DAVCO Farming
P.O. Box 972
Ayr QLD 4807
Attn: Graeme Cox
E: graeme.cox@davcofarming.com

A | Unit 15, 7 O’Connell Terrace
Bowen Hills QLD 4006 Australia
P | 07 3252 7448
E | admin@wmseng.com.au
W | wmseng.com.au
ABN | 85 700 247 836
Ref | 10718-L01-1
Date | 2 May 2023

Oaky North Flood Study
Dear Graeme,
Thank you for commissioning WMS to undertake a flood study for the Oaky North study area. We have prepared a short letter outlining the modelling process and results of the assessment.

1 BACKGROUND AND OBJECTIVES

DAVCO Farming (the client) have commissioned WMS to undertake a high-level flood study for the properties located at 829 and 834 Keith Venables Road, and 664, 669 and 667 Black Road, in Upper Haughton, Queensland (the site). The site location is illustrated in Figure 1-1. The site is subject to mainstream flooding from the Haughton River to the north and Oaky Creek to the south, and is also subject to overland flow flooding from the local catchment within the site. The objective of this study was to define the existing flood depths, levels and velocities within the site for the 1% Annual Exceedance Probability (AEP) event. The results of the study will be used to inform the preliminary planning layout for potential future development within the site.

Figure 1-1

Site Location

2 STUDY AREA AND TOPOGRAPHY

The site is located approximately 60 km southeast of Townsville, within the Burdekin Shire Council Local Government Area. The site and surrounding areas are zoned as rural, and consist mainly of low to moderately vegetated land, with some open grassland and crop fields to the east.

The local topography is characterised by hills to the west and southwest of the site, which drain in a generally north-eastern direction, forming several watercourses that eventually discharge into the Haughton River to the north of the site, or into Barratta Creek to the east of the site. The major watercourses that were of particular interest to this study were the Haughton River and Oaky Creek, which are in close proximity to the site. The site is also traversed by an overland flow path formed due to runoff from the local catchment located in the northern portion of the site.

The terrain within the subject site is relatively flat, with elevations ranging from approximately 45 mAHD at the western boundary to approximately 30 mAHD at the eastern boundary, within a horizontal distance of approximately 8.3 km (resulting in an average slope of approximately 0.2%). The subject site is bounded by a Sunwater irrigation channel at its south-eastern boundary, which acts as the main hydraulic control within the study area due to its elevated embankments (up to 2 m high).

The subject site topography is illustrated in Figure 2-1.

Figure 2-1

Subject Site Topography

3 PREVIOUS STUDIES

At the time this assessment was undertaken, there was limited information available regarding the flood risk and behaviour within the study area. A brief data review showed that no catchment-wide flood studies had been undertaken for the watercourses of interest.

The Haughton Solar Farm Hydraulic Impact Assessment (Jacobs, 2017) was one of the previous studies undertaken in the vicinity of the site. The Haughton Solar Farm is located adjacent to the subject site, and the scope of the 2017 Jacobs assessment included the hydraulic modelling of the Haughton River, Oaky Creek and Piccaninny Creek in the 1% AEP event.

In September 2022 WMS undertook the Oaky South Flood Study (WMS, 2022), which investigated the flood behaviour within the property referred to as 'Oaky South', and included the hydrologic and hydraulic modelling of Oaky Creek, Piccaninny Creek, Ho rse Camp Creek and Broken Dam Creek in the 1% AEP event. A local, site-specific flood model was developed by WMS for the flood study at Oaky South, and consisted of a WBNM hydrologic model combined with a TUFLOW hydraulic model. One of the hydrographs for Oaky Creek extracted from the Oaky South WBNM model has been used as input for the current assessment.

4 FLOOD MODELLING

A local, site-specific flood model was developed by WMS for the flood study at Oaky North in accordance with Australian Rainfall and Runoff (ARR) 2019 guidelines. The flood model consisted of a TUFLOW hydraulic model using a rain-on-grid approach to capture local overland flow behaviour, and also incorporated inflows for the Haughton River and Oaky Creek for the assessment of mainstream flooding behaviour. A summary of the model development is provided below.

4.1 HYDROLOGIC MODELLING

4.1.1 Local Catchment

As the local catchment within the subject site was relatively small, the method utilised to undertake the local catchment hydrology was a rain-on-grid approach. For a small catchment, rain-on-grid is an efficient methodology as it is integrated within the hydraulic model and therefore there is no requirement to build separate hydrologic and hydraulic models. The rain-on-grid approach was undertaken for the whole local catchment area of approximately 64 km 2.

4.1.1.1 Design Rainfall Data

The hyetographs for the rain-on-grid modelling were obtained for the 1% AEP events for a selection of six key durations and ten temporal patterns from the ARR2019 Data Hub utilising the TUFLOW ARR plugin tool for QGIS. The tool interfaces directly with the ARR2019 Data Hub and obtains the relevant hyetographs based on the catchment shapefile input and the requested events, durations, temporal patterns and other parameters such as losses and spatial patterns.

The six key durations modelled were the 180-minute, 360-minute, 540-minute, 720-minute, 1080-minute and 1440-minute durations. This captured a spread from shorter to longer duration events.

4.1.1.2 Temporal Patterns

The site is situated in the East Coast North temporal pattern region as defined in the ARR 2019. The temporal patterns for this region were extracted from the ARR2019 Data Hub utilising the TUFLOW ARR plugin tool for QGIS and have been adopted for the analysis.

4.1.1.3 Rainfall Losses

As per the regional data collected from the ARR 2019 Data Hub for the study area, the initial and continuing losses adopted for the catchment were 59 mm and 4.9 mm/h, respectively.

4.1.2 Oaky Creek

A WBNM hydrologic model for Oaky Creek was developed by WMS as part of the Oaky South Flood Study (WMS, 2022). The hydrographs for Oaky Creek at a location immediately downstream of its confluence with Piccaninny Creek were extracted from the Oaky South WBNM model and used as inputs for the Oaky North TUFLOW model.

4.1.3 Haughton River

Considering the large catchment area contributing to the Haughton River (approximately 1,127 km2) and the level of detail required for the assessment, a high-level approach was used for determining the Haughton River flows upstream of the site. The approach consisted of using the ARR Regional Flood Frequency Estimation (RFFE) Model online tool (http://rffe.arr-software.org/). The RFFE

transfers flood frequency characteristics from a group of stream gauged catchments to the location of interest, and requires the catchment centroid and outlet coordinates and the catchment area as inputs. The RFFE-derived 1% AEP peak flow for the Haughton River upstream of the site was 5,400 m3/s.

4.2 HYDRAULIC MODELLING

A 2D TUFLOW hydraulic model was developed to determine the flood behaviour at and around the site. TUFLOW is widely used in Australia and is considered the industry standard for flooding and drainage studies.

4.2.1 Model Extent and Terrain

The model extent was delineated to capture the entire site, and to ensure the entire local catchment was included. A DEM was developed based on 1 m resolution LiDAR data (QLD Government, 2011) and used to establish the model topography. A model grid cell size of 10 m was selected for the assessment. This grid size allows for appropriate representation of the various creeks and channels within the study area without producing excessive run times. The selected cell size was deemed appropriate based on the size of the area to be modelled and the level of detail required for the assessment.

4.2.2 Boundary Conditions

4.2.2.1 Inflow Boundaries and Initial Conditions

The hyetographs for the local catchment extracted from the ARR Data Hub were applied to the TUFLOW model as a 2D boundary condition using a ‘2d_rf’ polygon, and the total inflows from Oaky Creek and the Haughton River were applied as ‘2d_bc’ lines.

In addition, the balancing storage located northeast of the site (upstream of the Sunwater irrigation channel) was assigned an initial water level equivalent to the storage’s spillway level of 29 mAHD (based on 1 m resolution LiDAR data).

4.2.2.2 Outflow Boundaries

The outflow boundary was based on a water profile slope and was placed sufficiently downstream of the site to ensure that flood behaviour within the study area was not affected by the boundary assumptions. A slope boundary of 0.008 m/m was found to produce reliable results. Sensitivity analysis conducted during the Oaky South Flood Study on the boundary location and slope values showed that boundary assumptions did not significantly affect the flood levels in this area, largely due to the influence of the Sunwater irrigation channel acting as the main hydraulic control.

4.2.3 Materials

The hydraulic roughness (Manning’s ‘n’) values used in the TUFLOW model were in line with ranges outlined in Book 6 of ARR 2019.

Different values were used based on the different terrain characteristics, and were differentiated into nine categories which are shown in Table 4-1. The spatial distribution of roughness was delineated based on the inspection of aerial imagery and the local land zoning.

Table 4-1

Adopted Hydraulic Roughness Values

Terrain Type	Adopted Manning’s ‘n’
Minimal Vegetation	0.03
Moderate Vegetation	0.06
Heavy Vegetation	0.10

Crops

0.04

Watercourses

0.03

Watercourse Banks

0.07

Railway

0.20

Haughton Solar Farm

0.10

Waterbodies (Balancing Storage)

0.02

4.2.4 Simulation and Results Processing

The six key durations modelled were the 180-minute, 360-minute, 540-minute, 720-minute, 1080-minute and 1440-minute durations.

This captured a spread from shorter to longer duration events. For each duration, all ten temporal patterns were simulated. The water level results were then processed to extract the median values for the temporal patterns and the maximum values for the durations.

5 EXISTING FLOOD BEHAVIOUR

The 1% AEP peak flood depth and water level contours for the existing conditions are displayed in Appendix A, and 1% AEP peak flood velocities are displayed in Appendix B.

Along the northern boundary of the site, the results indicate that flows from the Haughton River remain relatively contained within the river banks, which suggests that the site is subject to limited mainstream flood risk from the Haughton River.

To the southeast of the site, flows from Oaky Creek break out of the creek channel and inundate a portion of the site along its southeastern boundary. This area is also subject to overland flow from the local catchment, although overland flow depths remain generally bellow 300 mm and velocities remain below 0.5 m/s.

The northern portion of the site is traversed by an overland flow path which drains in an eastern direction towards the balancing storage and the Sunwater irrigation channel. Peak flood depths along this flow path are generally below 500 mm, although this is exceeded at certain locations.

In line with Oaky South results, the Oaky North results show that the Sunwater irrigation channel is the main hydraulic control within the study area. Several openings throughout the irrigation channel allow water to exit the site and flow towards Barratta Creek, however most of the flow is retained within the channel embankments.

6 SUMMARY AND LIMITATIONS

WMS was commissioned to undertake a high-level flood study for the property located at 829 and 834 Keith Venables Road, and 664, 669 and 667 Black Road, in Upper Haughton, Queensland to determine the existing flood depths, levels and velocities within the site in the 1% AEP event. These results will be used to inform the preliminary planning layout for potential future development within the site.

Flood modelling shows that the site is subject to mainstream flooding from Oaky Creek, and overland flow from the local catchment.

The northern portion of the site is mostly affected by overland flow, while the south-eastern portion is affected by a combination of overland flow and outbreaks from Oaky Creek.

It is noted that this is a high-level, preliminary flood study intended for preliminary planning only, and that a more detailed study may be required as the site development plans are progressed into detailed stages.

Please do not hesitate to contact me if you have any queries or concerns.

Yours sincerely,

Blake Boulton
Managing Director
Encl.

Appendix A – 1% AEP Peak Flood Depth and Water Level Contours
Appendix B – 1% AEP Peak Flood Velocity

7 REFERENCES

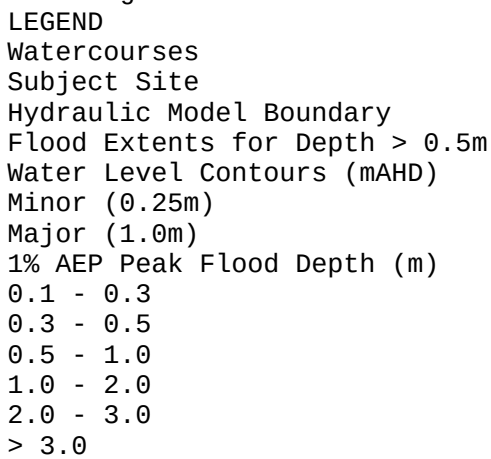
Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors). (2016). Australian Rainfall and Runoff: A Guide to Flood Estimation.

Jacobs. (2017). Haughton Solar Farm Hydraulic Impact Assessment.

WMS (2022). Oaky South Flood Study.

