities consist of remnant, HVR and unmapped regrowth. The property is strategically located [redacted]								
Endangered RE12.8.21	9.44	[redacted]	[redacted]	126.35	[redacted] in the South east Queensland bioregion [redacted] The property supports remnant and unmapped regrowth of RE12.8.21. The property is strategically located [redacted]								
Endangered RE12.9-10.15	25.68	[redacted]	[redacted]	94.83	[redacted] in the South east Queensland bioregion south-[redacted] The property is mapped as containing areas of remnant, HVR and unmapped regrowth associated with RE12.9-10.15. The property is strategically located [redacted] 12.9-10.15 is mapped in mixed polygons as the dominant RE. Therefore ground-truthing will be required to determine the extent present.								
Eucalypt woodland grouping													

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
Lloyd's Olive	192.12	[redacted]	[redacted]	1,742.52	[redacted] South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted] The property contains large patches of eucalyptus open forest on sedimentary rocks associated with RE12.9-10.2 and smaller patches of eucalyptus open forest on sedimentary rocks associated with RE12.9-10.17 which are [redacted]								
Spotted-tailed quoll	131.88	[redacted]	[redacted]	794.99	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted] The property contains patches of eucalypt dominated open woodland to forests on alluvium associated with RE12.3.3, 12.3.3d, and larger patches of 12.9-10.17 which are known to provide suitable habitat for Spotted-tailed quoll. [redacted]								
Collared delma	1169.20	[redacted]	[redacted]	772	The property is located in the South east Queensland bioregion, [redacted] The property contains large tracts of remnant woodlands, HVR woodlands and unmapped regrowth which contain a range of soil types including soils which are predominantly deep loamy red earths with sparse superficial ferruginous gravel, or deep texture contrast soils with thin sandy or loamy surfaces over strongly alkaline subsoils associated with rocky outcrops associated with REs 12.3.3, 12.9-10.2, 12.9-10.7, 12.9-10.5a. These communities are known to provide suitable habitat for the species. [redacted]	[redacted]	[redacted]	886.00	The property is located in the South east Queensland bioregion [redacted] The property contains large patches of remnant RE12.9-10.2 and RE12.9-10.5 which are known to support the species. [redacted]				
Red goshawk	664.76	[redacted]	[redacted]	1,415.62	The property is located in the South east Queensland bioregion, north-[redacted] The property is very large and is strategically located [redacted] The property contains patches of RE12.3.3, 12.3.3d, and large patches of								

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
			[redacted]		12.9-10.2 which are known to provide suitable habitat for Red Goshawk. There are also very large tracts of bushland including riparian woodlands with potential to support populations of the species.								
Swift parrot	134.48	[redacted]	[redacted]	2,146.84	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted] The property contains patches of eucalypt dominated woodlands to forests on alluvium associated with RE12.3.3, 12.3.3d, 12.9-10.17 and large patches of 12.9-10.2 which are known to provide suitable habitat for Swift parrot.								
Brush-tailed rock wallaby	19.52	[redacted]	[redacted]	200	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted] The property contains suitable habitat for the species associated with REs12.9-10.3 and 12.9-10.6. These RE's are within mixed polygons so the extent of suitable habitat will need to be ground-truthed.								
Koala	1647.92	[redacted]	[redacted]	1,180.95	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted] The property contains patches eucalypt dominated woodlands to open forests on alluvium associated with RE12.3.3, 12.3.3d, 12.9-10.17 and areas of RE12.8.16 which are known to provide suitable habitat for Koalas. There are a large number of Koala records to the east and north-east of the property including [redacted] There are also a high number of records in non-remnant areas.	[redacted]	[redacted]	280	The property is located in the South east Queensland bioregion, [redacted] There are large areas of eucalypt woodlands including remnant, HVR and unmapped regrowth. RE's include RE12.3.3, 12.3.7, 12.9-10.2, 12.9-10.7 There is essential habitat for Koalas mapped on the property.	[redacted]	[redacted]	546.11	[redacted] Property contains areas of remnant, HVR and unmapped regrowth including communities that provide suitable foraging habitat for the species.
Grey-headed flying fox	1488.36	[redacted]	[redacted]	1,180.95	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted]	[redacted]	[redacted]	91.75	The property is located in the South east Queensland bioregion, [redacted] There are large areas of eucalypt woodlands including remnant, HVR and unmapped regrowth. RE's include RE12.3.3, 12.3.7, 12.9-10.7. These	[redacted]	[redacted]	656.21	[redacted] Property contains areas of remnant, HVR and unmapped regrowth

