



Appendix E Evolve Ecology Report 2

Landsdown Eco-Industrial Precinct, Woodstock



Ecological Assessment Report: Week Two

Job Number: VS0366

06/10/2022

Evolve Environmental Solutions Pty. Ltd.

Document Control

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Document Issue

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1 Introduction & Purpose

Evolve Environmental Solutions (**Evolve**) was contracted by Calibre Professional Services Pty Ltd (**Calibre**) to conduct an Ecological Survey and Report on the Lansdown Road and Water Pipeline Alignment Project. The Ecological surveys contained within this report represent works conducted during the second week of surveys on the Lansdown Road and Water Pipeline Alignment Project, between 22nd and 27th May. Previous ecological survey works for the project conducted by Evolve from 28th March to 1st April were reported in *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock* Issued on 29th April 2022.

The aim of the May survey, which is the subject of this report, was to determine the presence or absence of threatened fauna species, habitat values and breeding places, and potential impact on fish movement at waterway crossings.

Findings of the survey are to support the following relevant approvals/permits as applicable:

- Vegetation clearing permit under the *Vegetation Management Act 1999*;
- Operational works for taking or interfering with water under the *Water Act 2000* and the *Planning Act 2016*;
- Riverine Protection Permit under the *Water Act 2000*;
- Operational work in a wetland protected area under the *Environmental Protection Act 1994* and *Planning Regulation 2017*;
- Operational Works development approvals for waterway barrier works under the *Fisheries Act 1994*;
- Should Protected Plants be identified during the survey, a Protected Plants Clearing Application under the *Nature Conservation Act 1992*; and
- Self-assessment of activities and impacts to Matters of National Environmental Significance (MNES) to confirm if a referral under the *Environment Protection and Biodiversity Conservation Act 1999* is required.

Survey works are to be undertaken in accordance with relevant Department of Environment and Science or Department of Agriculture and Fisheries methodologies and guidelines as outlined in **Section 3: Ecological Methodology** and should aim to:

- Ground-truth regional ecosystem mapping;
- Undertake habitat assessments;
- Survey for threatened fauna; and
- Complete waterway assessment suitable for Operational Works development approvals for waterway barrier works.

2 Site Context

The Lansdown Road and Water Pipeline Alignment Project is located approximately 38km south of Townsville along the Flinders Highway. The site traverses the Flinders Highway, Woodstock Giru Road alignments and easements, Ghost Gum Road and Bidwilli Road and associated easements (see **Figure 1**)





Legend

- Water pipeline alignment and dam
- Road Alignment



Figure 1 Site Context Lansdown A
19/04/2022

Figure 1: Site Context



Client: CDM Smith Australia Pty Ltd
Address: Lansdown Eco-Industrial Precinct

3 Ecological Methodology

3.1 Survey Timing

Motion sensor cameras were deployed for the duration of survey works. Fauna observations were conducted over the entirety of the survey period and waterway and vegetation assessments, additional to those previously conducted between the 28th March and 1st April, were conducted on Thursday 26th May.

Weather conditions for the assessment dates are provided below in **Table 1**.

Table 1: Weather conditions during site surveys (Source: www.bom.gov.au)

| Date | Day | Min Temp (°C) | Max Temp (°C) | Relative Humidity | Rainfall (mm) | MSLP (hPa) |
|------------|-----------|---------------|---------------|-------------------|---------------|------------|
| 22/05/2022 | Sunday | 19.5 | 27.1 | 68 | 0 | 1015.6 |
| 23/05/2022 | Monday | 20.2 | 27.9 | 70 | 0 | 1016.6 |
| 24/05/2022 | Tuesday | 19.1 | 28.4 | 70 | 0 | 1016.6 |
| 25/05/2022 | Wednesday | 18.0 | 27.5 | 72 | 0 | 1016.7 |
| 26/05/2022 | Thursday | 17.8 | 27.8 | 70 | 0 | 1014.9 |
| 27/05/2022 | Friday | 17.2 | 26.1 | 68 | 0 | 1015.4 |

Climatic records are drawn from the closest BOM station to the survey area, located in Townsville.

3.2 Survey Equipment Specifications

Survey equipment specifications are provided below in **Table 2**.

Table 2: Survey equipment specifications for the devices utilised in-field.

| Device Type | Unit Type | Unit Specifications |
|-------------|---------------------------------------|--|
| GPS | Arrow 100 Submeter GNSS Receiver | <ul style="list-style-type: none"> Multi-constellation GNSS receiver that utilizes differential corrections to achieve sub meter accuracy. |
| Camera trap | BlazeVideo No Glow Game Field Cameras | <ul style="list-style-type: none"> Trigger distance up to 23m when at temperatures below 25°C, full field of view trigger distance at temperatures between 25oC and 60oC. 70°PIR sensor detect wide and night vision up to 23m Trigger time in 0.3 second |

3.3 Floral Assessment Methodologies

Floral assessment methodologies were carried out as per guidelines published in *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland*. Version 5.1. Neldner et. al. (2020) with the following notable deviation:

- Queensland Herbarium Monitoring site tags or other permanent site tags were not placed at sampling locations.

Refer to **Plan 2** for locations of these surveys.



3.3.1 Quaternary Vegetation Surveys

Quaternary Vegetation surveys are conducted as a point assessment:

- The survey point is recorded as a GPS coordinate;
- All species present at the sample point are recorded for each ecological layer;
- Dominant species and the height of the Ecologically dominant layer are recorded; and
- Photos are taken from the survey point facing in each of the four cardinal directions; North, South, East and West.

3.4 Fauna Assessment Methodologies

Fauna assessments have been carried out as per survey guidelines published in *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland*, Eyre et. al. (2018) and *Significant impact guidelines for the endangered black-throated finch (southern) (Poephila cincta cincta)* (2009). Refer **Plan 1** for locations of these surveys.

3.4.1 Camera Trapping

Seventeen (17) motion sensor cameras were deployed for four (4) nights in total, between the 23rd May and 27th May. The following methodology was employed during the camera trapping surveys:

- Cameras were installed in key locations on site;
- Cameras securely attached 10 – 50 cm from the ground on a tree or post;
- Cameras were not baited; and
- Cameras were set on the burst function of 3 photos per trigger.

3.4.2 Scat and Sign Search

These searches were conducted incidentally to coincide with systematic surveys and other on-site activities.

- Traces were documented with use of a camera for later confirmation of ID.
- Samples were not removed from site.

3.4.3 Diurnal Bird Surveys

Based upon site conditions, wet season surveys for the white rumped black-throated finch (*Poephila cincta cincta*) were conducted.

- Surveys are inclusive of both Targeted searches and Water source observations.
- Each observer carried a pair of hand-held binoculars to assist with species identification.

3.4.3.1 Targeted Searches

One hour/ha within 600m radius of a water source. Targeted searches include:

- Specific effort devoted to searching grassland areas representing key habitat.
- Searching of trees, shrubs, mistletoes, raptor nest and tree hollows for Black throated finch nest.
- Call detection.
- Examination of flocks of co-occurring finch species, small granivorous doves and black-faced woodswallows (*Artamus cinereus*).

3.4.3.2 Water Source Observations

Six observer-hours a day for two days at each water source.



- Observations conducted for a period of three hours following first light.
- Observers positioned within view of the water's edge.

3.4.4 Spotlighting

3.4.4.1 Amphibian Spotlighting

Water body surveys were conducted searching for frogs, tadpoles and egg masses and listening for calling adult males.

- Spotlighting surveys were conducted on-foot.
- Each observer utilised a 30W hand-held spotlight.
- Hand-held recording devices were carried to assist in call identification.

3.4.4.2 Arboreal Mammal Spotlighting

Spotlighting surveys are conducted within the 100 x 100 m generic survey site for 30-person minutes by two ecologists.

- Spotlighting surveys were conducted on-foot.
- Tree canopies were inspected for arboreal mammals and perching birds.
- Binoculars were utilised to assist with species identification.
- Each observer utilised a 30W hand-held spotlight.