APPENDIX A
1% AEP PEAK FLOOD DEPTH AND WATER LEVEL CONTOURS

Appendix A
1% AEP Peak Flood Depth and
Water Level Contours
Existing Conditions



Oaky North Flood Study
A3 Scale: 1:35,000

Job No: 10718
Date: 22/03/2023

APPENDIX B
1% AEP PEAK FLOOD VELOCITY

Appendix B
1% AEP Peak Flood Velocity
Existing Conditions
LEGEND
Watercourses
Subject Site
Hydraulic Model Boundary
1% AEP Peak Flood Velocity (m/s)
0.2 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
> 2.0

Oaky North Flood Study
A3 Scale: 1:35,000

Job No: 10718
Date: 02/05/2023

Author: Rebecca Smith
File / Ref number: 2023/004297

01 February 2024
Department of Resources

Mr Mitchell Taylor
26 Stirrat St
Coorparoo QLD 4151
Via email: mitch@28south.com.au

Dear Mr Taylor
I refer to the application for a Relevant Purpose Determination you submitted to the Department of Resources (the department) on 21 December 2023. I have reviewed the submitted material and understand that the development application is for a material change of use to establish a solar farm and associated infrastructure on lots 1, 2 and 6/SP302825.
The department invites you to withdraw the Relevant Purpose Determination application given the following:
• The submitted information, including the site plan titled Figure 2- Relevant Purpose Project Footprint and Buffer (dated 19-12-2023), identifies that:
1. All clearing and infrastructure for the development will be located in category X area on Freehold land; and
2. All built infrastructure (other than fences, roads and underground services) will be set back at least 20 metres or 1.5 times the height of the tallest adjacent vegetation, whichever is greater, away from the category B areas.
•

You confirmed during our telephone conversation on 29 January 2024 that the development application is not for a preliminary approval that includes a variation request.

•

The department therefore understands that the development application will not require referral under Schedule 10, Part 3, Division 4 of the Planning Regulation 2017 (PR) for clearing native vegetation because:
1. No clearing that is assessable development will occur as a result of the material change of use; and
2. No accepted operational work may be carried out as a result of the material change of use; and
3. The development application is not for a preliminary approval that includes a variation request.
Accordingly, a relevant purpose determination is not required in this instance.

To withdraw the application, please confirm this in writing via an email to vegetation.support@resources.qld.gov.au quoting the reference number 2023/004297.
If you have any questions relating to this matter, please contact me on telephone: (07) 5374 5304 or email: Rebecca.Smith@resources.qld.gov.au
Please respond to this letter by 01 March 2024.

Please note: Any future development applications that impact regulated vegetation on the lot, or that involve a preliminary approval including a variation request, may require a relevant purpose determination and referral for clearing native vegetation. It is recommended that you contact the State Assessment and Referral Agency (SARA) for pre-lodgement advice if/when this occurs.

Yours sincerely

Rebecca Smith
Natural Resource Management Officer
Department of Resources

Attachments:
• Figure 2- Relevant Purpose Project Footprint and Buffer (dated 19-12-2023)

Telephone: 13 58 34 or 135 VEG
Email: vegetation@resources.qld.gov.au
Web: www.resources.qld.gov.au
ABN 59 020 847 551

CAMBRIDGE SOLAR FARM
Engagement Outcomes Report

Prepared for

CAMBRIDGE JMD Australia
5 February 2024

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:
Director

Calli Brown

Senior Consultant

Hayley Kardash

Project Code

P0044793

Report Number

Final

Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.
We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

All information supplied to Urbis in order to conduct this research has been treated in the strictest confidence.
It shall only be used in this context and shall not be made available to third parties without client authorisation.
Confidential information has been stored securely and data provided by respondents, as well as their identity, has been treated in the strictest confidence and all assurance given to respondents have been and shall be fulfilled.

urbis.com.au

CONTENTS

FIGURES

TABLES

INTRODUCTION

1. INTRODUCTION

This Engagement Outcomes Report (Report) has been prepared by Urbis Pty Ltd (Urbis) to support Cambridge JMD Australia's (Cambridge) proposal for a solar farm (the proposal) located at Keith Venables Road, Upper Haughton, Queensland (the site).

An engagement strategy was prepared in line with the Queensland Government's Queensland Solar Farm Guidelines and the International Association of Public Participation's (IAP2) Public Participation Spectrum.

The activities outlined in the Strategy sought to deliver an appropriate and relevant engagement process and provide opportunities for the community and stakeholders to:

- Learn about the project;
- Understand the process; and
- Provide feedback which will inform part of the site layout plan and technical reports.

This Report summarises the strategy and outcomes of the activities. It supports the Development Permit for a Material Change of Use and will be submitted to Burdekin Shire Council (Council) for approval.

1.1. Project context

Cambridge JMD Australia (Cambridge) is preparing a proposal to develop a solar farm on rural land within Upper Haughton, Queensland.

The proposal is initially seeking approval for an up to 300MW grid connected solar farm, substation and associated ancillary infrastructure (invertors, transformers and cabling) across 641ha located on Lot 6 (Stage 1).

Provision for a further 1,700MW of behind the meter (or grid connected at a future date) of solar farm with associated ancillary infrastructure (invertors, transformers and cabling) will be developed across the 1,400ha consisting of Lots 1 and 2 (Stages 2-4).

Figure 1 Indicative Staging

2. Community and stakeholder engagement strategy

A Community and Stakeholder Strategy (outlined below) was implemented to support the proposed solar farm which is being prepared for submission to Burdekin Shire Council. Given the site's location, the Strategy prioritised engagement with adjoining landowners and interested community groups via direct email communication and a series of one-on-one briefings. Our approach is to also inform the broader community and resident clusters within a 20km radius via a series of digital engagement methods, such as geo-targeted social ad, and website content.

2.1. ENGAGEMENT OBJECTIVE AND APPROACH

The engagement approach was adapted from the International Association of Public Participation's (IAP2) Public Participation Spectrum. The Spectrum (Figure 2) describes goals for public participation and the corresponding promise to the public. For this Strategy, the engagement objective aligns to the goals of informing and consulting with stakeholders and the community. This means our objective is to provide information on the project and obtain public feedback on the project.

Figure 2 IAP2 Public Participation Spectrum

To achieve these objectives, the engagement approach involved:

- Providing consistent, relevant, jargon-free, and up to date information on the project, impacts, benefits, and the planning report process through accessible, tailored open lines of communication.
- Providing opportunities for the community to give feedback to help inform the planning process.
- Responding appropriately and in a timely manner to concerns or questions raised by the community and stakeholders throughout the lifecycle of the project.
- Facilitating information flow to the project team by establishing working relationships to ensure stakeholder and community views and local knowledge are appropriately incorporated.
- Managing expectations by closing the feedback loop through sharing outcomes of stakeholder and community engagement.

3.

STAKEHOLDERS

As outlined in the Queensland Government’s Solar Farm Guidelines, ‘Stakeholders are people, or groups of
people, who are directly or indirectly affected by a solar farm project. Stakeholders can also include those
who may have an interest in or influence over the outcome of the solar farm development’.
Based on anticipated levels of impact and/or interest, we have separated stakeholders into four categories
as shown in Figure 3 below.
Figure 3 Stakeholders

Given the large site, its rural context, and minimal number of residential stakeholders, our approach
has been carefully tailored to ensure all adjoining landowners, special interest groups and interested
wider community members are informed of the proposal.
As part of the larger planning process, Cambridge and Urbis Planning has been, and will continue to be,
responsible for engagement with the state agencies and services providers.
They will work with Urbis Engagement to consult the local community and landholders. Urbis Heritage is
consulting with Aboriginal stakeholders in accordance with a Duty of Care Assessment (DoCA) being
prepared in accordance with the Aboriginal Cultural Heritage Act 2003 (ACHA).
Figure 4 shows the site, the surrounding geographic area, and the locations of the nearest residential
clusters.
Whilst these residential clusters do not surround the site and are unlikely to be impacted by the proposal, the
residents, businesses, and community groups in these clusters are likely to be interested in the features and
potential benefits of the solar farm.
Urbis Engagement is responsible for engagement with the local community and landowners. Engagement
activities include digital engagement, stakeholder briefings and enquiry management through the duration of
the planning process.

Figure 4 The site and surrounding residential areas

3.1.

DETAILED STAKEHOLDER MATRIX

Table 1 outlines the key stakeholders who has been involved throughout the engagement process. The stakeholder identification matrix is based on the principles of IAP2’s Public Participation Spectrum as outlined above.
The stakeholder categorisation is in line with the Queensland Government’s Queensland Solar Farm Guidelines and seeks to ensure people, or groups of people, who are directly or indirectly affected by a solar farm project are consulted with as part of the process.
Table 1 Stakeholder matrix

Stakeholder	Engagement objective	Forms of engagement
Government Local Government ▪ Burdekin Shire Council ▪ Planning and Development ▪ Councillors	Involve: Obtain feedback on the proposal for consideration into the design. Council is the responsible assessing authority.	On-line meeting/briefing
State Government State MP ▪ Dale Last, Member for Burdekin	Consult: Obtain feedback on the proposal and understand how the proposal may impact each agencies’ service.	Direct emails and letters

Direct emails		
On-line meetings if requested		

Stakeholder	Engagement objective	Forms of engagement
State agencies	Consult: Obtain feedback on the proposal and understand how the proposal may impact each agencies’ service.	Direct emails and letters
	Consult: Obtain feedback on the proposal and understand how the proposal may impact / align with political agenda / local strategy.	Direct email and letter
	Involve: Work directly with Davco to ensure feedback is considered and understood.	One-on-one meetings ▪
Powerlink Queensland (REZ Delivery Body) ▪		
State Assessment and Referral Agency		
Federal Government ▪		
Andrew Willcox MP, Member for Dawson		On-line meetings if requested
Landowners ▪		
Davco Farming		Phone calls Emails
Traditional Owners ▪		
Registered Aboriginal Parties	Consult: Obtain feedback on the proposal by providing balanced and objective information to assist in understanding the proposal’s impacts and benefits.	

Registered Aboriginal Parties is underway

Local community groups and businesses
Adjoining landowners
10 adjoining landowners, including:
▪

Haughton Solar Farm (Pacific Blue)

▪

Wilmar

▪

Sun Water

Surrounding community and residents
▪

Nearest residential clusters (within 20km radius)

▪

Ayr

▪

Mount Kelly

▪

Clare

6

STAKEHOLDERS

Consult: Obtain feedback on the proposal by providing balanced and objective information to assist in understanding the proposal’s impacts and benefits.

One-on-one meetings / project briefings

Inform: Obtain feedback on the proposal by providing balanced and objective information to assist in understanding the proposal’s impacts and benefits.

Social media geo-targeting ad campaigns
Local media publications
Community Facebook pages
Social impact survey

URBIS
CAMBRIDGE SOLAR FARM - ENGAGEMENT OUTCOMES REPORT

Stakeholder	Engagement objective	Forms of engagement
▪		
Local community groups and businesses		
▪		
Ayr Chamber of Commerce	Consult: Obtain feedback on the proposal by providing balanced and objective information to assist in understanding the proposal’s impacts and benefits.	Direct emails
▪		
North Queensland Conservation Council	Inform: Providing objective information to assist support the approach to community consultation / public awareness.	Media release (to be issued postlodgement)
▪		
Bowen & Ayr Farming & Horticulture Noticeboard (Facebook group)	Consult: Obtain feedback on the proposal by providing objective information to assist in understanding the proposal’s impacts on its service offering.	Addressed through the Bushfire Assessment Report prepared by Rob Friend and Associates.
▪		
Burdekin Clay Target Club Inc	Horseshoe Lagoon.	Community newsletter Social impact survey
Other interested third parties Local media		
▪		
Burdekin Local News		

- Townsville Bulletin
- Emergency Services
- Queensland Fire and Emergency Services
- Queensland Rural Fire Services

4.

Forms of engagement

Given the timing of lodgement (February 2024), engagement activities have been strategically timed
to ensure the community and important stakeholders were not consulted during the Christmas
school holiday period.
Cambridge has prioritised engagement with adjoining landowners (November 2023) and influential
community / business groups (February 2024) to support lodgement.
Engagement with the broader community catchment – through geo-targeted advertising campaigns,
project website and social impact survey – will commence early February (post-lodgement).

4.1.

PRIORITY ENGAGEMENT (DIRECT NEIGHBOURS AND LOCAL COMMUNITY
GROUPS AND BUSINESSES)

4.1.1. Direct neighbour briefings
▪

Cambridge consulted with the neighbours directly bordering the site via a series of direct neighbour
letters, phone calls, and meetings that were held face-to-face. Given the relationship, Davco (site
landowner) supported Cambridge to facilitate these conversations.

▪

Eight neighbouring landowners opted in for a one-on-one briefing throughout November 2023. Outcomes
of the neighbour briefings have been outlined in detail in Section 5 of this document.

▪

These close neighbours were consulted during the project’s design, which will continue through the
planning approval process and inform the construction management plan and environment management
plans (if the project is approved).

▪

Consultation with direct neighbours included providing them with an overview of the proposal the ability
to ask questions of the project team.

4.1.2. Community newsletter
▪

The community newsletter outlined key features of the project and invited feedback. It included details of
the project email and phone number managed by Urbis Engagement to answer questions and collect
feedback.

▪

The newsletter was also used to invite stakeholders to a briefing to find out

more about the project.

▪

The newsletter has been distributed via email to stakeholders identified in Section 3 of this document. It
also included a link to the social impact survey that will directly inform the Social Impact Assessment.