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
					The property contains patches of eucalypt dominated woodlands to forests on alluvium associated with RE12.3.3, 12.3.3d, 12.9-10.17 and areas of RE12.8.16 which are known to provide suitable habitat for Grey-headed flying fox.				communities are known to provide preferred foraging resources for the species.				including communities that provide suitable foraging habitat for the species.
Australian painted snipe	235.52	[redacted]	[redacted]	67.18	The property is located in the South east Queensland bioregion [redacted] The property is very large and is strategically located [redacted] The property contains patches of eucalypt dominated woodlands to forests on alluvium associated with RE12.3.3, 12.3.3d in the lower lying areas of the property adjacent to creeks which can support suitable habitat for the species.	[redacted]	[redacted]	21.30	The property is located in the South east Queensland bioregion, [redacted] There are riparian woodlands and floodplain areas that have potential to provide suitable habitat for the species associated with RE12.3.3 and 12.3.7.	[redacted]	[redacted]	56.38	[redacted] The property contains some areas of remnant and HVR woodlands as well as unmapped regrowth. Potential habitat for the Australian Painted Snipe is associated with lower lying floodplains and riparian areas associated with RE12.3.3 and 12.3.7.
Australian painted snipe (continued)		[redacted]	[redacted]	32.6	[redacted] in the South east Queensland bioregion [redacted] The property supports regrowth vegetation of RE12.3.3. These floodplain and riparian areas have potential to provide suitable habitat for the species.	[redacted]	[redacted]	96.2	[redacted] South east Queensland bioregion. The property contains large areas of RE12.3.3. These floodplain and riparian areas have potential to provide suitable habitat for the species. The communities include HVR and unmapped regrowth.				
Powerful owl	596.88												
Glossy black cockatoo	469.28	Mountain [redacted]	[redacted]	189.75	[redacted] Property contains areas of remnant, HVR and unmapped regrowth including communities that provide suitable foraging habitat for the species. These are associated with RE12.8.14.	[redacted]	[redacted]	310.83	[redacted] the South east Queensland bioregion [redacted] The property supports suitable habitat for the species associated with RE12.9-10.6 and 12.8.14. Vegetation communities consist of remnant and regrowth. The property is strategically located [redacted]				
Caustis blakei subsp. macrantha	41.64	[redacted]	[redacted]	232.58	The property is located in the South east Queensland bioregion, [redacted] There are large areas of eucalypt woodlands including remnant, HVR and unmapped regrowth. RE's include RE12.3.3, 12.3.7, 12.9-10.2, 12.9-10.7. These communities are known to support preferred habitat for the species.								
Short-beaked Echidna	302.84	[redacted]	[redacted]	2,146.84	The property is located in the South east Queensland bioregion, [redacted] The property is very large and is strategically located [redacted]								

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
			[redacted]		The vegetation communities on the property are known to provide suitable habitat for the Short-beaked Echidna.								
Platypus	191.08	-			Habitat availability will be assessed subsequent to field validation								
Slender milkvine	451.48	-											
Of Concern RE 12.3.8	3	[redacted]	[redacted]	0.48	[redacted] South east Queensland bioregion. The property is situated within an area where M. irbyana populations are known to occur. The property supports very small area of RE12.3.8. The property is strategically located [redacted]								
Of Concern RE 12.9-10.3	0.2	[redacted]	[redacted]	1.89	[redacted] South east Queensland bioregion. The property supports small patches of high value regrowth and unmapped regrowth of RE12.9-10.3. The property is strategically located [redacted] 12.9-10.3 is mapped in as the fourth RE mixed polygons. Therefore ground-truthing will be required to determine the extent present.								
Of Concern RE 12.9-10.7	595.68	[redacted]	[redacted]	1048.24	The property is located in the South east Queensland bioregion, [redacted] The property supports remnant and unmapped regrowth of RE12.9-10.7. The property is very large and is strategically located [redacted] 12.9-10.7 is mapped in mixed polygons as a secondary RE. Therefore ground-truthing will be required to determine the extent present.								