3.5 Waterway and Wetland Assessment

3.5.1 Waterways

Waterways and drainage features were walked and captured by GPS. Photo points and aquatic features were noted at certain points along and near the crossing points, and additional crossing sections were noted that were not mapped as fisheries waterways but still would meet the definition of a waterway defined by the Department of Agriculture and Fisheries (DAF) as exhibiting at-least one of the following attributes:

1. *Defined bed and banks*
The bed and banks need to be continuous upstream and downstream of the site rather than isolated and broken sections of a depression.
2. *An extended, if non-permanent, period of flow*
Flow must continue beyond the duration of a rain event and have some reliability attached to rainfall. There is a need to distinguish between channels that funnel immediate localised rainfall; and waterways where flow has arisen from an upstream catchment.
3. *Flow adequacy*
The flow needs to be sufficient to sustain basic ecological processes and habitats, and to maintain biodiversity within or across the feature. The adequacy of the flow depends on the ecological function of the channel e.g. waterways that connect to fish habitat like a wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish.
4. *Fish habitat at, or upstream of, the site*
Most instream features provide habitat for fish under adequate flow conditions or, in the case of pools, during dry periods. Therefore, it is important to have some knowledge of the fish species for the site and their habitat use, particularly in headwater streams. Periodic connectivity to upstream and off stream fish habitat are also considered fish habitat.

Site access permissions were not available for the southern tributary of Fields Creek mapped on Lots 17 and 18 on Plan 124205 as the landholder did not respond to attempts to contact them.



Refer to **Plan 4A** for locations of this assessment.

3.5.2 Wetlands

The *Queensland Wetland Definition and Delineation Guideline Part A: A guide to existing wetland definitions and the application of the Queensland Wetlands Program definition* is used to identify whether a site should be considered a wetland. The Guideline provides a four-step process for applying the Program's Wetland Definition. This process involves:

1. Knowing and understanding the definition;
2. Planning the investigation of a potential feature;
3. Conducting the investigation and recording information; and
4. Applying the wetland decision tree.

Four factors are considered in defining what is and isn't a wetland: Hydrology, Flora and Fauna, Soils and Non-biotic features.

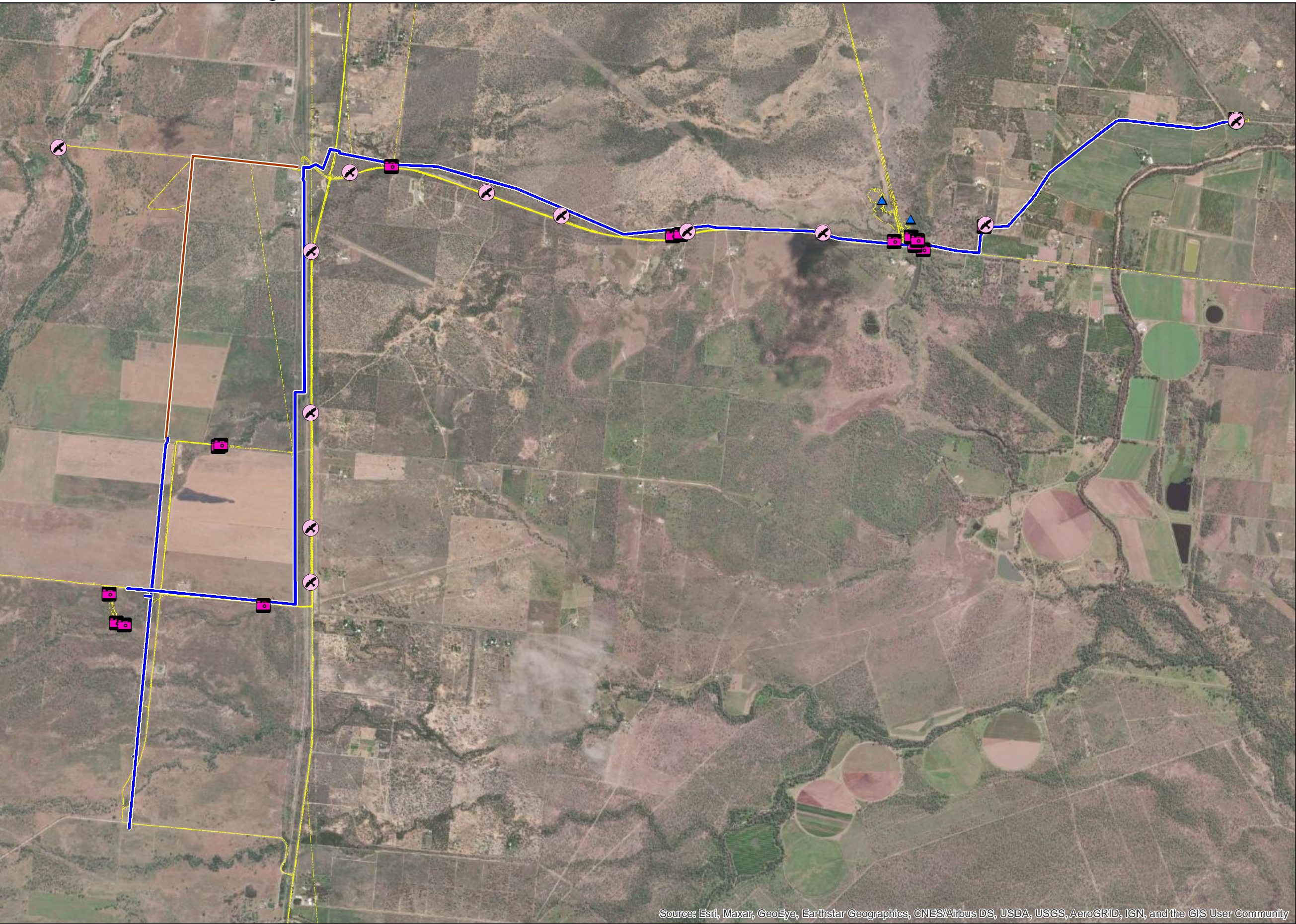
To be considered a wetland under the definition the water body must meet criteria for the hydrology factor and at least one of the other three factors.

The Aquatic Biodiversity Assessment Mapping Method (AquaBAMM) is a decision support tool that is predominantly used to compare sites within a catchment or geographic area using four measure "categories" - low, medium, high, or very high. Assessment is carried out using a mix of diagnostic assessment (field surveys, broadscale mapping, etc) and expert opinion. An assessment will be carried out against each key criterion using values identified through site specific surveys and review of publicly available information. Based on the data and interpretation from experienced scientists a measurement of low, medium, high, or very high has been attributed for each of the criteria. An overall measurement has been provided using an average of all the criteria.

Refer to **Plan 3** for locations of this assessment.



Plan 1: Field Survey Effort (Fauna)



Legend

Water trunk alignment

Road Alignment

GPS Tracklog (May)

Morning Watercourse surveys

Diurnal Bird Survey Points

Camera Trap Locations (additional)