▪

It was distributed via email on 6 February 2024to select community groups and businesses located within
a 20km radius around the site.

▪

The community newsletter is included in Appendix A.

4.1.3. Engagement email and phone number
The community newsletter provided a dedicated phone number and email address managed by Urbis to
enable people to provide feedback on the project and ask questions. At the time of writing this report, we
have received no enquiries about the project.
Urbis will continue to manage the enquiry line as engagement continues with the broader community
catchment, and throughout the planning approval process.

4.2.

BROADER COMMUNITY CONSULTATION

4.2.1. Social media geo-targeting

- For publishing in February 2024, Cambridge will develop a social media advertising campaign. The campaign includes information about the project, will drive the community to the webpage and encouraged people to undertake the social impact survey.

- The ad campaign is set to launch across Facebook, and targeted people within a 20km radius of the site (refer to Figure 4 in this report).

4.2.2. Local media publications

- Urbis is working closely with Barrett Comms (appointed PR Consultant) to inform the local media about the proposed solar farm. Local media publications will support the engagement process by further informing community located in neighbouring suburbs.

- Urbis will continue to manage the engagement enquiry phone and email line during this time to ensure all community enquiries, questions and concerns are quickly resolved throughout the planning approval process.

5.

FEEDBACK RECEIVED

The following table outlines the matters raised, and the project response.
Table 2 Feedback received
Stakeholder

How this group was consulted

Items discussed

Project response

Urbis consulted with Council through a series of pre-lodgement meetings.

▪

Council suggested an Economic Needs Assessment be provided to support the Development Application, with specific analysis on the potential loss of agricultural land.

A Social Economic Impact Assessment has been prepared for the proposal which provides key analysis of the social and economic Impacts and benefits of the project to the LGA.

▪

Council noted that the site is located:

Section 6 and 7 of the planning report address the location of the site in respect to Local and State overlays and provides justification for the proposed development, particularly it’s designation within mapped priority agricultural areas.

Government
Local Government
▪

Burdekin Shire Council

▪

Planning and Development

▪

–

Outside of the Planning Schemes mapped Renewable Energy Investigation areas; and

–

Within the mapped priority agricultural area of the NQRP. Appropriate justification for both these overlays is to be included in any future development application.

Council agreed that a Development Application supported by the following documentation would assist with their assessment:

10

FEEDBACK RECEIVED

The Development Application is supported by all listed specialist material.

Stakeholder	How this group was consulted	Items discussed
Council	▪	▪ Solar farm layout plans and details of BESS; ▪ Town planning assessment; ▪ Ecology report; ▪ Acoustic impact assessment; ▪ Bushfire report; ▪ Visual impact assessment and glint and glare assessment; ▪ Social economic benefits assessment; ▪ Community engagement report; ▪ Traffic impact assessment; ▪ Civil engineering report, earthworks plans; and ▪ Site based stormwater management plan.
		Council recommended engagement is undertaken with all relevant stakeholders. Council suggested that community contribution by CREP (monetary, sponsoring buses or events etc.) would be received well by the local

community and has been undertaken

URBIS
CAMBRIDGE SOLAR FARM - ENGAGEMENT OUTCOMES REPORT

Project response

Thorough engagement has been undertaken with all relevant stakeholders including Native Title groups and adjoining landholders.

FEEDBACK RECEIVED

11

Stakeholder	How this group was consulted	Items discussed	Project response
by Pacific Blue and other solar farm developers.		Visual Impact Assessment: ▪	Council confirmed that the Visual Impact Assessment would be required to include montages from the nearest sensitive receiver (i.e. landholder residence) as well as the nearest sensitive receiver which is not occupied by the landowner. The Visual Impact Assessment works off a “worst case” substation infrastructure height of 20-30m, as final substation infrastructure details will not be known until the detailed design stage of the proposed development. The assessment includes a viewshed analysis identifying sensitive receivers (i.e. residential dwellings) within proximity to the site as well as montages showing the views of the substation which could be available from the two residences identified by Council.
Councillors	Urbis consulted with the Burdekin Shire Councillors via email on 6 February 2024. At the time of writing this report, no feedback has been received from any Councillors.		Cambridge will continue to consult with Councillors throughout the planning process and ensure any future feedback is addressed.
State Government	Urbis consulted with the State MP via email on 6 February 2024. A meeting is scheduled with Dale Last MP. This report will be updated following outcomes of the briefing.		Cambridge will continue to consult with the State MP throughout the

planning process and ensure any
future feedback is addressed.

State MP
▪

12

Dale Last, Member for Burdekin

FEEDBACK RECEIVED

Stakeholder	How this group was consulted	Items discussed	Project response
State agencies	Urbis consulted with the Powerlink Queensland (REZ Delivery Body) via email. Powerlink has indicated up to 400MWp could be connected to the grid via a substation connected to the 275KV powerlines that run alongside Lot 6 and 1. Cambridge will continue to consult with the state agencies throughout the planning process and ensure any future feedback is addressed. The development application will also be formally referred to SARA as per of the legislative requirements.	▪	
Powerlink Queensland (REZ Delivery Body)	This application is running in parallel with the development application and would be expected to be approved in Q2 2025.	▪	
State Assessment and Referral Agency	Urbis consulted with the State Assessment and Referral Agency (SARA) via Teams on 21 June 2023 and 10 November 2023. SARA provided high-level advice regarding State referral triggers and noted the process for the removal of wetland mapping would occur concurrently to the development application assessment.		
Federal Government	Urbis consulted with the Federal MP via email on 6 February 2024. At the time of writing this report, no	▪	
Andrew Willcox MP, Member for Dawson			

feedback has been received from Andrew Willcox MP, Member for Dawson.

Cambridge will continue to consult with the Federal MP throughout the planning process and ensure any future feedback is addressed.

Cambridge has been working closely with Davco through the planning process.

N/A

Cambridge will continue to consult with Davco throughout the planning process and ensure any feedback is addressed throughout subsequent proposal updates and technical studies.

Landowners
▪

Davco Farming

Stakeholder	How this group was consulted	Items discussed	Project response
Traditional Owners Consultation with relevant Registered Aboriginal Parties is ongoing in accordance with preparing a Duty of Care Assessment (DoCA) in accordance with the Aboriginal Cultural Heritage Act 2003 (ACHA). Local community groups and businesses Adjoining landowners 10 adjoining landowners, including: ▪ Haughton Solar Farm (Pacific Blue) ▪ Wilmar ▪ Sun Water	Cambridge and Davco undertook a series of one-on-one briefings with adjoining landowners.	Key feedback raised included: ▪ Briefings took place between 29 November and 12 December 2023. ▪ ▪	Majority of neighbours confirmed they had no objections towards the proposal, and agreed no further consultation is required before the formal exhibition period. One neighbour noted they would be interested to know about the increase traffic volumes anticipated on Black Road. Aware that additional traffic would occur during construction and would like more detail.
		Other comments included: “I’m unlikely to see anything due to the vegetation on both sides of the river between my property and the proposed solar farm.” “There are no adverse impacts to cattle and farming operation and	

Cambridge will continue to monitor enquiries and answer questions that arise through the planning process.

Response to traffic enquiries:

Construction traffic

The peak construction traffic is anticipated to occur during construction from 2028 to 2030 (during construction of Stage 3).

Expected daily traffic during construction is expected to include 295 light vehicles and 19 heavy vehicles, with the peak hour traffic generation consisting of 94 light vehicles and 6 heavy vehicles.

While worker shuttle buses are anticipated to be used, for a conservative assessment it has been assumed that workers will be travelling via private vehicle.

Operation traffic

Stakeholder	How this group was consulted	Items discussed	Project response
			therefore no objections to the proposed development.”
			The total day-to-day operations and maintenance staff post construction is 75 staff for all Stages 1-4. During construction of Stage 4, it is expected that Stages 1, 2 and 3 operational traffic will access the site. At this time, it is anticipated that 75 light vehicles and 8 heavy vehicles will access the site in each peak hour for operations and maintenance.
Surrounding community and residents	Consultation commencing early February 2024 via: ▪ Nearest residential clusters (within 20km radius) ▪ Social media advertisements (geo-targeted posts) ▪ Ayr ▪ Local media publications ▪ Mount Kelly ▪ Project website. ▪ Clare ▪ Horseshoe Lagoon.		
Local community groups and businesses			

- Ayr Chamber of Commerce
- North Queensland Conservation Council

URBIS
CAMBRIDGE SOLAR FARM - ENGAGEMENT OUTCOMES REPORT

Local community groups and businesses were consulted with via email on 6 February 2024. Groups were issued a copy of the community newsletter and invited to attend a one-on-one briefing with the project team.

This Report will be updated with outcomes of consultation with the broader community late February 2024.

To be updated February 2024.

At the time of writing this Report, no feedback has been received from community groups / businesses.

Cambridge will continue to share updates on the project with local community groups and businesses as the project progresses post lodgement.

FEEDBACK RECEIVED

15

Stakeholder

- Bowen & Ayr Farming & Horticulture Noticeboard (Facebook group)
- Burdekin Clay Target Club Inc

How this group was consulted

Items discussed

Project response

Other interested third parties

Local media

- Burdekin Local News
- Townsville Bulletin

A media release will be issued to media stakeholders post-lodgement.

Emergency Services

- Queensland Fire and Emergency Services
- Queensland Rural Fire Services

16

FEEDBACK RECEIVED

Addressed through the Bushfire Assessment Report prepared by Rob Friend and Associates.

6.

Future community and stakeholder engagement

Cambridge welcomes feedback on the proposal. In addition to the broader community consultation outlined in Section 4, Cambridge will continue to keep stakeholders and the community informed of the project approval process through the exhibition and determination phases by:

- Continuing to engage with the community about the project, its impacts, and the approval process.
- Providing information on how the community's views have been addressed on the project website and through social channels / local media publications.
- Enabling the community to seek clarification about the project through the two-way communication channels.

DISCLAIMER

This report is dated 5 February 2024 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Ltd (Urbis) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Cambridge RE Partners (Instructing Party) for the purpose of Engagement Outcomes Report (Purpose) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A

COMMUNITY NEWSLETTER

COMMUNITY NEWSLETTER

CAMBRIDGE
SOLAR FARM
February 2024

KEY BENEFITS OF CAMBRIDGE SOLAR FARM

Cambridge JMD Australia (Cambridge) is seeking approval to develop a solar farm and battery energy storage system (BESS) on rural land within Upper Haughton, Queensland.

The proposal directly supports national renewable energy targets, and contributes to Queensland's commitment to reduce emissions, create new jobs, and diversify the state's economy.

The first stage intended to be constructed is a 300MW grid connected solar farm, a battery energy storage system (BESS) and supporting infrastructure (invertors, transformers and cabling) across 641ha.

If approved, the renewable energy facility will:
Create enough clean, renewable electricity to power around 100,000 homes per year in North Queensland.

The proposal for Stage 1 is being prepared as part of a larger site master plan. The master plan will be delivered in subsequent stages as shown in the image below.

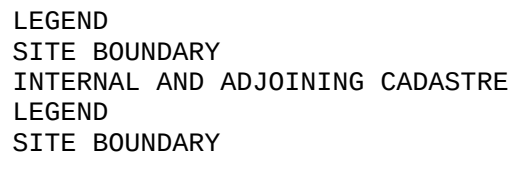
Reduce local and national carbon dioxide (CO_2) emissions supporting and sustaining the health of future generations.

The Stage 1 proposal is being prepared as a Development Permit for a Material Change of Use and will be submitted to Burdekin Shire Council (Council) for approval.

Support national energy independence and contribute to the State Government's renewable energy targets.
Create 350 jobs during construction and 10 - 20 during operation contributing to the local economy.

Cambridge is working closely with the landowner Davco Farming to prepare its proposal.