OFFSET VALUE	OFFSET AREA REQUIRED (HA)	PROPERTY NAME	LOT AND PLAN/S	ESTIMATED AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS	PROPERTY NAME	LOT AND PLAN	AREA AVAILABLE (HA)	COMMENTS
Endangered RE12.3.3	27.44	[redacted]	[redacted]	78.97	The property is located in the South east Queensland bioregion [redacted] The property supports remnant and unmapped regrowth of RE12.3.3. The property is very large and is strategically located [redacted] 12.3.3 is mapped in mixed polygons as a dominant RE. Therefore ground-truthing will be required to determine the extent present.								
Endangered RE12.3.3d	24.36	[redacted]	[redacted]	24.59	[redacted] The property supports high value regrowth and unmapped regrowth of RE12.3.3d. 12.3.3d is mapped in mixed polygons. Therefore ground-truthing will be required to determine the extent present.								
Endangered RE12.3.18	30.16	[redacted]	[redacted]	8.25	[redacted] South east Queensland bioregion. The property supports areas of remnant, HVR and unmapped regrowth RE12.3.18. The property is strategically located [redacted]								
Of concern RE12.9-10.16	18.32	-											

7 Offset delivery

7.1 Property acquisition

Property acquisition under the Qld offset delivery program will involve the voluntary negotiation and purchase of an entire property. However, depending on the landholding, tenure and the Local Government planning arrangements, part property acquisition may be possible and considered. ARTC's current acquisition strategy, for the purpose of Qld offsets, is based on the following land dealing arrangements:

1. Private treaties on private land
2. ARTC acquired and owned land
3. Land historically acquired for the Southern Freight Rail Corridor (SFRC) and
4. Private treaties associated with ARTC's early acquisition process

Property acquired as part of the Qld offset delivery program will be undertaken through voluntary land dealings informed by independent land valuations, open and transparent negotiations, and ultimately agreed to between the relevant titleholders and ARTC. This acknowledges that as the Strategy progresses alternative land dealing arrangements may arise.

7.2 Landholder agreements

Non-acquisition-based agreements or landholder agreements, for the purpose of environmental offsets, are legal arrangements between a proponent, such as ARTC, and a landholder / titleholder that seeks to secure certain management actions over all or part of a property for environmental offsetting purposes. Common contractual agreements include landholder agreements between a proponent and the landholder as well as service provider agreements between a proponent and the service provider. Both seek to fulfil the objectives of the Offset Area Management Plan (OAMP) and define which party is responsible for delivering certain objectives within the OAMP. These contractual agreements also serve to disburse financial payments based on a range of factors including fulfilment of performance measures / milestones. It is common for landholder agreements to also include a financial incentive component. Financial incentive payments associated with landholder agreements provide financial compensation to the titleholder to facilitate delivery of environmental offset management objectives on behalf of a proponent. Financial incentives payments are often split according to the agreed commitments between the proponent and the landholder.

7.3 Financial settlement

MNES values impacted under the EPBC Act are required to be offset through land-based mechanisms, as such, financial settlement cannot be used as the primary delivery option for the Queensland Inland Rail projects. However, for those remaining MSES values that cannot be satisfied under a land-based solution, financial settlement under QEOP may be assessed. For financial settlements under QEOP, unless agreement has been reached that the impact and offset will be staged, the full amount of the financial settlement must be paid prior to construction.

7.4 Offset Area Management Plans

Ongoing land management will be conducted according to approved OAMP's which will seek to maximise landscape conservation outcomes by increasing resilience of self-sustaining communities and populations whilst also seeking to achieve habitat quality gains at the offset site and improved connectivity within the region.

The OAMPs will be linked to the agreed offset securing mechanism which will drive monitoring, assessment, compliance and reporting requirements.

OAMP's will define appropriate and transparent governance arrangements which will include defining roles and responsibilities of all responsible and accountable parties associated with offset delivery including on-ground management, monitoring and reporting.