N

0.0170.350.71.051.4

Kilometers

Coordinate System: GDA 1994 MGA Zone 55

Projection: Transverse Mercator

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

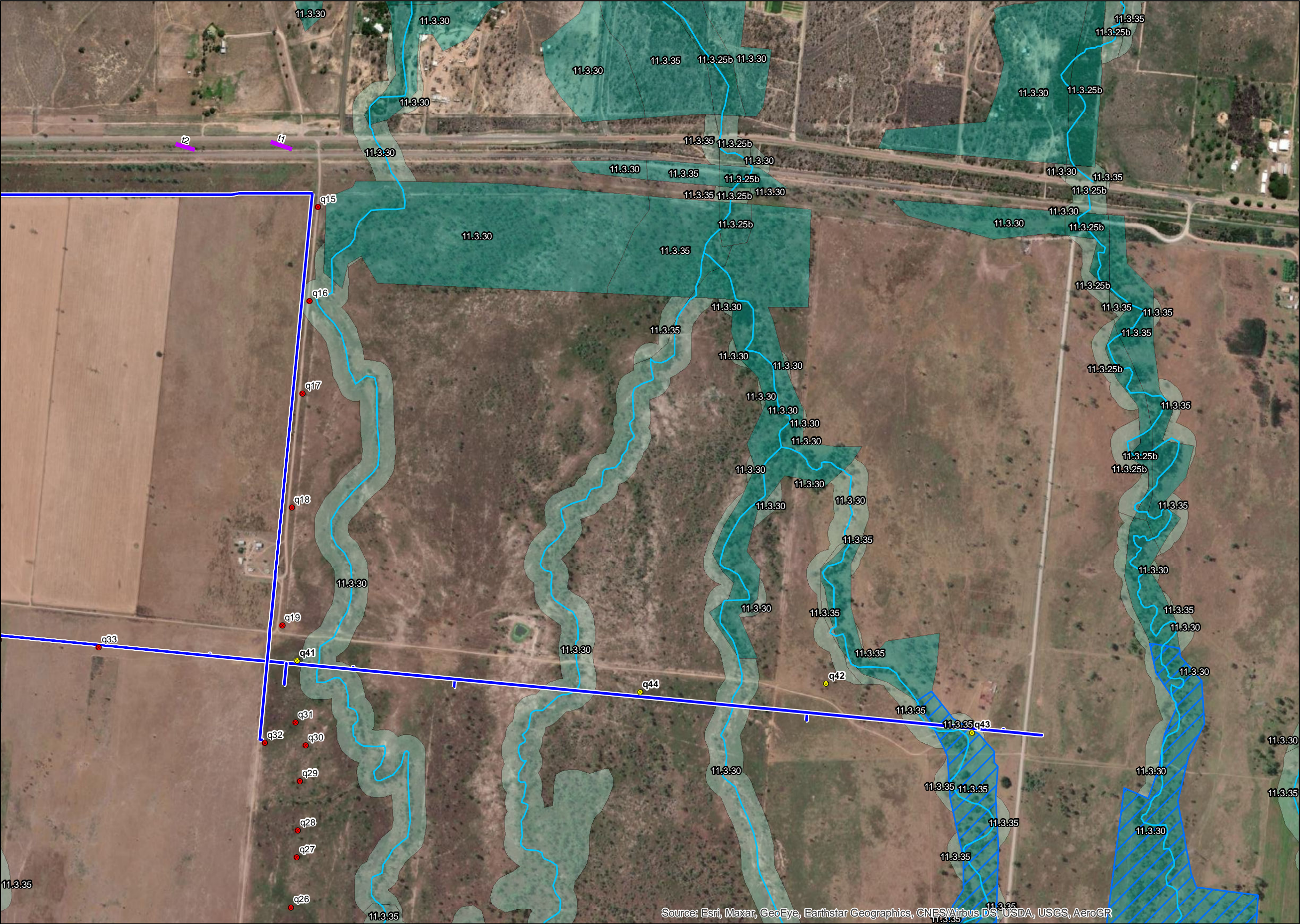


| Issue | Date | Description | Drawn | Checked |
|-------|------------|-------------|-------|---------|
| A | 14/06/2022 | Preliminary | AL | AH |

Lansdown Eco-Industrial Precinct

Date: 14/06/2022
Plan 2 Field Survey Effort Fauna Lansdown May A

Plan 2: Regional Ecosystems



Legend

- Water trunk alignment
- Quaternary points (additional)
- Quaternary points
- Transects
- VM Watercourses
- VM Wetlands
- VM Essential Habitat

Regional Ecosystems v12

VMA STATUS

- hvr_end
- hvr_leastc
- hvr_oc
- rem_end
- rem_leastc
- rem_oc

0 55 110 220 330 440 550 m

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator



| Issue | Date | Description | Drawn | Checked |
|-------|-----------|-------------|-------|---------|
| A | 8/06/2022 | Preliminary | AL | AH |

Lansdown Eco-Industrial Precinct

Date: 8/06/2022
Plan 3 RE's Lansdown May A

Plan 3: Wetland Assessment



Legend

- Water trunk alignment (May)
- Wetlands of High Ecological Significance
- Wetland Observation Point (additional)
- Wetland Observation Points
- Ground-truthed wetland area

0 0.075 0.15 0.3 0.45 0.6 Kilometers

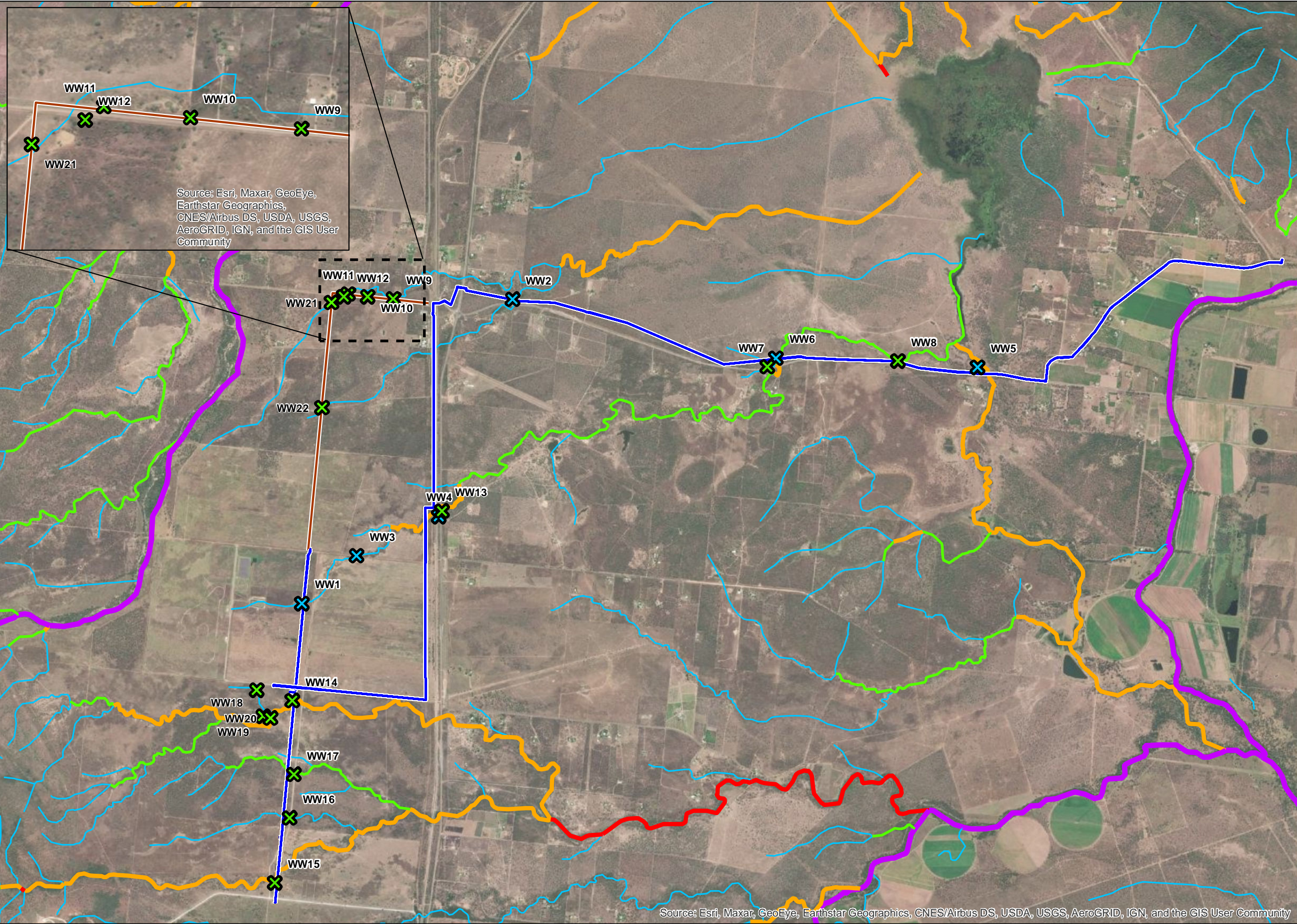
Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

N



| Issue | Date | Description | Drawn | Checked |
|-------|------------|-------------|-------|---------|
| A | 14/06/2022 | Preliminary | AL | AH |

Plan 4A: Fisheries Assessment



Legend

- Water trunk alignment
- Road Alignment
- Waterway observation points (additional)
- Waterway observation points
- Old Waterways for WWBW
- Risk of Impact
 - 1 - Low
 - 2 - Moderate
 - 3 - High
 - 4 - Major
- Ordered drainage 100K