THE SITE



INTERNAL AND ADJOINING CADASTRE

MAPPED VEGETATION - CONSTRAINED

EASEMENT (POWERLINE)

MAPPED VEGETATION - CONSTRAINED

MAPPED VEGETATION - CONSTRAINED (WITH POTENTIAL TO MANAGE)

342.3 SETBACK FROM

MAPPED VEGETATION - CONSTRAINED (MINOR)

CONSTRAINED
VEGETATION

MAPPED VEGETATION - CONSTRAINED (MINOR)

37.5M BUFFER TO CONSTRAINED VEGETATION

CONSTRAINED
VEGETATION

342.3 SETBACK FROM
CONSTRAINED
VEGETATION

SETBACK FROM 42.3
CONSTRAINED
VEGETATION

EXTENT OF SOLAR PANELS
SUBSTATION

37.5M BUFFER TO CONSTRAINED VEGETATION

INDICATIVE INVERTER LOCATIONS

EXTENT OF SOLAR PANELS

SETBACK FROM
CONSTRAINED
VEGETATION

SUBSTATION
INDICATIVE INVERTER LOCATIONS
6M WIDE ACCESS ROAD
46.1

ER
W
SE

EA

19.8 ha

3

42.5

SETBACK FROM 30

PROPERTY
BOUNDARY

SETBACK FROM
CONSTRAINED
VEGETATION

SETBACK FROM
CONSTRAINED
VEGETATION

PO

SETBACK FROM
CONSTRAINED
VEGETATION

ME
NT

42.2

SETBACK FROM
CONSTRAINED
VEGETATION

1

40.8

20.2 ha

SETBACK FROM
PROPERTY
BOUNDARY

SETBACK
FROM POWER
EASEMENT

30

SETBACK FROM
CONSTRAINED
VEGETATION

30

ER
SE

EA

41

SETBACK FROM
CONSTRAINED
VEGETATION

46.1

37.5

ME

ER

W

NT

SETBACK FROM
CONSTRAINED
SETBACK FROM
VEGETATION

PO

19.8 ha

SE
ME

CONSTRAINED
VEGETATION

EA

2

SETBACK FROM 30
PROPERTY
BOUNDARY

4

37.5

SETBACK FROM
CONSTRAINED
VEGETATION

W
PO

40.8

SETBACK FROM
CONSTRAINED
VEGETATION

20.0 ha

NT

37.5

SETBACK FROM
CONSTRAINED
46.1 VEGETATION

30

SETBACK FROM
CONSTRAINED
VEGETATION

CAMBRIDGE SOLAR FARM

INDICATIVE STAGING PLAN

40.8

Level 32, 300 George Street | Brisbane QLD 4000 Australia | +61 7 3007 3800 |
URBIS Pty Ltd | ABN 50 105 256 228

SETBACK FROM
PROPERTY
BOUNDARY
DISCLAIMER

1

SETBACK FROM
P0044793
CONSTRAINED
VEGETATION
PROJECT NO.

1:12,500 @ A1
1:25,000 @ A3
0

100

250

DRAWING NO.

500m

MP-01

❩

Relatively flat and clear land with minimal
environmental constraints.

❩

Well located, with limited impact on surrounding
community.

SETBACK FROM
PROPERTY
BOUNDARY

20.0 ha

4

20.2 ha

REVISION

37.5

Detailed plans for the site will be developed
with respect to all physical and environmental
considerations, following engagement with neighbours
and the wider community.
SE

EA

30

NT
ME

SETBACK FROM
CONSTRAINED
VEGETATION

37.5

SETBACK FROM
CONSTRAINED

46.1 VEGETATION

SETBACK FROM 30
PROPERTY
BOUNDARY

SETBACK FROM
CONSTRAINED
VEGETATION

SETBACK
FROM POWER
EASEMENT

ER

41

Ability for high solar irradiance (amount of direct
sun per square metre).

W

2

30

)

PO

40.8

SETBACK FROM
CONSTRAINED
VEGETATION

SETBACK FROM
PROPERTY
BOUNDARY

30

Other reasons for site selection include:

DATE

Figure 1 Proposed site area: Following the delivery of Stage 1, Cambridge intends to expand its solar farm to deliver a total 1,700MW of solar energy across the site.
SETBACK FROM
CONSTRAINED
VEGETATION

42.2

24.01.2024

4

SETBACK FROM 30
PROPERTY
BOUNDARY

SETBACK FROM
CONSTRAINED
VEGETATION

37.5

CLIENT

Cambridge JMD Australia

3

The site was also chosen by Cambridge because there is a high-voltage transmission line running through the site. The transmission line enables power generated to be easily exported into the grid.

30

SETBACK FROM
PROPERTY
BOUNDARY

30

SETBACK FROM
PROPERTY
BOUNDARY

CONSTRAINED
VEGETATION

SETBACK FROM 42.3
CONSTRAINED
VEGETATION

42.5

6M WIDE ACCESS ROAD

The site is strategically located within the North and Far North Queensland Renewable Energy Zone and will support Queensland meet its 50% renewable energy target by 2030. It is located on Keith Venables Road, Upper Haughton, which is adjacent to the Burdekin River and 24 kilometres west of Ayr, North Queen.
160 SETBACK FROM

160 SETBACK FROM

MAPPED VEGETATION - CONSTRAINED (WITH POTENTIAL TO MANAGE)

IDENTIFYING AND MANAGING POTENTIAL IMPACTS

PLANNING PATHWAY

Cambridge is committed to identifying and minimising any potential impacts arising from this proposal. As part of the development application that will be submitted to Burdekin Shire Council, several specialist reports will assess:

Early 2024
We will lodge the development application to be reviewed by Burdekin Shire Council.

- The glint and glare to determine the sunlight's reflection from the solar panels.
- The visual impact of the facility's appearance in the area.
- The impact on the environment and biodiversity.
- The impact on the surrounding environment, including neighbouring farming operations.

Early 2024
The community will be notified during public exhibition. At this time, formal submissions can be made to Council for review. Council will also refer the planning application to relevant government agencies and authorities for consideration and feedback.

These reports will include suggestions for suitable measures to mitigate potential impacts if they are identified.
As part of managing impacts, Cambridge is preparing a Social Impact Assessment (SIA), a study of the potential social impacts and benefits associated with the proposed solar farm.
As part of this, we are seeking your feedback through a 5 minute survey. You can access the survey via the following QR code.

STAY IN TOUCH

Cambridge is committed to keeping the community informed at each stage of the project through a series of communication activities, including community newsletters, stakeholder and community briefings and updated information available on a designated project website.
Cambridge has commissioned Urbis Engagement

to collect your feedback and provide further information about the proposed solar farm.
You can reach the team on:
engagement@urbis.com.au
1800 244 863

Mid 2024
Following public exhibition, Council will determine the outcome of the proposal.
Late 2024
Once a determination is made, we will update the community about the planning outcome, and provide information regarding construction and next steps.
Late 2026
Anticipated completion and commissioning of the solar farm.

Wetland Amendment Report
Wetlands Mapped on 1/SP302825 & 10/GS602

16 February 2024

DUE DILIGENCE ADVICE | DEVELOPMENT STRATEGY & PLANNING | ECOLOGICAL SURVEY & ASSESSMENT
EPBC ACT ASSESSMENT & APPROVALS | STATE & LOCAL GOVERNMENT APPROVALS & PERMITS
VEGETATION, HABITAT, FAUNA & REHABILITATION MANAGEMENT PLANS | BIODIVERSITY OFFSETS | EXPERT WITNESS

Wetlands Mapped on 1/SP302825 & 10/GS602

Document Control
Project No:

2023-007b

Document:

Wetland Amendment Report

Client:

Cambridge JMD Australia

www.28south.com.au
28 South Environmental Pty Ltd

Disclaimer

Document History and Status

Revision	Date	Description	By	Review
1	7 Feb 2024	Draft	RC/MB	MT
2	16 Feb 2024	Final	RC/MB	MT

Approval for Issue
Name

Position

Date

Mark Barnett

Technical Director

16 February 2024

Wetlands Mapped on 1/SP302825 & 10/GS602

Table of Contents

Table of Tables
Table 1.

Table of Figures

Table of Attachments

Wetlands Mapped on 1/SP302825 & 10/GS602

1. Introduction

28 South Environmental (28 South) has been engaged by Urbis, on behalf of Cambridge JMD Australia (the Proponent), to provide environmental advisory services in support of development of a new solar farm in Upper Haughton, Queensland, to be located across Lots 1, 2 and 6 on SP302825.
Review of Matters of State Environmental Significance (MSES) Wetland Protection Area (WPA) mapping across these lots has identified two wetlands of High Ecological Significance (HES) being mapped – one within Lot 1 on SP302825 (“Lot 1 mapped wetland”), and the other on Lot 10 on GS602 (“Lot 10 mapped wetland”). The trigger area of the Lot 10 mapped wetland is mapped as extending into Lot 6 on SP302825.
Subsequent ground-truthing surveys have determined that neither of the mapped HES wetlands occur.
Consequently, the Proponent has requested 28 South to prepare an application to have the Queensland Government’s (“the State”) HES wetland maps and WPA maps amended.

2. Purpose of the report

The purpose of this report is to present technical justification for the removal of the two subject wetlands, and associated trigger areas, from the State’s HES wetland mapping. Removal of these areas from the State’s wetland mapping is considered warranted on the basis that the current mapping inaccurately indicates the presence of wetlands in the nominated locations and that these areas do not exhibit any environmental values that would typically be associated with wetlands.
This request is made under section 19 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water and Wetland Biodiversity)) and section 186 of the Environmental Protection Regulation 2019 (EP Reg). For this purpose, the report has been prepared to provide more accurate information indicating the extent, hydrological type or ecological significance of the subject wetlands, as required by section 19(1)(a) of the EPP (Water and Wetland Biodiversity) and section 186(1)(b)(i) of the EP Reg. To do so, this report provides discussion on the attributes of the wetland areas in question based on the Queensland Wetland Definition and Delineation Guideline – PART A (DERM, 2011) (QWDDG).

3. Background

3.1 Wetland locations

The two wetlands in question are located on adjoining properties, approximately 55 km southeast of Townsville, situated south of Mount Elliot and west of the Burdekin River.

3.1.1 Lot 1 mapped wetland

The Lot 1 mapped wetland, and associated trigger area (500 m buffer from edge of HES wetland), are both wholly located within Lot 1 on SP302825 (“Lot 1”) as shown in Figure 1 and Figure 2 respectfully. Lot 1 is an 802 hectare (ha) freehold property, located at 667 Black Road, Upper Haughton within the Burdekin Shire Council local government area (LGA).

Wetlands Mapped on 1/SP302825 & 10/GS602

Figure 1.

Figure 2.

Lot 1 mapped wetland of HES

Lot 1 mapped wetland of HES, with trigger area

3.1.2 Lot 10 mapped wetland

The Lot 10 mapped wetland is wholly located within Lot 10 on GS602 (“Lot 10”) as shown in Figure 3. Lot 10 is a 277 ha freehold property located at 669 Black Road, Upper Haughton within the Burdekin LGA.

The trigger area associated with this wetland extends beyond Lot 10 into Lot 1, Lot 6 on SP302825 (“Lot 6”) to the south, the Haughton River (unallocated State land) and Lot 95 on SP143120 to the north as shown in Figure 4.

Wetlands Mapped on 1/SP302825 & 10/GS602

Figure 3.

Figure 4.

Lot 10 mapped wetland of HES

Lot 10 mapped wetland of HES, with trigger area

Wetlands Mapped on 1/SP302825 & 10/GS602

3.2

Mapped wetland characteristics

Both wetlands are mapped as being palustrine wetlands within the Haughton sub-catchment of the Great Barrier
Reef catchment, and therefore were within the scope of assessment for the Aquatic Conservation Assessments
using AquaBAMM for the non-riverine wetlands of the Great Barrier Reef catchment (Rollason, 2012).

3.2.1 Lot 1 mapped wetland
The Lot 1 HES wetland is mapped as 20.5 ha and has an Aquatic Biodiversity Assessment and Mapping Method
(AquaBAMM) spatial unit identifier of “ha_w00518”. The State’s HES wetland mapping assigns this wetland an
AquaScore1 of ‘high’, derived from the individual criteria scores presented in Table 1.
AquaBAMM assessment has identified Regional Ecosystem (RE) 11.3.31a2 as being associated with the Lot 1
mapped wetland. The Regional Ecosystem Description Database (REDD) defines this RE as:

“Palustrine wetlands. Often dominated by Marsilea drummondii, Cyperus spp. and Ludwigia perennis, along
with grasses such as Leersia hexandra, Elytrophorus spicatus and Oryza spp. Occurs in gilgai and other
depressions. Palustrine.”

Table 1. AquaScores for Lot 1 mapped wetland (ha_w00518)

Criteria	AquaScore
Criterion 1: Naturalness aquatic	Very high
Criterion 2: Naturalness catchment	High
Criterion 3: Diversity and richness	High
Criterion 4: Threatened species and ecosystems	High
Criterion 5: Priority species and ecosystems	Very high
Criterion 6: Special features	Nil
Criterion 7: Connectivity	

N/A – switched off for non-riverine wetlands

Criterion 8: Representativeness

High

AquaScore dependability

42%

Photos of the Lot 1 mapped wetland are presented as Plate 1 to Plate 4.

3.2.2 Lot 10 mapped wetland
The Lot 10 HES wetland is mapped as 27.5 ha and has an AquaBAMM spatial unit identifier of “ha_w00520”. The
State’s HES wetland mapping assigns this wetland an AquaScore of ‘high’, derived from the individual criteria
scores presented in Table 2.
AquaBAMM assessment has identified RE 11.3.27x1b as being associated with the Lot 10 mapped wetland. The
REDD defines this RE as:

1
2

“Sedgelands to grasslands on Quaternary deposits. Often occurs as an Eleocharis dulcis sedgeland but a
variety of other species dominate in local areas including Typha orientalis and Phragmites australis. Trees and

Summary score derived by combining all of the criterion scores from the AquaBAMM.
Superseded: Revision of the regional ecosystem classification removed this regional ecosystem code from use.

large shrubs are generally absent. Occurs on broad drainage depressions situated on old alluvial plains.
Palustrine.”
Table 2. AquaScores for Lot 10 mapped wetland (ha_w00520)

Criteria	AquaScore
Criterion 1: Naturalness aquatic	Very high
Criterion 2: Naturalness catchment	Very high
Criterion 3: Diversity and richness	High
Criterion 4: Threatened species and ecosystems	High
Criterion 5: Priority species and ecosystems	Very high
Criterion 6: Special features	No data
Criterion 7: Connectivity	N/A – switched off for non-riverine wetlands
Criterion 8: Representativeness	Low
AquaScore dependability	53%

Photos of the Lot 10 mapped wetland are presented as Plate 5 to Plate 10.