The Offset Area Management Plan/s will define:

- Conservation outcomes and associated management actions;
- Monitoring activities and timeframes;
- Performance criteria to be achieved for each MNES / MSES / MLES and interim milestones;
- Corrective actions and triggers for corrective actions; and
- Auditing and reporting.

7.5 Offset delivery approach

ARTC will seek to acquire a portfolio of offset properties that meet MNES / MSES / MLES offset obligations, in the first instance. Non-acquisition-based landholder agreements may be considered, where there is landholder interest and demonstrated experience in fulfilling management obligations. Particular attention will be necessary in any landholder or service provider contracts for both acquisition-based or landholder agreement-based offset delivery methods to ensure management objectives can be fulfilled according to the approved OAMP. Financial settlement of State-based offset matters may be considered where cost effective and appropriate to do so.

8 Offset partnerships

ARTC is committed to achieving enduring and meaningful conservation outcomes through the delivery of environmental offsets in the local regions where impacts occur. ARTC will seek to establish and foster working partnerships with key organisations who can assist in the delivery of environmental offsets and provide value adds such as social benefits by involving local communities.

Partnerships may include:

- Securing and managing land for conservation
- Revegetation and restoration
- Targeted pest and weed management programs
- Education and raising awareness of key biodiversity values in the local regions of the project
- Research associated with key threatened species and or vegetation communities.

Options for offset partnerships are being explored and will be outlined in greater detail in the Environmental Offset Proposals.

ARTC is also seeking to maximise the social and community benefits of the environmental offset investments by working with relevant Aboriginal groups, local government, community groups, Natural Resource Management Catchment Groups and conservation organisations to support both the site selection process, and the ongoing management and monitoring of these offset sites. ARTC has commenced consultation with stakeholder groups and will continue to do so through the project approval and offset process to explore these opportunities.

9 Next steps

ARTC is committed to providing environmental offsets for significant residual impacts to MNES and those MSES and MLES that are not assessed under the Commonwealth framework. The EO Act does not affect or limit the functions and powers of the Coordinator-General under the SDPWO Act, however ARTC will have regard to the principles of the QEOP in determining and implementing offset requirements for MSES and MLES.

Land-based offsets that comply with the EPBC Act Environmental Offsets Policy will form the initial focus for delivering the project's Queensland environmental offset requirements. Land-based offsets will be strategically located and co-locate a number of the project's MNES, MSES and MLES offset requirements. Larger offset sites will be preferentially identified that contain sufficient area of the required values to meet the total Queensland Inland Rail project requirements.

This Strategy applies across all relevant Queensland projects. While the offset properties identified under this Strategy are preliminary, further offset site optimisation on revised MNES, MSES and MLES impact information will be subsequently undertaken in order to generate an up to date offset property portfolio. Landholder engagement and ground-truthing will need to occur to assist finalising offset sites and total offset areas required.

. An Environmental Offset Delivery Plan will be prepared during 2021 outlining the final offset package to be delivered for all Queensland projects once all offset requirements are determined.

Regular communication and progress updates will be provided to government agencies including seeking feedback on proposed offset sites and conservation outcomes to be achieved. Specifically, this will include the following key steps:

- Undertake further offset site optimisation on revised MNES, MSES and MLES impact information to generate an up to date offset feasibility assessment.
- Undertake additional seasonal ecological assessments within target areas of the project alignment to progress the understanding of validated impacts on MNES, MSES and MLES including assessing habitat quality for future offset site condition comparison.
- Continue to consult with DAWE and OCG on the proposed approach for the assessment and delivery of environmental offsets for Queensland projects.
- Consult with stakeholders to identify opportunities for collaboration and partnerships.
- Select potential offset properties that contain the required offset values across Queensland projects and engage with landowners as early as possible to understand options available.
- Finalise a shortlist of preferred offset sites and begin preliminary ground truthing. Ground-truthing will include validation of the presence of offset values, confirming suitability of the site, assessing habitat quality and determining management actions.
- Prepare required documentation according to Figure 2, Staging Offset Assessment and Delivery, at key milestones to gain regulator feedback and endorsement of the offset package.

10 References

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