0 0.2 0.4 0.8 1.2 1.6 Kilometers

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

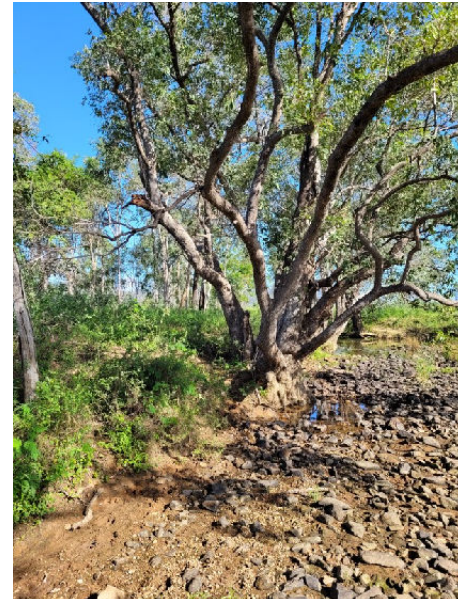
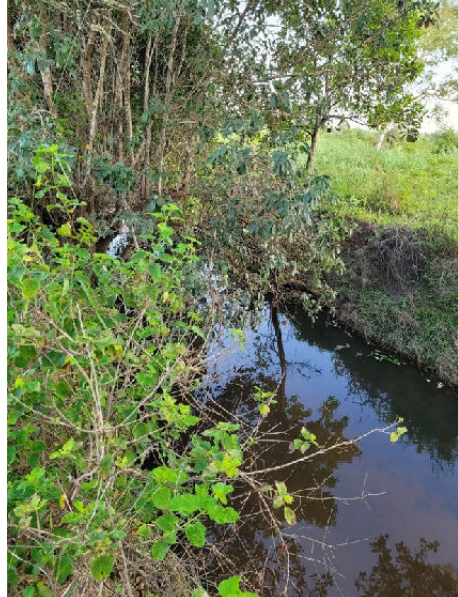
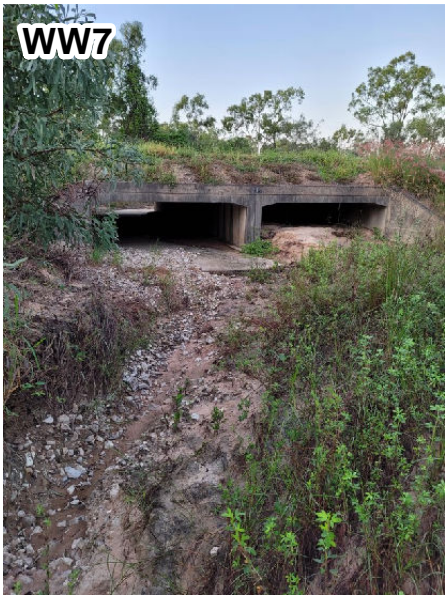


| Issue | Date | Description | Drawn | Checked |
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| A | 5/10/2022 | Preliminary | AL | AH |

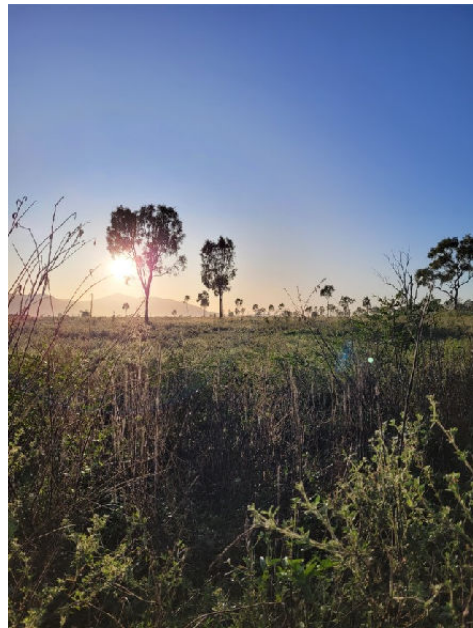
Lansdown Eco-Industrial Precinct

Date: 5/10/2022
Plan 5 Fisheries Lansdown May A

Plan 4B: Fisheries Assessment - Photo Plan



Plan 5C: Fisheries Assessment - Photo Plan



| Issue | Date | Description | Drawn | Checked |
|-------|-----------|-------------|-------|---------|
| A | 5/10/2022 | Preliminary | AL | AH |

Lansdown Eco-Industrial Precinct

Date: 5/10/2022
Plan 5C Fisheries May Lansdown A

4 Ecological survey results

4.1 Flora survey results

Four quaternary transects were conducted within the proposed impact area in addition to vegetation surveys previously conducted on-site between 28th March and 1st April. Refer **Appendix A** for the additional quaternary data.

On-site conditions were substantially wetter during the May survey period than those in April but have not resulted in a change in woody species composition. The coverage of grassy and herbaceous species across the site appears to have substantially increased due to wetter on-ground conditions. One additional species to the 111 previously recorded (see *Ecological Assessment Report – Landsdown Eco-Industrial Precinct, Woodstock Issue B*) was noted - *Lotononis bainesii*, an introduced pasture legume.

The following discrepancies were noted between **VMA** mapping and on-ground observations:

- Quaternary observation point 41 (Q41) is mapped as non-remnant 11.3.30, however extant woody vegetation in the vicinity is consistent with RE 11.3.35.
- Quaternary observation point 42 (Q42) is mapped as remnant 11.3.35 however woody vegetation is absent from the survey location, indicating that the area is non-remnant.

None of the recorded flora species were listed under the *EPBC Act 1999* or *NCA 1992*. A threatened flora likelihood of occurrence assessment was conducted at the time of last reporting and remains unchanged (Refer to **Appendix C** of *Ecological Assessment Report – Landsdown Eco-Industrial Precinct, Woodstock Issue B*).

No Threatened Ecological Communities (TEC's) were flagged as having a probability of occurrence within the project area or buffer area by a PMST report generated for the project (refer to **Appendix D** of *Ecological Assessment Report – Landsdown Eco-Industrial Precinct, Woodstock Issue B*). On-ground flora surveys of the project area found no evidence of any TEC's or associated Regional Ecosystems.

The majority of the project area is of reduced ecological value due to the extent of grazing and clearing disturbances. Ecological values pertaining to granivorous grassland and wetland utilising species including the endangered southern black-throated finch (*Poephila cincta cincta*), endangered eastern star finch (*Neochmia ruficauda ruficauda*) and vulnerable southern squatter pigeon (*Geophaps scripta scripta*) are present, though reduced due to altered species composition of the ground layer reducing seed availability.



4.2 Waterways

Under the *Fisheries Act 1994*, a waterway includes a river, creek, stream, watercourse, drainage feature or inlet of the sea. From publicly available information provided by DAF, to meet the definition of a waterway at least one of the following attributes must be met:

5. *Defined bed and banks*
The bed and banks need to be continuous upstream and downstream of the site rather than isolated and broken sections of a depression.
6. *An extended, if non-permanent, period of flow*
Flow must continue beyond the duration of a rain event and have some reliability attached to rainfall. There is a need to distinguish between channels that funnel immediate localised rainfall; and waterways where flow has arisen from an upstream catchment.
7. *Flow adequacy*
The flow needs to be sufficient to sustain basic ecological processes and habitats, and to maintain biodiversity within or across the feature. The adequacy of the flow depends on the ecological function of the channel e.g. waterways that connect to fish habitat like a wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish.
8. *Fish habitat at, or upstream of, the site*
Most instream features provide habitat for fish under adequate flow conditions or, in the case of pools, during dry periods. Therefore, it is important to have some knowledge of the fish species for the site and their habitat use, particularly in headwater streams. Periodic connectivity to upstream and off stream fish habitat are also considered fish habitat.

Assessment of fifteen (15) waterway locations within the project area were conducted using the four criteria above along with any other distinguishable features.