Plate 1. Lot 1 mapped wetland

Plate 2. Lot 1 mapped wetland

Plate 3. Lot 1 mapped wetland

Plate 4. Lot 1 mapped wetland

Wetlands Mapped on 1/SP302825 & 10/GS602

Plate 5. Lot 10 mapped wetland

Plate 6. Lot 10 mapped wetland

Plate 7. Lot 10 mapped wetland

Plate 8. Lot 10 mapped wetland

Plate 9. Lot 10 mapped wetland

Plate 10. Lot 10 mapped wetland

3.3

Land use

Both of the mapped HES wetlands are situated within the alluvial plains of the Upper Haughton and Burdekin
Rivers.

Wetlands Mapped on 1/SP302825 & 10/GS602

Lot 1 has historically been subject to substantial levels of broad-scale land clearing and levelling to support irrigated
sugarcane (Saccharum officinarum*) cropping. An electrical easement extends through Lot 1, parallel to the
western property boundary. This easement accommodates a Powerlink high voltage transmission line.
Lot 10 accommodates a combination of remnant vegetation (approx. 187.2 ha), cleared cropping land (approx.
73.6 ha), Powerlink electrical easement and Black Road. The HES wetland is mapped as wholly occurring within
the area of remnant vegetation within Lot 10.

4.

Assessment against wetland criterion

The Program Wetland Definition consists of criteria for four factors: hydrology, biota, soils, and non-soils/ non-biota,
which are used to test if a feature is a wetland or not (Table 3). Each criterion is assessed by indicators that can
be described by the collection of information or evidence from field survey or other sources, as identified in Table
2 of the QWDDG.
Table 3. Factors and criteria from the Program Wetland Definition per Table 1 of the QWDDG
Factor

Criterion

Hydrology

Areas of permanent or periodic/intermittent inundation, with water that is static or
flowing, fresh, brackish or salt, including areas of marine water the depth of which at
low tide does not exceed 6 metres

Biotic (fauna and flora)

Supports plants and animals, at least periodically, that are adapted to or dependent
on living in wet conditions for at least part of their life cycle

Soils

The substratum is predominately undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layer (hydric soils)

Non-soils, non-biotic

The substratum is not soil and is saturated with water, or covered by water, at some
time.

The following sections describe characteristics of the two mapped wetland areas, as relevant to the defining factors
and criteria of a wetland, established through a combination of site surveys and review of publicly available
information.
The Lot 1 and Lot 10 mapped wetlands are separate features, without connectivity or inter-dependence. For this

reason, each wetland is discussed separately.

4.1 Hydrology

4.1.1 Indicators

Hydrology is the most important environmental driver of wetlands. The hydrological regime that supports wetlands varies with wetland type, region and associated environmental factors such as climate (DERM, 2011). The QWDDG recognises that there is generally little information from which to define minimum hydrological thresholds for any wetlands in Queensland. Therefore, the Program definition is structured so that it requires indicators of the presence of inundation while the degree of inundation is assessed by the biotic and soils criterion. Water-logging must be present but of sufficient duration and/ or frequency to create conditions that support wetland indicator plants, animals or soils. Saturation in the root zone is fundamental for defining wetland hydrology (Tiner, 1999; DERM, 2011). Thus water-logging generally must be within the upper 0.3 m of the surface, because this is the part of the substrate that influences most of the plants and animals.

In the absence of hydrological information, the QWDDG recognises that the dominance of wetland plant or soil indicators, in conjunction with other hydrological indicators, provide enough evidence that the hydrological criteria have been met. Other indicators include micro-relief, aerial imagery or hydrological models. Wetlands typically occur in topographic settings where surface water collects or groundwater discharges.

4.1.2 Assessment

A local, site-specific flood model was developed by WMS for a flood study that encompassed Lots 1, 2 and 6 on SP302825 and Lot 10 on GS602 (WMS, 2023) in accordance with Australian Rainfall and Runoff (ARR) 2019 Guidelines (Ball J, 2019). The flood model consisted of a TUFLOW hydraulic model using a rain-on-grid approach to capture local overland flow behaviour, and also incorporated inflows for the Haughton River and Oaky Creek for the assessment of mainstream flooding behaviour.

Six key durations were modelled; 180-minute, 360-minute, 540-minute, 720-minute, 1080-minute and 1440-minute durations. This captured a spread from shorter to longer duration events. For each duration, ten temporal patterns were simulated. The water level results were then processed to extract the median values for the temporal patterns and the maximum values for the durations.

The results of 1% Annual Exceedance Probability (AEP) peak flood depth modelling indicates that flows from the Haughton River remain relatively contained within the river banks. Lot 6 and Lot 1 are traversed by an overland flow path which drains in an eastern direction towards the balancing storage and the Sunwater irrigation channel.

Peak flood depths along this flow path are generally below 500 mm, although this is exceeded at certain locations.

Figure 5.
4.1.2.1

1% AEP peak flood depth and water level contours (WMS, 2023)

Lot 1 mapped wetland

The Lot 1 mapped wetland is mapped as occurring in the middle of a cropping paddock, with no surface features indicative of a wetland.

Flood modelling of a 1% AEP event indicates that an overland flow path traverses Lot 6 and Lot 1, flowing through the area mapped as wetland, draining in an eastwards direction. However, there is no on-ground evidence of this preferential flow path outside of a large scale flood event, as shown by Plate 1 to Plate 4.

The absence of standing water (Plate 1 to Plate 4) or shallow soil water-logging (Plate 11), as observed through site inspection, further supports the determination that the Lot 1 mapped wetland (as mapped) does not support or exhibit the hydrological conditions required to meet the definition of a wetland.

Further, hillshade elevation data demonstrates that there is no micro-relief, or other topographic features, that would promote the concentration or retention of surface water within the mapped footprint of the Lot 1 mapped wetland (Figure 6).

Wetlands Mapped on 1/SP302825 & 10/GS602

Plate 11.

Shallow soil condition within Lot 1 mapped wetland

Figure 6.
4.1.2.2

Hillshade elevation data for Lot 1

Lot 10 mapped wetland

Despite being immediately adjacent to the Haughton River, flood modelling has demonstrated that flood waters in a 1% AEP event are confined to the bank-full width of the river. Minor inundation (0.1-0.3 m) occurs sporadically across Lot 10 during a 1% AEP event (Figure 5). Consequently, the Lot 10 mapped wetland is not subject to regular inundation by surface flows.

The absence of standing water (Plate 5 to Plate 10) or shallow soil water-logging (Plate 12), as observed through site inspection, further supports the determination that the Lot 10 mapped wetland (as mapped) does not support or exhibit the hydrological conditions required to meet the definition of a wetland.

Further, hillshade elevation data demonstrates that there is no micro-relief, or other topographic feature, that would promote the accumulation of surface water within the mapped footprint of the Lot 10 mapped wetland (Figure 7).

Wetlands Mapped on 1/SP302825 & 10/GS602

Plate 12.

Shallow soil condition within Lot 10 mapped wetland

Figure 7.

4.2

Hillshade elevation data for Lot 10

Biota

4.2.1 Indicators
4.2.1.1

Plants

Plants are widely used as indicators of wetlands because there is often a strong relationship between soil saturation
and the development of communities dominated by plants adapted to and requiring such conditions. Therefore,
plants are often particularly useful indicators for the identification and delineation of wetlands (DERM, 2011).
While the criterion in the definition includes land that supports wetland plants (DES&I, 2013a), to be conclusive it
is considered that the vegetation has to be dominated by such plants, as this indicates that inundation with water
is the dominant factor determining the types of plant (and animal) communities associated with the site (DERM,
2011).

Wetlands Mapped on 1/SP302825 & 10/GS602

4.2.1.2

Fauna

The Program Wetland Definition recognises that there are species that are adapted to and dependent on living in wetland conditions for all, or at least part of, their life (DES&I, 2013b). Such species can be used as one line of evidence when testing a feature for wetland status.

4.2.2 Assessment

Ecological surveys have been conducted across Lots 1, 6 and 10 by 28 South Environmental, Hansen Botanical Assessments (HBA) (flora surveys) and EcoSmart Ecology (fauna surveys) through separate mobilisations through 2023.

Vegetation and Flora

HBA assessed the existing vegetation and potential flora biodiversity values of the sites, utilising variable survey techniques and intensities. Targeted field survey was performed to identify the presence or absence of threatened species3 that could possibly occur in the area. Similarly, vegetation communities were assessed against the relevant diagnostic criteria and condition thresholds of suspected Threatened Ecological Communities to determine the presence or absence of a threatened community. Observations and evidence of occurrence, habitat suitability, site conditions, and threats were also noted to aid in the determination of potential occurrence of threatened species and/ or ecological communities.

Quaternary assessments and photo point surveys were used over the sites and adjoining area to assess vegetation communities and regulated vegetation mapping extents. Quaternary assessments were conducted in compliance with the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 6.0. Updated April 2022 (Neldner, et al., 2022) and provided floristic and structural data to characterise vegetation communities.

Regional Ecosystem determinations were made to assess accuracy of mapping and/ or variance in the RE categorisation. Mapped RE categorisations were compared to known RE descriptions as outlined within the REDD (Queensland Herbarium, 2023). Vegetation communities present were verified and assigned a homogeneous RE categorisation. Where elements of heterogeneity were observed, an estimate of the proportion of each RE was documented.

The remnant status of existing vegetation was determined by comparing the existing predominant canopy against the undisturbed predominant canopy. The Queensland Herbarium defines the predominant canopy under the Vegetation Management Act 1999 as the Ecologically Dominant Layer (EDL) which is the stratum of vegetation that contains the most above ground biomass. This is typically equivalent to the upper stratum (Walker & Hopkins, 1990). Tree heights were determined using a calibrated hypsometer.

The crown cover definitions and associated crown separation descriptions (e.g. sparse) were also documented to allow for a consistent description of the spatial distribution of the vegetation communities.

The landform description upon which the field validated vegetation communities

occurred was based on simple
erosional landform patterns characterised by relief and modal slope and
described by (Speight, 1990).
Fauna and Habitat
EcoSmart undertook preliminary surveys to assess potentially important fauna
values across the sites, utilising
numerous fauna survey methodologies to either identify fauna directly, and/ or
assess the potential for fauna to
occur.
Independent point-based bird surveys were conducted shortly following sunrise
for 20 minutes over four
consecutive mornings within three hours of sunrise. Birds were recorded by
either sight or sound, recording the
3

species while observing bird activity. Opportunistic observations of birds were recorded throughout the surveys
whenever traversing the sites or while conducting other survey activities, increasing the effective bird survey
duration.
Ultrasonic calls of bats were recorded using Anabat Swift recording units deployed at alternating independent
locations over four nights. Survey effort focused on areas likely to have higher bat activity, namely waterways and
large patches of remnant vegetation. Anabat Swift recording frequency was set to full-spectrum recording to
increase the likelihood of bare-rumped sheathtail bat calls being identified.
Active habitat searches for sheltering fauna were conducted each day. Searches were not restricted to any single
location but were rather used throughout the sites wherever suitable rocks, logs or ground debris could be moved.
Shedding bark and hollows (where possible) was also inspected for sheltering arboreal vertebrates. Searching was
focused on areas of Category B (Remnant) vegetation, although not entirely restrictive. Koala scats searches
around the base of feed trees was conducted concurrently.
Opportunistic observations of all fauna encountered, heard or detected were recorded throughout the survey.
Opportunistic recording was continuous in addition to specific methodologies outlined above.
4.2.2.1

Lot 1 mapped wetland

Vegetation management RE mapping shows the Lot 1 mapped wetland to be non-remnant (Category X) vegetation,
which is consistent with the historical use of the land for cropping.
Pre-clear mapping shows that Lot 1 may once have hosted a mosaic of RE 11.3.35a (70%) and 11.3.10 (30%).
The description of these pre-clear REs is provided in Table 4. Neither of these REs are analogous with a wetland.
The current on-ground condition, nor the pre-clear mapping, aligns with the AquaBAMM identification of the Lot 1
mapped wetland as RE 11.3.31a (Section 3.2.1).
Table 4. Pre-clear REs associated with Lot 1
Pre-clear
Regional
Ecosystem

Description

Wetland
Status

11.3.35a

Corymbia tessellaris, C. clarksoniana and Eucalyptus platyphylla woodland. Occurs on Cainozoic alluvial plains. Older floodplain complexes, major stream levees and lighter deltaic deposits.

Not a wetland

11.3.10

Eucalyptus brownii woodland to open woodland. The ground layer is typically tussock grasses, including Aristida spp., Chloris spp., Fimbristylis dichotoma, Eriachne spp., Eragrostis spp. and Chrysopogon fallax. Areas on fertile soils

may contain Heteropogon contortus, Bothriochloa bladhii and Chrysopogon fallax. Occurs on Cainozoic alluvial plains.

Not a wetland

Botanical survey of the Lot 1 mapped wetland confirmed that the area has been historically cleared and maintained,
and appears to have been consistently laser levelled to facilitate cropping. Since being retained in fallow, and
therefore not worked by machines, evidence of slumping or standing water was not evident. Woody vegetation was
limited, however two of the recorded species are unlikely to be tolerant of sustained inundation or soil saturation,
those being Grevillea striata and Vachellia bidwillii, noting that a couple of Melaleuca viridiflora were also observed.
The ground cover layer, which is dominated by exotic pasture grasses and legumes, would also be intolerant of
sustained inundation or soil saturation. If the area was historically a wetland, then the area is likely to have slumped
and shown evidence of sustained inundation and prevalence of more hydrophytes (e.g. Eleocharis spp., Cyperus
spp., Persicaria spp.).
No wetland-dependent fauna species were observed proximal to the Lot 1 mapped wetland.

Wetlands Mapped on 1/SP302825 & 10/GS602

4.2.2.2

Lot 10 mapped wetland

The Lot 10 mapped wetland is mapped as being RE 11.3.27, with the remainder of Lot 10 mapped as being either
RE 11.3.35 or a mosaic of 11.3.35/11.3.10 (70/30%). This mapping is closely aligned, but not identical to the
AquaBAMM identification of the Lot 10 mapped wetland as RE 11.3.27x1b (Section 3.2.2).
Description of the Lot 10 REs is provided in Table 5.
Table 5. REs associated with Lot 10
Regional
Ecosystem

Description

Wetland
Status

11.3.27

Freshwater wetlands. Vegetation is variable including open water with or without aquatic species and fringing sedgelands and eucalypt woodlands. Occurs in a variety of situations including lakes, billabongs, oxbows and depressions on floodplains.

Palustrine
wetland

11.3.35

Eucalyptus platyphylla, Corymbia clarksoniana woodland, occasionally with Corymbia tessellaris. A secondary tree layer commonly occurs, including Planchonia careya, Pandanus spiralis, Melaleuca viridiflora or M. nervosa and Petalostigma pubescens. The ground layer is usually tussock grasses, including Themeda triandra, Heteropogon contortus, Mnesithea rottboellioides and Bothriochloa decipiens, together with herbs or forbs such as Glycine tabacina, Galactia tenuiflora or Sida hackettiana. Occurs on Cainozoic alluvial plains. Older
floodplain complexes, major stream levees and lighter deltaic deposits.

Not a
wetland

11.3.10

Eucalyptus brownii woodland to open woodland. The ground layer is typically tussock grasses, including Aristida spp., Chloris spp., Fimbristylis dichotoma, Eriachne spp., Eragrostis spp. and Chrysopogon fallax. Areas on fertile soils may
contain Heteropogon contortus, Bothriochloa bladhii and Chrysopogon fallax. Occurs on Cainozoic alluvial plains.

Not a
wetland

Botanical survey of the Lot 10 mapped wetland has determined that the area is almost entirely comprised of flora
species analogous with RE 11.3.7, which although situated on a floodplain, is typically associated with the poorly
consolidated sand veneers that are generally higher in the floodplain landscape

than those on more clayey loam.
The regional ecosystems description database describes RE 11.3.7 as follows:

“Corymbia clarksoniana, C. tessellaris and C. dallachiana woodland to open woodland. There is usually a
secondary tree layer, including Acacia salicina, Lysiphyllum hookeri or Grevillea striata. Occurs on levees and
plains formed from Quaternary alluvial deposits. Soils are usually deep uniform sands with minor areas of
sandy red earths. Not a Wetland.”

The composite canopy species and many of the shrub and ground cover species of this open woodland would be
intolerant of sustained inundation or soil saturation. Clearings within the mapped wetland would appear to have
primarily supported this RE but there is a possibility that portions of RE 11.3.35 may have also occurred. The
primary composite species of RE 11.3.35 would also be intolerant of sustained inundation or soil saturation.
The HBA Botanical Assessment Report is provided as Attachment 1.
No wetland-dependent fauna species were observed proximal to the Lot 10 mapped wetland.

Wetlands Mapped on 1/SP302825 & 10/GS602

4.3

Soils

4.3.1 Indicators
Soil indicators that conclusively identify a wetland soil are the accumulation of organic (decomposed plant)
materials, the presence of sulfidic materials and gleyed soil matrix colours. Other indicators such as mottles,
segregations, ferruginous root channel and decreasing matrix chroma may be relict landscape features and require
careful consideration against the current hydrologic regime in order to assist in wetland identification (DERM, 2011).
The Queensland Government's Soil Indicators of Queensland Wetlands: Field Guide (DNRM, 2008) includes a key
to help identify and delineate Queensland wetland soils.

4.3.2 Assessment
The extent of both mapped wetlands is covered by the Soil survey of the lower Burdekin River, Baratta CreekHaughton River Area, North Queensland which resulted in soil mapping at a 1:100,000 scale across the region
(Reid, 1984).
4.3.2.1

Lot 1 mapped wetland

The Lot 1 mapped wetland is mapped (Figure 8) as overlying the soil profile class 2Uge, which is summarised in
Table 6.
Table 6. Soil unit mapped underlying the Lot 1 mapped wetland

Soil profile class	Soil name	Australian Soil Classification	Topographic features	Subdivision	Major features
2Uge	Grey and dark clays	Vertosol	Major river flood plains	Depression and drainage lines with 0.20.53% slope	

Mottled grey and dark light or light medium cracking clays, strongly alkaline by 60 cm.

Figure 8.

distinguishing

1:100,000 soil mapping of the Lot 1 mapped wetland

Wetlands Mapped on 1/SP302825 & 10/GS602

During inspection of the mapped wetland, soil was observed as being dry, modified by agricultural practices and
absent of shallow soil water-logging (Plate 12).
Soil within the wetland footprint was observed to be devoid of organic material (0.2 m or greater) within 0.3 m of
the soil surface, exhibited no signs of acid sulfate soil and showed no evidence of gleyed soil matrix colours. Based
on this evidence, the soils within the mapped Lot 10 mapped wetland are not considered to be wetland soils per
the key to wetland identification provided in Soil Indicators of Queensland Wetlands: Field Guide (DNRM, 2008).
4.3.2.2

Lot 10 mapped wetland

The Lot 10 mapped wetland is mapped (Figure 9) as overlying two soil profile classes, 2Dyb and 6Dbd, which are
summarised in Table 7.
Table 7. Soil unit mapped underlying the Lot 10 mapped wetland

Soil profile
class

Soil
name

2Dyb

Solodicssolodized
solonetz

6Dbd

Solodicssolodized
solonetz

Figure 9.

Australian Soil
Classification

Sodosol

Chromosol

Topographic
features

Subdivision

Major
features

Major
river
flood plains

Slightly
elevated areas
and
some
levee

back
slopes, <0.5%
slope

Grey and dark duplex soils
with medium textured A
horizon, 12 to 20 cm deep,
strongly alkaline by 60 cm.

Recent
Haughton
River alluvial
deposits, 0-3%
slope

Brown duplex soils with
medium or occasionally
coarse textured A horizon,
20 to 40 cm deep, alkaline
soil
reaction
trend.
Overlies medium or coarse
textured material at 90-150
cm.

Miscellaneous
alluvial
deposits

distinguishing

1:100,000 soil mapping of the Lot 10 mapped wetland

During inspection of the mapped wetland, soil was observed as being dry, and absent of shallow soil water-logging
(Plate 12).

Soil within the wetland footprint was observed to be devoid of organic material (0.2 m or greater) within 0.3 m of the soil surface, exhibited no signs of acid sulfate soil and showed no evidence of gleyed soil matrix colours. Based on this evidence, the soils within the mapped Lot 1 mapped wetland are not considered to be a wetland soil per the key to wetland identification provided in Soil Indicators of Queensland Wetlands: Field Guide (DNRM, 2008).

4.4

Non-biota, non-soils

4.4.1 Indicators
This criterion is required because some obvious wetland features in Queensland have no vegetation or soil present and cannot be consistently identified from fauna indicators. These features include water in a channel, such as rocky river beds, waterfalls, boulders, headwaters, etc, and also subterranean wetlands (DERM, 2011).

4.4.2 Lot 1 mapped wetland
The area mapped as Lot 1 mapped wetland is devoid of non-biotic or non-soils features or characteristics that would otherwise be indicative of a wetland environment.

4.4.3 Lot 10 mapped wetland
The area mapped as Lot 10 mapped wetland is devoid of non-biotic or non-soils features or characteristics that would otherwise be indicative of a wetland environment.

5.

Summary and Conclusion

This report has been prepared to support an application to have two mapped wetlands of HES– one within Lot 1 on SP302825 (‘Lot 1 mapped wetland'), and the other on Lot 10 on GS602 (‘Lot 10 mapped wetland’) – removed from the State’s wetland mapping. This report has presented technical justification for the removal of the two subject wetlands, and associated trigger areas. Removal of these areas from the State’s wetland mapping is considered warranted on the basis that the current mapping inaccurately indicates the extent of wetlands in the nominated locations and that these areas do not have high environmental significance. This report has provided assessment of the groundtruthed attributes of the subject wetland areas based on the Queensland Wetland Definition and Delineation Guideline – PART A (DERM, 2011) (QWDDG).
Neither of the mapped wetlands have been assessed as exhibiting the requisite hydrological, biotic or soil characteristics that are required by the QWDDG definition of a wetland. Further, both mapped areas are devoid of non-biotic or non-soils features or characteristics that would otherwise be indicative of a wetland environment. On this basis, it is considered appropriate for both the Lot 1 and Lot 10 mapped wetlands, and associated trigger areas, to be removed from the State’s wetland mapping.

6. References

Ball J, B. M. (2019). Australian Rainfall and Runoff Guidelines. Canberra: Geoscience Australia, Commonwealth of Australia.

DERM. (2011). Queensland Definition and Delineation Guideline. Brisbane: Department of Environment and Resource Management, Queensland Government. Retrieved from Part A: A Guide to Existing Wetland Definitions and th Application of the Queensland Wetlands Program Definition.

DES&I. (2013a, March 22). Flora - Wetland Indicator Species List. Retrieved from WetlandInfo: https://wetlandinfo.des.qld.gov.au/wetlands/ecology/components/biota/flora/flora-indicatorspecies/

DES&I. (2013b). Wetland indicator animals of Queensland. Retrieved from WetlandInfo: https://wetlandinfo.des.qld.gov.au/wetlands/factsmaps/wildlife/?AreaID=queensland&Kingdom=animals&SpeciesFilter=WetlandIndicator

DNRM. (2008). Soil Indicators of Queensland Wetlands: Field Guide. Brisbane: Department of Natural Resources and Water, Queensland Government.

Neldner, V., Wilson, B., Dillewaard, H., R. T., Butler, D., McDonald, W., . . . Appelman, C. (2022). Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 6.0. Brisbane: Queensland Herbarium, Queensland Department of Environment and Science.

Queensland Herbarium. (2023). Regional Ecosystem Description Database. Version 13. Brisbane: Department of Environment and Science, Queensland Government.

Reid, R. E. (1984). Soils of the lower Burdekin River - Barratta Creek - Haughton River Area, North Queensland. Brisbane: Queensland Department of Primary Industries.

Rollason, S. a. (2012). Aquatic Conservation Assessments (ACA), using AquaBAMM, for the nonriverine wetlands of the Great Barrier Reef catchment, Version 1.3. Brisbane: Department of Environment and Resource Management.

Speight, J. (1990). Vegetation. In R. McDonald, R. Isbel, J. Speight, J. Walker, & M. Hopkins, Australian Soil and Land Survey Field Handbook. Melbourne: Inkata Press.

Tiner, R. (1999). Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification, and Mapping. Boca Raton: CRC Press.

Wetlands Mapped on 1/SP302825 & 10/GS602

Walker, J., & Hopkins, M. S. (1990). Vegetation. In R. I. McDonald, Australian Soil and Land Survey
Field Handbook (pp. 58-86). Melbourne: Inkata Press.
WMS. (2023). Oaky North Flood Study.