Table 3; Waterways assessment

| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|--|--|--|--|--|--|
| Gilligan Creek tributary adjacent to Woodstock Giru Road (WW7) | Yes – defined top of bank is approximately 6.5m in width | No - no water was present during the time of survey. Vegetation species found near bed and banks were not wetland indicator species suggesting the channel remains dry for extended periods. | Yes – crossing point had significant erosional evidence at time of survey showing that a significant volume of water has flowed through the area in the recent past. | No - upstream and downstream habitats are similar to that of the crossing point. No water pools or wetland indicator species could be found. | Area dominated by <i>Stylosanthes scabra</i> . |
| Gilligan Creek on lot 118 on EP532 (WW8) | Yes - defined top of bank is approximately 6m in width | Yes - water was present within the waterway at the time of survey. Vegetation observed on low banks showed evidence of recent water flow. | Yes - water was present within the waterway at the time of survey. | Yes – the waterway connects upstream to a large body of water in Serpentine Lagoon. | <i>Lophostemon grandiflorus</i> located on waterway banks. |
| Fields Creek within Jones Road reserve, adjacent to lot 4 on RP800794 (WW9) | No – no clearly defined banks discernable. | Potentially – pooled water upstream and downstream of the location would suggest that flow exists. However, alteration of the waterway at multiple locations to form dammed areas for agricultural use as visible in arial imagery | Potentially – pooled water upstream and downstream of the location would suggest that flow adequacy would exist. | Yes – pooled water is visible on arial imagery both upstream and downstream of the surveyed location. | <i>Cyperus sp. present</i> . |



| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|--|---|--|---|---|---|
| | | may affect the period of flow. | | | |
| Fields Creek along northern edge of Jones Road (WW10) | No – roadside depression with no defined banks or wetland indicator species present | Potentially - at the time of survey the sand substrate was water logged. | No – no signs of flow were seen during the survey. | Yes – a farm dam is located upstream of the survey location, and a substantial body of pooled water was noted within the waterway located adjacent. | Wetland indicator species absent from road reserve. Defined waterway observed within adjacent property, nearest bank 3.5m into property from boundary fence. |
| Fields Creek crossing under Jones Road. (WW11) | No – roadside depression with no defined banks except immediately adjacent to where a culvert crossing has been installed under Jones Road. | Yes - at the time of assessment the pooled water was present adjacent to the culvert crossing. Both upstream and downstream of the crossing point water permanence was noted. This suggests that flow occurs beyond the initial rain period with adequate structure to allow for water conveyance. | Potentially - at time of assessment there was no flow at the point of assessment. Fringing vegetation indicates that the creek would be wet at least on a semi-permanent basis. | Yes - upstream of the crossing point a farm dam is present which would provide suitable fish habitat. | <i>Ludwigia octovalvis</i> , a wetland indicator species was noted at the survey location. |
| Fields Creek south of Jones Road (WW12) | No – roadside depression with no defined banks except immediately adjacent to | Yes - At the time of assessment the pooled water was present adjacent to the culvert | Potentially - At time of assessment there was no flow at the point of assessment. Fringing | Yes - upstream of the crossing point a farm dam is present which | <i>Ludwigia octovalvis</i> , and <i>Elocharis sp.</i> which are wetland indicators were |



| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|---|---|--|---|---|--|
| | where a culvert crossing has been installed under Jones Road. | crossing and along the boundary of lot 101 on EP1666. Water permanence was noted both upstream and downstream, suggesting that flow occurs beyond the initial rain period with adequate structure to allow for water conveyance. | vegetation indicates that the creek would be wet at least on a semi-permanent basis. | would provide suitable fish habitat. | extensively present at the boundary between the road reserve and lot 101 on EP1666. |
| Tributary of Gilligan Creek at Flinders highway (WW13) | Yes - Defined top of bank is approximately 6m in width | Yes - At the time of assessment the pooled water was present adjacent to the culvert crossing | Potentially - At time of assessment there was no flow at the point of assessment. Evidence of sediment deposition is present. | No – WW13 is a short (558m) tributary of Gilligan creek extending with 395m of dry creek bed upstream of the survey location. | <i>Ludwigia octovalvis</i> , a wetland indicator species was noted at the survey location. |
| Four Mile Creek adjacent to Bidwilli Road (WW14) | Yes - Defined top of bank is approximately 12m in width. | Yes – At the time of assessment pools of water were visible along the waterway. | Potentially - At the time of assessment there was no flow. Evidence of sediment deposition is present. | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | <i>Lophostemon grandiflorus</i> fringing waterway. Evidence of cattle accessing waterway. |
| Two mile Creek at road reserve (WW15) | Yes - Defined top of bank is approximately 12m in width. | Yes – At the time of assessment pools of water were visible along the waterway although water was not flowing. | Potentially - At the time of assessment there was no flow. Evidence of sediment erosion and deposition is present. | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | <i>Lophostemon grandiflorus</i> and <i>Leucaena</i> fringing waterway. |



| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|--|---|---|---|---|--|
| South tributary of Two mile Creek on lot 87 RP911426 (WW16) | Yes - Defined top of bank is approximately 8m in width. | Yes – At the time of assessment pools of water were visible along the waterway although water was not flowing. Evident raising of the roadway above the bed level of the waterway is expected to adversely affect water flow. | Potentially - At time of assessment there was no flow at the point of assessment. Pooling water and evidence of sediment deposition is present. | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | <i>Corymbia clarksoniana</i> , <i>Eucalyptus crebra</i> and <i>Stylostanthes scabra</i> fringing waterway. <i>Lophostemon grandiflorus</i> growing in waterway. Waterway is blocked at the road which is built up above bed level. |
| North tributary of Two Mile Creek on lot 87 RP911426 (WW17) | Yes - Defined top of bank is approximately 7m in width. | Yes – At the time of assessment pools of water were visible along the waterway although water was not flowing. Evident raising of the roadway above the bed level has caused pooling upstream of the roadway, reducing waterflow. | Potentially - At time of assessment there was no flow at the point of assessment. Pooling water and evidence of sediment deposition is present. | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | <i>Lophostemon grandiflorus</i> growing in waterway. Waterway is blocked at the road which is built up above bed level. |
| Tributary of Four Mile Creek on lot 87 RP911426 (WW18) | Yes – Defined top of bank is approximately 5m in width. | Yes – At the time of assessment pools of water were visible along the waterway | Potentially - At time of assessment there was no flow at the point of assessment. Evidence | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | Area dominated by <i>Stylostanthes scabra</i> . |



| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|--|---|---|--|---|---|
| | | although water was not flowing. | of sediment deposition is present. | | |
| Four Mile Creek (west) on lot 87 RP911426 (WW19) | Yes – Defined top of bank is approximately 5m width | Yes – At the time of assessment a deep pool of water was present at the assessment location, although flow was not evident. | Potentially - At time of assessment there was no flow at the point of assessment. Steep waterway banks indicate sufficient periodic flow to produce erosional activity. | Yes – A substantial pool of water was present at the assessment site. Pools of water were also recorded downstream at WW20. | <i>Lophostemon grandiflorus</i> , <i>Acacia</i> sp. and <i>Cryptostegia grandiflora</i> (Indian rubber vine) fringing waterway. Steep waterway banks. |
| Four Mile Creek (east) on lot 87 RP911426 (WW20) | Yes – Defined top of bank is approximately 8m. | Yes – At the time of assessment pools of water were visible immediately either side of the assessment point. | Potentially - At time of assessment there was no flow at the point of assessment. Pooling water and evidence of sediment deposition is present. | Yes – Pools of water were visible both up and downstream of the survey location at the time of observation. | <i>Lophostemon grandiflorus</i> growing along waterway banks. Evidence of cattle crossing of waterway. |
| Fields Creek at road easement between lots 14 E124325 and 101 EP1666 (WW21) | No – No defined bed or banks were evident at the time of traversing the site. | Yes – No flow was observed during either assessment period, however the landholder indicated that seasonal flow occurs from the dam located on Lot 80 E124325, through Lot 14 E124325 to the dam located on Lot 101 EP1666 during the | Potentially - At time of assessment there was no flow at the point of assessment, however landholder observations indicate that periods of flow occur. No erosion or sediment deposition was observed. | Yes – Permanent farm dams are present both upstream and downstream of the waterway location. | Vegetation characterised by pasture grass and legume species. |



| Name | Defined bed and banks | An extended, if non-permanent, period of flow | Flow adequacy | Fish habitat at, or upstream of, the site | Distinguishable features |
|--|---|--|--|--|--|
| | | wettest months of the year. | | | |
| Unnamed tributary of Fields Creek at southern boundary of lot 16 E124205 (WW22) | No – Defined bed or banks are not in evidence | No – At the time of assessment no water or waterlogging of soil was observable. Vegetation species observed in the vicinity were not wetland indicator species suggesting the area remains dry for extended periods. | No – No erosion, sediment deposition or other evidence of flow was observable. | No - No water pooling or other evidence of fish habitat were observable on-ground or from available areal imagery. The waterway, as mapped extends a distance of less than 250m upstream of the observation point. | Vegetation dominated by <i>Chloris virgata</i> . |



All waterway observation points (WW7 to WW21) meet the definition of a waterway under the *Fisheries Act 1994*, with the exception of WW10, which only meets the definition of a waterway if it forms a secondary channel or tributary to the section of Fields Creek 3.5m adjacent to it within Lot 2 on RP748183. Flow observations following recent rain events would be required to make this determination and to confirm landholder statements with regards to waterway observation point WW21. No evidence of waterway values were found at waterway observation point WW22.

4.3 Wetlands

Assessment of the accessible wetland areas has been broken down into four (4) assessment criteria being:

- Hydrology;
- Flora and Fauna;
- Soils; and
- Non-biotic features.

Observations made on Lot 1 RP726632 confirming the wetland status as mapped under the MSES High Ecological Significance Wetlands Mapping are outlined in **Table 4**, below, the location of Wetland assessment points is provided in **Plan 3**.



Table 4; Wetlands assessment

| Wetland Name | Hydrology | Flora and Fauna | Soils | Non - Biotic |
|---------------------------------------|--|--|--|--|
| Wetland on Lot 1 RP726632 (W5) | <p>At the time of survey, the area was inundated by water to a depth of approximately 40cm. Observations of the adjacent land parcel made between the 28th March and 1st April during an atypically dry period gave no indication of above ground water presence, as such the wetland may not be permanent but qualifies for a hydrological ranking of ephemeral based upon present conditions following a period of high rainfall.</p> <p>Rating = Medium</p> | <p>Floral composition of the wetland area match that expected to be typically found in wetland (both permanent and ephemeral) environments and along fringing area of wetlands.</p> <p>The upper canopy was dominated by <i>Melaleuca viridiflora</i> and <i>Lophostemon grandiflorus</i>, with the occasional <i>Corymbia tessellaris</i>. Mid canopy was largely void and ground cover was dominated by <i>Leersia hexandra</i>. These are considered to be wetland indicator species.</p> <p>Wetland associated fauna species identified within the wetland area included: <i>Threskiornis molucca</i>, <i>Threskiornis spinicollis</i>, <i>Litoria fallax</i>, <i>Litoria rubella</i>, <i>Ardea intermedia</i>, <i>Nycticorax caledonicus</i>, <i>Egretta novaehollandiae</i> and <i>Todiramphus macleayii</i>.</p> <p>Rating = High (Flora) Rating = High (Fauna)</p> | <p>Erosion of uplands and deposition of sediments (sand, silt, clay, gravels) by alluvial processes in relatively low areas have formed alluvial landforms. When flow exceeds the ability of the stream channels to carry the throughput, overbank flow carries sediment away from the channel until the velocity is such that the suspended load is deposited forming alluvial landforms such as levees or alluvial plains.</p> <p>This description of the alluvial plain best describes the wetland area and surrounding environment.</p> <p>Additional surveys for completion of more detailed soil assessments would include auger samples to better ascertain soil structure and composition in relation to wetland indicator hierarchy.</p> <p>Rating = Medium</p> | <p>The wetland assessment site was considered slightly lower in elevation when compared to its surrounds, facilitating pooling during periods of rain. Little non-biotic features of any significant value were noted.</p> <p>Rating = Low</p> |



From the above assessment of the 4 factors in determining a wetland, the subject area matches the characteristics and description of a wetland as stated in *The Queensland Wetland Definition and Delineation Guideline Part A*. The wetland is best described from the current survey as an ephemeral palustrine wetland located in the Great Barrier Reef Catchment.

4.4 Fauna survey results

Ninety-two (92) fauna species were recorded during the field survey effort, including domestic cattle. Eighty-five (85) of the detected species were native, with the majority (75) being avian species. Refer **Table 5** for full fauna species list, and **Plate 1** for a selection of bird species recorded.

Three (3) conservation significant species were detected by on-ground survey effort:

- Koala (*Phascolarctos cinereus*) is listed as endangered under the *Nature Conservation Act 1992* and the *EPBC Act 1999*, and were detected from trace evidence during previous survey works conducted 28th March and 1st April.
- Black throated finch (*Poephila cincta*) were detected by diurnal bird surveys conducted between 22nd and 27th May. Due to visual similarity and range overlap it was unable to be determined if the recorded individual belonged to the endangered (*NCA 1992* and *EPBC Act 1999*) white rumped sub-species *Poephila cincta cincta*, or the least concern northern subspecies *Poephila cincta atropygialis*. A Wild Net species search returned 21 records for *Poephila cincta cincta* and zero records for *Poephila cincta atropygialis* (refer to **Appendix E Ecological Assessment Report – Landsdown Eco-Industrial Precinct, Woodstock Issue B**)
- Southern squatter pigeon *Geophaps scripta scripta*, listed as vulnerable under the *NCA* and *EPBC*.

The Black-throated Finch and Squatter Pigeon are both granivorous species, dependent on seeding grasses as a primary food source.

The Black-throated Finch is considered to occur within 5km of water sources. Based upon delineation from permanent water sources visible from aerial imagery, including farm dams, all of the proposed impact area falls within 5km of a water source.

Although undergoing seasonal variation in abundance, seeding grass species were recorded from all twenty-two (22) secondary vegetation surveys conducted between 28th March and 1st April, thirty-nine (39) out of forty (40) quaternary vegetation surveys conducted during the same period and three (3) of the four (4) additional quaternary vegetation surveys conducted on 26th May. Overall, indicating an availability of potential food resources for granivorous species across 96.97% survey area.

Two species listed as migratory by the *EPBC Act 1999* were recorded; the Barn Swallow *Hirundo rustica* and the Glossy Ibis *Plegadis falcinellus*.





Photo Plate 1: A selection of bird species encountered during site surveys. Clockwise from top left; white-faced heron, whistling kite, red-tailed black cockatoos and royal spoonbills with glossy ibis.

Table 5: Fauna species detected by on-ground site surveys.

| Class | Scientific name | Common name | Status | Source |
|-----------------|----------------------------------|----------------------------|--------|--------|
| Amphibia | <i>Litoria caerulea</i> | Australian green tree frog | LC | S |
| Amphibia | <i>Litoria fallax</i> | Eastern sedge frog | LC | S |
| Amphibia | <i>Litoria rubella</i> | Red tree-frog | LC | S |
| Amphibia | <i>Rhinella marina</i> | Cane toad | I | A, S |
| Aves | <i>Accipiter cirrocephalus</i> | Collared sparrowhawk | LC | I* |
| Aves | <i>Acridotheres tristis</i> | Indian myna | LC | D, I |
| Aves | <i>Anas superciliosa</i> | Pacific black duck | LC | D |
| Aves | <i>Anseranas semipalmata</i> | Magpie goose | LC | D |
| Aves | <i>Antigone rubicunda</i> | Brolga | LC | I |
| Aves | <i>Aprosmictus erythropterus</i> | Red-winged parrot | LC | D |
| Aves | <i>Ardea alba</i> | Great egret | LC | D |
| Aves | <i>Ardea intermedia</i> | Intermediate egret | LC | C, D |
| Aves | <i>Ardea sumatrana</i> | Great-billed heron | LC | D |
| Aves | <i>Ardeotis australis</i> | Australian bustard | LC | I |
| Aves | <i>Bubulcus ibis</i> | Cattle egret | LC | D |
| Aves | <i>Cacatua galerita</i> | Sulphur-crested cockatoo | LC | D, N |
| Aves | <i>Cacatua sanguinea</i> | Little corella | LC | D |