Wetlands Mapped on 1/SP302825 & 10/GS602

Attachment 1:
HBA Botanical
Assessment Report

PO Box 63
Coolum Beach Q 4573

Ref: TES29_Ltr_01b

P 0466 428 625
E chris.hansen44@protonmail.com

29 October 2023

Mitch Taylor
Director - Principal Consultant
28 South Environmental
131 Robertson St,
Fortitude Valley QLD 4006
[sent via e-mail: mitch@28south.com.au]

Dear Mitch,

RE: Preliminary terrestrial flora survey of the Haughton River Solar Farm project

Scope

Hansen Botanical Assessments (HBA) Pty Ltd was invited to assist 28South Environmental to assess the existing vegetation and potential flora biodiversity values of several parcels of land identified as potential locations for a solar farm and/or associated infrastructure. The land parcels are specifically described as:

§

Lot 1, 2 & 6 on SP302825 (Site) and

§

Lot 10 on GS602 (Wetland Protection Area investigation area, not part of Site).

These lots are hereafter referred to as the study area (Figure 1), however variable survey techniques and intensities were applied across the various lots.

This letter provides an explanation of the survey techniques that were applied and a summary of the survey findings relevant to the study area.

Methodology

The field flora survey methods that were employed over the study area aimed to:

§

validate existing Queensland Government regional ecosystem (RE) mapping, and better define the spatial extent, structural composition and general condition of vegetation communities;

§

ascertain whether any vegetation communities within these areas satisfy the diagnostic criteria and condition thresholds of any threatened ecological community (TEC) that is currently listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);

§

undertake targeted searches for conservation significant flora species that are

listed
under the Nature Conservation Act 1992 (NC Act) and/or the EPBC Act; and,
1

§

collate sufficient information that may be used to develop a Property Map of Assessable
Vegetation (PMAV) for this portion of the study area.

Desktop Review
Commonwealth and State database searches were undertaken for the study area and surrounds to identify records or potential occurrences of threatened and near threatened flora
species. Database searches applied a 10 km search radius from a central location within the
study area (the search area). The search area is representative of the broader region.
Desktop searches covered the following databases and government mapping sources:
§

EPBC Act Protected Matters Search Tool (DEECCW 2023);

§

Queensland WildNet database (DES 2023a);

§

Protected Plants Flora Survey Trigger Map (DES 2023b);

§

Australasian Virtual Herbarium (CHAH 2023);

§

Remnant 2020 regional ecosystem mapping (Version 12.04) and Essential Habitat Mapping and Database (Version 10.0), maps at 1:100 000 scale (DR 2023); and,

§

Detailed surface geology - Queensland - version 6.13 (DR 2018).

Field Surveys
The study area was assessed between and inclusive of 19 and 22 June 2023. A total of 36 hours
was spent on site.
The field flora surveys that were carried out over the study area were conducted in compliance
with the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation
Communities in Queensland, Version 6.0. Updated April 2022 (Neldner et al. 2022). A total of 46
detailed Quaternary vegetation assessment sites were undertaken. These were supplemented
with 11 additional photo points. Substantial portions of the study area were traversed on foot.
At this stage, a flora species list was not collated for the study area; however, no species of
conservation significant were detected within the study area with one noted as occurring in
surrounding riparian areas being Black Ironbox (Eucalyptus raveretiana). This is discussed
further in the results section below.
The remnant status of existing vegetation was determined by comparing the existing
predominant canopy with the undisturbed predominant canopy. The Queensland

Herbarium
defines the predominant canopy under the Vegetation Management Act 1999 (VM Act), as the ecologically dominant layer (EDL), namely, that stratum of the vegetation that contains the most above ground biomass. The EDL can be defined in terms of growth form, height, cover density and species. In the majority of cases, the EDL is equivalent to the upper stratum (Walker and Hopkins 1990). Tree heights were determined using a calibrated hypsometer. The crown cover definitions and associated crown separation descriptions (e.g. sparse) were also applied to the lower strata to allow a consistent description of the spatial distribution of the respective vegetation layers.

The landform description upon which the field validated vegetation communities occurred was based on simple erosional landform patterns characterised by relief and modal slope and described by Speight (1990).

Mapping

Queensland Government mapped REs were validated in the field using the survey data previously described in combination with the latest geology mapping (DR 2018) and site assessment of the underlying substrate.

Positional data was collected using a differential global positioning system; with an accuracy of between 1 and 3 m. Positional locations were recorded using the Latitude/Longitude coordinate systems. All locations presented in this report are within zone 55K. The map datum used was WGS84.

Limitations

Vegetation surveys often fail to record all species of flora present in a study area for a variety of reasons, including seasonal absence or reduced flowering during certain seasons. The ecology and nature of some significant and/or cryptic species means that such species are potentially not recorded during short survey periods.

Survey Findings - desktop

Significant flora

The Queensland WildNet database did not identify any conservation significant flora species that have been positively identified by the Queensland Herbarium as occurring within a 2, 5, 10, and 20 km radial search of the study area. A 50 km radial search identified 13 species of conservation significance.

The predictive modelling of the Commonwealth’s Protected Matters Search identified five significant flora species that are or have habitat that is likely to occur in the search area. One of these species were also identified in the WildNet database search results.

Of these 17 flora species identified in the search results, one (Black Ironbox (Eucalyptus raveretiana)) was positively identified in riparian areas adjacent to the study area during the June 2023 survey.

Watercourses

Three (3) vegetation management watercourses (two stream order 1, one stream order 6) are mapped on the vegetation management wetlands supporting map. The larger, order 6 watercourse in the north represents the Haughton River and fringes the northern boundary of the study area; while the 2 order 1 watercourses occur in the north-east and south-east of the study area, outside of the proposed solar array.

Wetlands

A palustrine wetland is mapped based on waterbody data and is in the central portion of Lot 1 on SP302825. Another wetland as mapped on the vegetation management wetlands map to the north of the study area centrally through Lot 10 on GS602. The latter is associated with a State mapped polygon of RE 11.3.27.

A wetland protection area (WPA) buffer applies to both wetland areas. It should also be noted
that the wetland mapped in Lot 1 on SP302825, although not associated with any mapped RE
(i.e. currently mapped as non-remnant or Category X vegetation) is also mapped as a wetland
of high ecological significance (HES).

Protected plants high risk areas

The study area is not mapped as having a high risk of supporting conservation significant flora
species on the protected plants flora survey trigger map.

Survey findings – Field survey

This preliminary assessment determined that the entire study area is located on Quaternary
alluvium (Qa: clay, silt, sand and gravel: floodplain alluvium) that is associated with the
Haughton River and numerous unnamed and named tributaries (e.g. Oaky Creek). Remnant
vegetation was limited to the northern portions of the study area while the balance supported
non-remnant vegetation that was representative of degraded pasture established in disused
sugar cane paddocks (Figure 2).

A total of 46 vegetation assessment sites were undertaken within the study area (Figure 3).

Queensland regulated vegetation

The preliminary vegetation assessment of study area determined the following:

1. Detailed assessment of the vegetation communities in the study area determined that
the woodlands and fringing open forest are representative of four regional ecosystems
(REs) that are prescribed in the Regional Ecosystem Database Descriptions (Queensland
Herbarium 2022).
2. The Haughton River discharges into the Coral Sea but is not subject to a tidal regime in
the vicinity of the study area. Although holding water in deeper bends and depressions
in the channel floor at the time of survey, the watercourse is ephemeral. Remnant
vegetation associated with the watercourse comprises fringing woodland to open forest
dominated by Black Ironbox (Eucalyptus raveretiana), Weeping Teatree (Melaleuca
fluviatilis) and/or Weeping Paperbark (Melaleuca leucadendra) and associated River
Oak (Casuarina cunninghamiana), Leichhardt Tree (Nauclea orientalis) and Carbeen
(Corymbia tessellaris). The distribution of canopy trees was particularly prevalent along
the toe of bank. The canopy of these patches had a median height of 20 m and a canopy
cover ranging from 60 to 70% along the toe of bank and 15 to 30% on the upper banks
and terraces where present. The various in-stream accretion islands commonly
supported a variable distribution of River Oak and Weeping Teatree woodland.
This community is representative of RE 11.3.25a, which is currently listed as Least
Concern under the VM Act and satisfies the 70/50 rule as prescribed under the VM Act.
It should be noted that the spatial extent of remnant RE 11.3.25a as mapped by the
Queensland Government was substantially over-mapped in several locations.
3. The floodplain to the south of the Haughton River currently supports a woodland to

open woodland of variable condition and spatial distribution. The primary composition
of these communities is representative of RE 11.3.35 and an association of this RE
(11.3.35a). The patches of the latter typically supported a canopy dominated by Poplar
Gum (Eucalyptus platyphylla), Carbeen and Large-fruited Bloodwood (Corymbia
clarksoniana) with a median height of 14 m and canopy cover ranging from 15 to 40%.
This cohort is representative of RE 11.3.35a, which is currently listed as Least Concern
under the VM Act and satisfies the 70/50 rule as prescribed under the VM Act.
This community graded into patches dominated by Poplar Gum with associated
Longfruited Bloodwood and is more representative of RE 11.3.35, which is currently listed as
Least Concern under the VM Act.
4. The polygon of RE 11.3.27 (in the adjoining areas within Lot 10 on GS602) and a
considerable portion of remnant vegetation mapped by the Queensland Government as
RE 11.3.35a/11.3.10 (70/30) was found to support a canopy of Carbeen and Dallachy’s
Gum (Corymbia dallachiana) with associated but oft suppressed Large-fruited
Bloodwood. The composition of this vegetation type was relatively consistent and had
a median height of 12 m and canopy cover ranging from 15 to 20%. This cohort is
representative of RE 11.3.7, which is currently listed as Least Concern under the VM Act
and satisfies the 70/50 rule as prescribed under the VM Act.
The Vegetation Management Wetlands map that applies to Lot 10 indicates that RE
11.3.27 is a wetland and therefore a WPA applies. The field-validated community at this
location (i.e. RE 11.3.7) is not a wetland RE, nor does it support species that would
typically define a wetland (i.e. at least periodically the land supports plants or animals
that are adapted to and dependent on living in wet conditions for at least part of their
life cycle). A few small depressions supporting bog-rushes (Eleocharis spp.) were
recorded in the western extent of the patch, however these were all less than 100 m2 in
area and not representative of the typical groundcover. Furthermore, the substratum
upon which the field-validated distribution of RE 11.3.7 does not appear to be
predominantly undrained soils that are saturated, flooded or ponded long enough to
develop anaerobic conditions in the upper layers.
As such the WPA mapping is erroneous and should be amended.
5. No patches of RE 11.3.27 were identified in the study area.
6. Small residual patches of Reid River Box (Eucalyptus brownii) open woodland to
woodland were recorded in the central southern portion of the study area. This cohort
is representative of RE 11.3.10 and is currently listed as Least Concern under the VM
Act.
Reid River Box was recorded occasionally in the various patches of REs 11.3.7, 11.3.35,
and 11.3.35a but were generally limited to only a few trees and therefore too small to
map as an independent community.
7. The balance of the study area supports degraded paddocks that are variously
comprised

of Purple Chloris (*Chloris inflata), Stylos (*Stylosanthes spp.), Flannel Weed (*Sida
cordifolia), Bunched Speargrass (Heteropogon contortus), Joyweed (*Alternanthera
ficoidea), and Indian Bluegrass (*Bothriochloa pertusa). Woody vegetation is limited to
a variable distribution of regenerating and/or residual Chinee Apple (*Ziziphus

mauritiana), Rubber Vine (*Cryptostegia grandiflora), Whitewood (Atalaya hemiglauca), Velvet Wattle and/or Broad-leaved Teatree (Melaleuca viridiflora) with a
median height of 2 m and average cover of generally less than 1%. Most of the regenerating woody vegetation appears to have been ’chained and windrowed’ in recent months.
The degraded paddocks are not actively grazed and are likely to have historically been
utilised for the cultivation of Sugar Cane (*Saccharum officinarum).
This cohort is not representative of any RE described in the Regional Ecosystem Description Database (DES 2022).
8. The HES wetland that is mapped by the Queensland Government in the central portion
of Lot 1 on SP302825 was found to be largely non-existent and instead support a vegetation cohort similar to that described in the previous point, i.e. degraded pastures.
As with the WPA in discussed in point 4, the degraded pasture is not representative of
an RE that is considered a wetland and does not:

- support plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle; or,
- appear to be predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers.

As such the HES and WPA mapping is erroneous and should be amended.
EPBC Act listed threatened ecological communities
Database searches identified one TEC that is listed under the EPBC Act as potentially occurring
in the search area.
None of the vegetation types within the study area are representative of or have the potential
to satisfy the diagnostic criteria and/or the condition thresholds of any TECs that are currently
listed under the SPRAT database.
Significant Flora Species
Black Ironbox (Eucalyptus raveretiana) was frequently recorded as a co-dominant canopy
species in the patches of RE 11.3.25a that fringe the southern and northern banks of the
Haughton River; however, these well outside the study area.
No other flora species of State and/or National significance were recorded or considered likely
to occur within the study area. Likelihood of occurrence tables (LOOTs) for Commonwealth and
State listed flora species have been included in Attachment B.
Exotic flora
Exotic species were variously distributed throughout the study area. Of particular concern are
Rubber Vine, Chinee Apple, Siam Weed (*Chromolaena odorata), Lantana (*Lantana camara),
Castor Oil Plant (*Ricinus communis), and Hymenachne (*Hymenachne amplexicaulis). These
species were variously recorded throughout the study area, however all six are highly invasive
and will recolonise areas following disturbance.