| Class | Scientific name | Common name | Status | Source |
|-------|---------------------------------|------------------------------|--------|---------|
| Aves | <i>Calyptorhynchus banksii</i> | Red-tailed black-cockatoo | LC | D |
| Aves | <i>Centropus phasianinus</i> | Pheasant coucal | LC | D, I, N |
| Aves | <i>Cinnyris jugularis</i> | Yellow sunbird | LC | I |
| Aves | <i>Climacteris picumnus</i> | Brown treecreeper | LC | D |
| Aves | <i>Coracina novaehollandiae</i> | Black-faced cuckooshrike | LC | D |
| Aves | <i>Coracina papuensis</i> | White-bellied cuckooshrike | LC | D |
| Aves | <i>Corvus coronoides</i> | Australian raven | LC | C, D |
| Aves | <i>Coturnix chinensis</i> | King quail | LC | I* |
| Aves | <i>Cracticus nigrogularis</i> | Pied butcherbird | LC | D |
| Aves | <i>Cygnus atratus</i> | Black swan | LC | D |
| Aves | <i>Dacelo novaeguineae</i> | Laughing Kookaburra | LC | D, I |
| Aves | <i>Dicrurus bracteatus</i> | Spangled drongo | LC | D |
| Aves | <i>Egretta novaehollandiae</i> | White-faced heron | LC | I |
| Aves | <i>Entomyzon cyanotis</i> | Blue-faced honeyeater | LC | D |
| Aves | <i>Eolophus roseicapilla</i> | Galah | LC | D |
| Aves | <i>Falco longipennis</i> | Australian hobby | LC | D |
| Aves | <i>Geopelia humeralis</i> | Bar-shouldered dove | LC | D |
| Aves | <i>Geopelia placida</i> | Peaceful dove | LC | I* |
| Aves | <i>Geophaps scripta scripta</i> | Southern squatter pigeon | V | D |
| Aves | <i>Gerygone mouki</i> | Brown gerygone | LC | S |
| Aves | <i>Grallina cyanoleuca</i> | Mudlark | LC | C, D |
| Aves | <i>Gymnorhina tibicen</i> | Australian magpie | LC | C, D |
| Aves | <i>Haliastur sphenurus</i> | Whistling kite | LC | D, I |
| Aves | <i>Hirundo rustica</i> | Barn Swallow | LC, M | D, I |
| Aves | <i>Lonchura castaneothorax</i> | Chestnut-breasted mannikin | LC | D |
| Aves | <i>Lophoictinia isura</i> | Square-tailed kite | LC | D |
| Aves | <i>Malurus melanocephalus</i> | Red-backed fairy-wren | LC | I* |
| Aves | <i>Manorina melanocephala</i> | Noisy miner | LC | I |
| Aves | <i>Meliphaga lewinii</i> | Lewin's honeyeater | LC | D |
| Aves | <i>Melithreptus albogularis</i> | White-throated honeyeater | LC | D |
| Aves | <i>Merops ornatus</i> | Rainbow bee-eater | LC | I |
| Aves | <i>Microcarbo niger</i> | Little cormorant | LC | D |
| Aves | <i>Milvus migrans</i> | Black kite | LC | D |
| Aves | <i>Neochmia phaeton</i> | Crimson finch | LC | I* |
| Aves | <i>Nycticorax caledonicus</i> | Rufous (Nankeen) night heron | LC | D |
| Aves | <i>Ocyphaps lophotes</i> | Crested pigeon | LC | D, I |
| Aves | <i>Pandion haliaetus</i> | Osprey | LC | D |
| Aves | <i>Pardalotus rubricatus</i> | Red-browed pardalote | LC | D |
| Aves | <i>Pelecanus conspicillatus</i> | Australian pelican | LC | D |
| Aves | <i>Peneothello pulverulenta</i> | Mangrove robin | LC | C, D |
| Aves | <i>Petrochelidon ariel</i> | Fairy martin | LC | S |
| Aves | <i>Philemon buceroides</i> | Helmeted friarbird | LC | D |
| Aves | <i>Philemon corniculatus</i> | Noisy friarbird | LC | A, D |



| Class | Scientific name | Common name | Status | Source |
|-----------|---------------------------------|----------------------------|--------|---------|
| Aves | <i>Platalea flavipes</i> | Yellow-billed spoonbill | LC | C |
| Aves | <i>Platalea regia</i> | Royal spoonbill | LC | D |
| Aves | <i>Platycercus adscitus</i> | Pale-headed rosella | LC | D |
| Aves | <i>Plegadis falcinellus</i> | Glossy ibis | LC, M | D |
| Aves | <i>Poephila cincta</i> | Black-throated finch | E/LC | D |
| Aves | <i>Poodytes gramineus</i> | Little grassbird | LC | D |
| Aves | <i>Ramsayornis modestus</i> | Brown-backed honeyeater | LC | D |
| Aves | <i>Rhipidura albiscapa</i> | Grey fantail | LC | D |
| Aves | <i>Rhipidura leucophrys</i> | Willie wagtail | LC | I |
| Aves | <i>Sericornis frontalis</i> | White-browed scrubwren | LC | D |
| Aves | <i>Strepera graculina</i> | Pied currawong | LC | A |
| Aves | <i>Taeniopygia bichenovii</i> | Double-barred finch | LC | D |
| Aves | <i>Threskiornis molucca</i> | Australian white ibis | LC | D, I, N |
| Aves | <i>Threskiornis spinicollis</i> | Straw-necked ibis | LC | D, I |
| Aves | <i>Todiramphus macleayii</i> | Forest kingfisher | LC | D |
| Aves | <i>Todiramphus sanctus</i> | Sacred kingfisher | LC | D |
| Aves | <i>Trichoglossus moluccanus</i> | Rainbow lorikeet | LC | D |
| Aves | <i>Vanellus miles</i> | Masked lapwing | LC | D, I |
| Aves | <i>Zosterops luteus</i> | Yellow white-eye | LC | D |
| Mammalia | <i>Bos taurus</i> | Domestic cattle | I | C, I |
| Mammalia | <i>Canis lupus</i> | Dog | R | C, S |
| Mammalia | <i>Felis catus</i> | Domestic cat | I | C, I |
| Mammalia | <i>Macropus giganteus</i> | Eastern grey kangaroo | LC | I |
| Mammalia | <i>Notamacropus agilis</i> | Agile wallaby | LC | C, I, S |
| Mammalia | <i>Peramelidae spp.</i> | Bandicoot | LC | S |
| Mammalia | <i>Phascolarctos cinereus</i> | Koala | E | S* |
| Mammalia | <i>Rattus sp.</i> | Rat | I | C* |
| Mammalia | <i>Sus scrofa</i> | Feral pig | I | C* |
| Mammalia | <i>Vulpes vulpes</i> | Red fox | R | I |
| Reptillia | <i>Chelodina longicollis</i> | Eastern long-necked turtle | LC | N |
| Reptillia | <i>Lampropholis delicata</i> | Garden skink | LC | I |
| Reptillia | <i>Varanus varius</i> | Lace monitor | LC | I* |

Key for interpretation of fauna species observations.

| Code | Observation source | Code | Species status |
|------|---|------|--|
| A | Audio observation | E | Endangered |
| C | Camera trap | I | Introduced species |
| D | Targeted diurnal surveys | LC | Least Concern |
| I | Incidental observation | R | Restricted matter |
| N | Spotlighting works | V | Vulnerable |
| S | Identified from traces | M | EPBC Act 1999 listed migratory species |
| * | Identified only from previous survey period | | |



A selection of fauna species identified during spotlighting and via camera capture are provided in **Photo Plate 2 and 3**. Bandicoot were detected from traces (see **Photo Plate 4**) and unable to be identified beyond a family level of categorisation. Two species of bandicoot are known to occur within the region; the northern brown bandicoot (*Isodon macrourus*) and the long-nosed bandicoot (*Perameles nasuta*). Neither species is conservation significant.



Photo Plate 2: A selection of species encountered during spotlighting surveys. Clockwise from top left; red tree frog, green tree frog, eastern sedge frog and a roosting brown gerygone.





Photo Plate 3: Captures from fauna camera trapping; a dingo recorded by CAM008, and an intermediate egret recorded by CAM006.





Photo Plate 4; Trace evidence in the form of tracks of wild dog (left) and bandicoot (right).

Multiple finch nests were observed during surveys (Refer **Photo Plate 5**). None of these nests were in use at the time of survey. The bottle shaped woven grass nest of the black-throated finch (*Poephila cincta*) is similar in appearance to those of two co-occurring species observed during site surveys;

- the double-barred finch (*Taeniopygia bichenovii*)
- the chestnut-breasted manikin (*Lonchura castaneothorax*)

The zebra finch (*Taeniopygia guttata*) which may occur within the impact area based upon species range and habitat requirements also constructs a similar, bottle shaped grass nest. As such it is not possible to determine which species the observed bottle shaped nest belonged to.



Photo Plate 3; Disused finch nest found within the survey area.



Star finches (*Neochmia ruficauda*), for which potential habitat occurs within the survey area, build domed nests with a side entrance of woven grass in shrubs or tall clumps of grass. The eastern subspecies of the star finch (*Neochmia ruficauda ruficauda*) is listed as an endangered species by the EPBC Act 1999 and the NCA 1992. Star finch were not detected by site survey effort.

A summary of threatened fauna species considered to have known, high or moderate likelihood of occurrence based on site surveys is provided in **Table 6**, below. Table 6; MNES fauna species rated as having a moderate to known likelihood of occurrence.

| Class | Scientific name | Common name | EPBC code | EPBC Act Status | Likelihood of occurrence |
|-----------------|---------------------------------|-------------------------------------|-----------|------------------|--------------------------|
| Aves | <i>Plegadis falcinellus</i> | Glossy ibis | 991 | Migratory Marine | Known |
| Aves | <i>Poephila cincta cincta</i> | Black throated finch (white rumped) | 64447 | E | High |
| Aves | <i>Calidris ferruginea</i> | Curlew sandpiper | 856 | CE Migratory | Moderate |
| Aves | <i>Rostratula australis</i> | Australian painted snipe | 77037 | E | Moderate |
| Aves | <i>Geophaps scripta scripta</i> | Squatter pigeon (southern) | 64440 | V | Known |
| Mammalia | <i>Phascolarctos cinereus</i> | Koala | 85104 | E | Known |
| Mammalia | <i>Dasyurus hallucatus</i> | Northern quoll | 331 | E | Moderate |

5 Conclusion

Evolve Environmental Solutions were commissioned to conduct ecological survey works to support the implementation of the Lansdown Road and Water Pipeline Alignment Project. Site surveys have been conducted to assess the following:

- Vegetation composition;
- Waterway and wetland values; and
- Fauna species presence.

Previous vegetation surveys found vegetation within the project site to be largely consistent with values mapped under the VMA 1999 with the exception of the following:

- Discrepancies regarding the location of boundaries between RE 11.3.30 and RE11.3.35
- Small areas of vegetation adjacent to roadways and non-remnant vegetation patches being mapped as remnant vegetation under the VMA 1999 but found to be non-remnant and cleared of native woody vegetation.
- One transect area (T21) mapped as RE 11.3.27e wetland was found to contain vegetation consistent with RE 11.3.35 and lacked wetland indicators.

Additional quaternary vegetation surveys conducted on the additional water alignment between south Bidwilli Road and Manton Quarry Road found:



- Quaternary observation point 41 (Q41) is mapped as non-remnant 11.3.30, however extant woody vegetation in the vicinity is consistent with RE 11.3.35.
- Quaternary observation point 42 (Q42) is mapped as remnant 11.3.35 however woody vegetation is absent from the survey location, indicating that the area is non-remnant.

No threatened flora species were located by on-site surveys. Flora likelihood of occurrence assessment conducted at the time of last reporting considered threatened flora species to have an 'unlikely' or 'low' likelihood of occurrence within the project area and remains unchanged (Refer to **Appendix C** of *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock Issue B*.)

Following on-site assessment, Evolve believe the project site has potentially suitable habitat for multiple MNES fauna species as summarized in **Table 6**. A full fauna likelihood of occurrence assessment has previously been conducted for the site as provided in **Appendix B** of *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock Issue B*, and this assessment remains current for all species excluding the southern squatter pigeon *Geophaps scripta scripta* and glossy ibis *Plegadis falcinellus* which are now known to occur on-site based upon site survey data.

Queensland Department of Environment and Science species profile advice for the northern quoll (*Dasyurus hallucatus*) states that quolls are likely to disappear in areas where less than 50-70% woodland remains within a 4km radius. Based on this information and the lack of potential denning sites in the form tree hollows and rocky crevices within the proposed impact area only portions of the proposed impact area which retain 50% or greater woodland cover within a 4km radius are considered potential habitat for the northern quoll.

The extent of potential habitat for water-source dependent granivorous species, including the southern squatter pigeon and white rumped black-throated finch is considered to include the entirety of the proposed impact area on the basis that:

- All areas fall within 5km of permanent water sources.
- 96.97% of vegetation sampling points contain foraging opportunities for granivorous species in the form of seed producing grasses.

It is recommended that clearing of Koala (*Phascolarctos cinereus*) habitat; southern squatter pigeon (*Geophaps scripta scripta*) habitat; and white rumped black-throated finch (*Poephila cincta cincta*) habitat be referred under the *Environment Protection and Biodiversity Conservation Act 1999*.



6 Bibliography

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7 Appendix



Appendix A

Quaternary Vegetation Data and Findings



Table 7; Key for interpretation of Quaternary Vegetation survey data.

| Key; |
|-------------------------------------|
| Introduced flora species |
| Native flora species |
| Dominant species at sample location |

Quaternary vegetation survey point (Q41)

| Quaternary | Q41 | |
|-----------------------------------|------------------------------|---|
| Mapped RE | 11.3.30 non-remnant | |
| Observed RE | 11.3.35 non-remnant | |
| Ground layer | Shrub layer | Canopy layer |
| <i>Alternanthera ficoidea</i> | <i>Melaleuca viridiflora</i> | <i>Corymbia clarksoniana</i> ; 10m high, 300mm DBH |
| <i>Chloris gayana</i> | | |
| <i>Lotononis bainesii</i> | | |
| <i>Malvastrum coromandelianum</i> | | |
| <i>Sida acuta</i> | | |
| <i>Sida cordifolia</i> | | |
| <i>Stylosetanthes scabra</i> | | |





Photo Plate; Photos taken at quaternary assessment point forty-one (Q41) clockwise from top left facing; North, East, South and West, respectively.



Quaternary vegetation survey point (Q42)

| Quaternary | Q42 | |
|-------------------------------------|--|--|
| Mapped RE | 11.3.30 non-remnant | |
| Observed RE | Land-zone and non-remnant status consistent, assessable woody vegetation absent. | |
| Ground layer | Shrub layer | Canopy layer |
| <i>Alternanthera ficoidea</i> | | <i>Lophostemon grandiflorus</i> ; 10m high, 400mm DBH |
| <i>Mesosphaerum suaveolens</i> | | |
| <i>Lotononis bainesii</i> | | |
| <i>Macropitilluim atropurpureum</i> | | |
| <i>Portulaca pillosa</i> | | |
| <i>Tridax procumbens</i> | | |





Photo Plate; Photos taken at quaternary assessment point forty-two (Q42) clockwise from top left facing; North, East, South and West, respectively.



Quaternary vegetation survey point (Q43)

| Quaternary | Q43 | |
|-----------------------------------|--|---|
| Mapped RE | 11.3.35 | |
| Observed RE | Land-zone consistent, assessable woody vegetation absent, area is non-remnant. | |
| Ground layer | Shrub layer | Canopy layer |
| <i>Alternanthera ficoidea</i> | - | <i>Acacia stenophylla</i> ; 13m high, 300mm DBH. |
| <i>Lotononis bainesii</i> | | |
| <i>Malvastrum coromandelianum</i> | | |
| <i>Paspalum dilatatum</i> | | |
| <i>Senna obtusifolia</i> | | |
| <i>Sida acuta</i> | | |





Photo Plate; Photos taken at quaternary assessment point forty-three (Q43) clockwise from top left facing; North, East, South and West, respectively.



Quaternary vegetation survey point (Q44)

| Quaternary | Q44 | |
|-------------------------------|---------------------------------|----------------------------|
| Mapped RE | 11.3.30 non-remnant | |
| Observed RE | 11.3.30 non-remnant | |
| Ground layer | Shrub layer | Canopy layer |
| <i>Alternanthera ficoidea</i> | <i>Acacia salicina</i> | <i>Eucalyptus crebra</i> : |
| <i>Chloris gayana</i> | <i>Eremophila mitchellii</i> | 17m high, 450mm DBH. |
| <i>Cyperus compressus</i> | <i>Cryptostegia grandiflora</i> | |
| <i>Cyperus gracilis</i> | | |
| <i>Panicum laevinode</i> | | |
| <i>Sida cordifolia</i> | | |
| <i>Stylosetanthes scabra</i> | | |





Photo Plate; Photos taken at quaternary assessment point forty-four (Q44) clockwise from top left facing; North, East, South and West, respectively