Hymenachne was recorded in numerous areas of standing water throughout the study area.

Summary of findings
The preliminary field assessment found that the bulk of the study area is largely devoid of native woody vegetation and represents a highly modified ecosystem dominated by exotic species.
None of the identified vegetation communities within the study area have the potential to satisfy the diagnostic criteria and/or the condition thresholds of any TECs that are currently listed under the SPRAT database.
Black Ironbox was frequently recorded as a co-dominant canopy species in the patches of RE 11.3.25a that fringe the southern and northern banks of the Haughton River; however, these well outside the study area. No other flora species of State and/or National significance were recorded or considered likely to occur within the study area.
Restricted invasive species are established within the study area and have the potential to become a serious threat to the extant vegetation communities as well as future development options.

If you require any further information, please do not hesitate to contact me via e-mail or on 0466 428 625

Kind regards,

Chris Hansen
Principal Consultant
HBA

Att:
References
Disclaimer
Attachment A – Figures
Attachment B – Likelihood of occurrence table (LOOT)

References

CHAH, (2023) Australasian Virtual Herbarium. Council of Heads of Australasian Herbaria, http://avh.chah.org.au.

Cropper, S.C., (1993). Management of endangered plants. CSIRO Publishing, Collingwood, Victoria.

DEECCW, (2023) EPBC Act Protected Matters Search Report accessed 21 June 2023. Department of Climate Change, Energy, the Environment and Water, Australian Government, Canberra. http://www.environment.gov.au/epbc/pmst/index.html.

DES, (2023a). Protected Plants Flora Survey Trigger Map. Date accessed 21 June 2023, Department of Environment and Science, Queensland Government, Brisbane.

DES, (2023b). Wildnet Extract. Date accessed 21 June 2023, Department of Environment and Science, Queensland Government, Brisbane.

DES, (2020). Flora Survey Guidelines - Protected Plants, Version 2.01, Department of Environment and Science, Queensland Government, Brisbane.

DR, (2023). Regulated Vegetation Management Map, Vegetation Management Supporting Map Version 12.04 and Essential Habitat Database version 10.0. Date accessed 21 June 2023, Department Resources, Queensland Government, Brisbane.

DR (2018) Detailed surface geology - Queensland - version 6.13. Department of Resources, Queensland Government, Brisbane.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Richter, D., Addicott, E.P. and Appelman, C.N. (2022) Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 6.0. Updated April 2022. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

Queensland Herbarium, (2021) Regional Ecosystem Description Database (REDD), Version 12 (March 2021). Department of Environment and Science, Queensland Government, Brisbane.

Speight, J.G., (1990). Landform. In: McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J., Hopkins, M.S. (Eds.), Australian Soil and Land Survey Field Handbook. Inkata Press, Melbourne.

Walker, J., Hopkins, M.S., (1990). Vegetation. In: McDonald, R.C., Isbel, R.F., Speight, J.G., Walker, J., Hopkins, M.S. (Eds.), Australian Soil and Land Survey Field Handbook. Inkata Press, Melbourne, pp. 58–86.

Disclaimer

The preparation of this report has been in accordance with the brief provided by the Client and relies upon data collected under limitations, as specified within the report. All findings, conclusions or recommendations contained within the report are based on the circumstances and represent the professional opinions of Hansen Botanical Assessments Pty Ltd (HBA). The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by HBA.

If a third party relies upon the facts, content, opinions, or subject matter contained in this report without the prior consent of HBA, the third party assumes all risk and releases and indemnifies HBA from any loss, damage, claim, or liability arising directly or indirectly from the use of or reliance upon this report.

Attachment A
Figures

500,000

510,000

Horseshoe Lagoon
k

y

Cr

OVERVIEW MAP
ee

k

C ree

TON RO
AD

COAC
H

R OA D

ee k
er

MOUNT
ISA iv
nR
to
Study
Area

k
e

e

BA

ek

BRISBANE

AD

RO

Gate
G

A

TT

ully

A
RR

re

Sand y C

MACKAY

Hau
gh

Majors Creek
r
or C
Maj

UPPER

CAIRNS
Major C
r

Woodstock

ug
Ha

on
ht

er
iv
R

D

1SP302825

10GS602

Upper Haughton
k

Hau

y Creek

k
ee

Cr

re
e

on
go

C
ky

ST

La

Oa
Rive
ghton

Oa
k

2SP302825

6SP302825

Reid River

BLA
CK R
OA

AD

KEITH VENABL
ES ROAD

7,820,000

O
MORRILL R

7,820,000

u r Mi
le

HAUGH

Fo

Sa
nd

O

CK

H

r

A
M

R

O
A

e
Cr e

n
in

c

e
rs
Ho

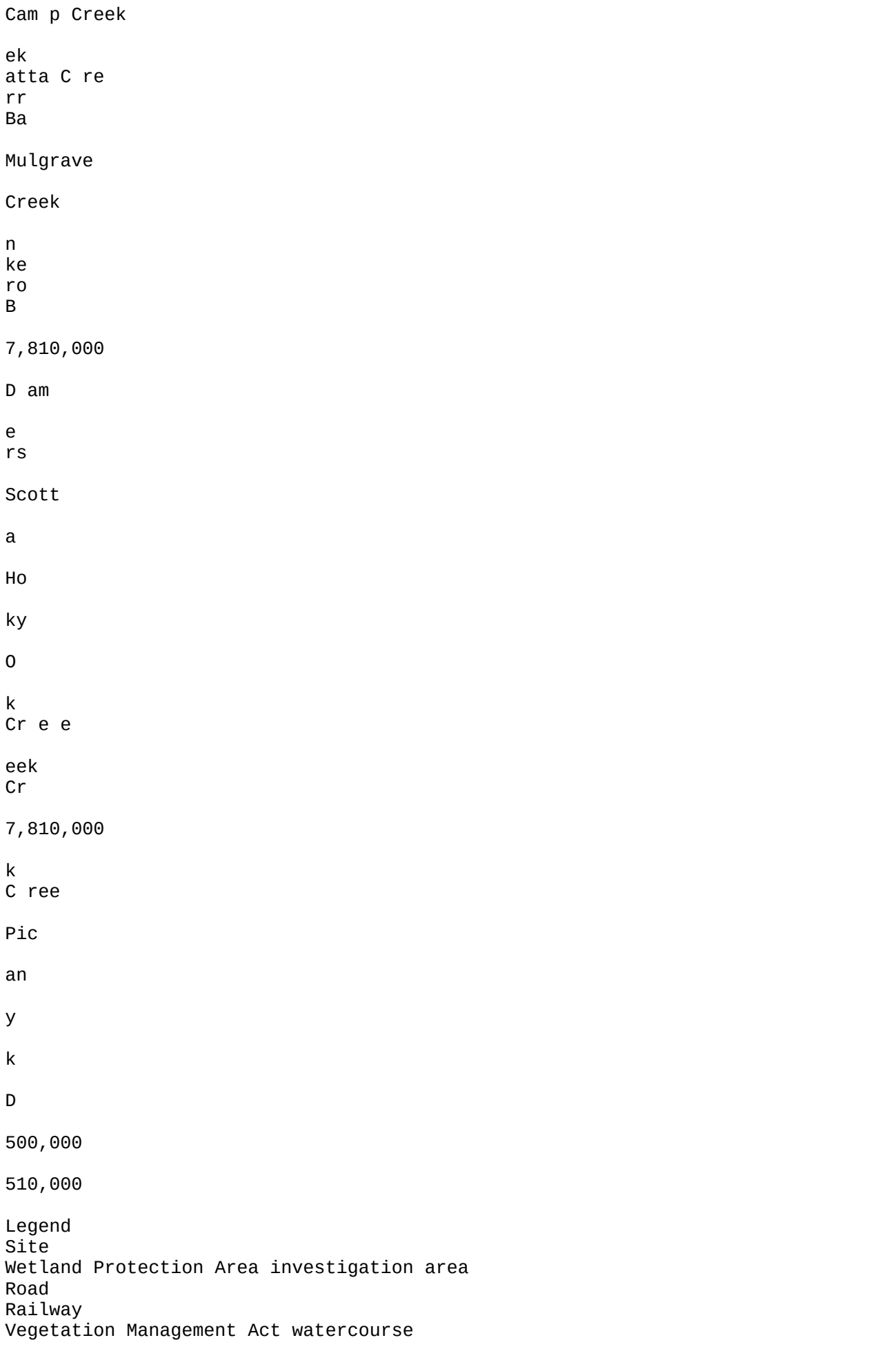
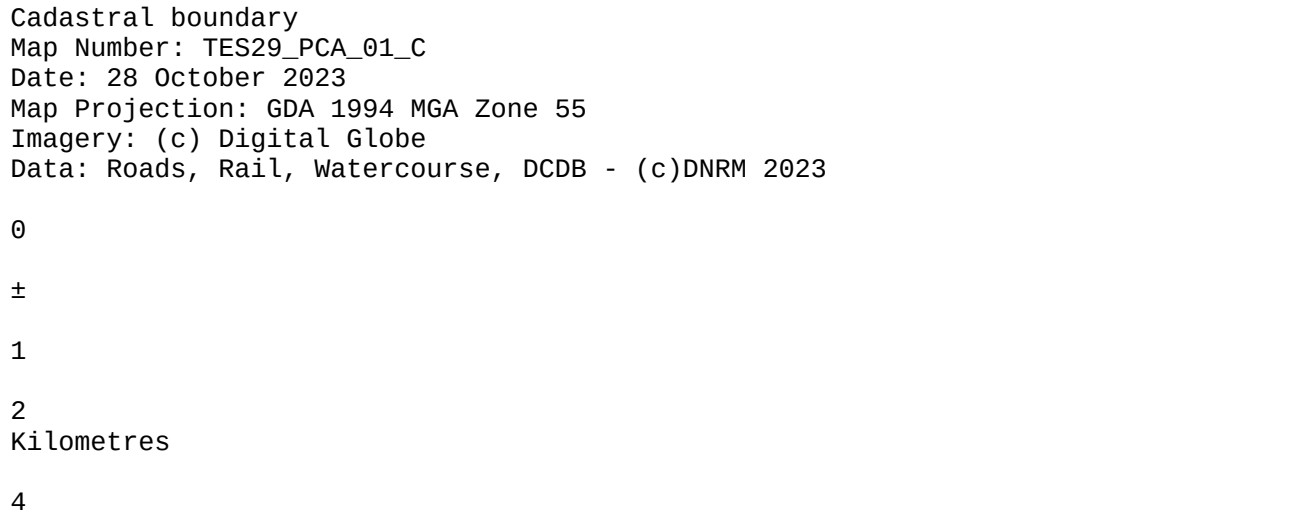

Cam p Creek
ek
atta C re
rr
Ba
Mulgrave
Creek
n
ke
ro
B
7,810,000
D am
e
rs
Scott
a
Ho
ky
O
k
Cr e e
eek
Cr
7,810,000
k
C ree
Pic
an
y
k
D
500,000
510,000
Legend
Site
Wetland Protection Area investigation area
Road
Railway
Vegetation Management Act watercourse

Figure 1 : Locality of the study area
Haughton River Solar Farm Preliminary constraints analysis (flora)



500,000

502,000

504,000

506,000

Haught on

11.3.25a

11.3.35

River

BLA
CK R

OAD

11.3.25a

7,820,000

508,000

11.3.35

7,820,000

498,000

11.3.35a
11.3.7

11.3.35
11.3.7

11.3.35

Ha

ug

hto
n

Ri
ve

r

11.3.25a

11.3.10
11.3.25a

11.3.35

7,818,000

7,818,000

11.3.10

11.3.35

11.3.35a/11.3.35
70/30

11.3.10
11.3.35a

ek

H au g h

7,816,000

ton R
iv er

11.3.25a

498,000

Oa k

500,000

502,000

504,000

506,000

y

Cr

ee k
Lagoon Cr

e

7,816,000

11.3.25a

508,000

Legend
Site

Cadastral boundary

Wetland Protection Area investigation area

Cleared vegetation (2015-2016)
Vegetation Management Act Status

Road

Least concern

Railway
Vegetation Management Act watercourse

0

0.5

1
Kilometres

1.5

2

Figure 2 : Field-validated vegetation mapping

Haughton River Solar Farm Preliminary constraints analysis (flora)
Map Number: TES29_PCA_02_D
Date: 28 October 2023
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Road, Rail, Watercourse - (c) DNRM 2023

498,000

500,000

502,000

504,000

506,000

Haught on
Q36

508,000

River
7

BLA

CK R

OAD

8

Q37

Q30

Q33

Q31

Q32

Q42
Q21

Q29

Q39

Q22
Q20

Q23
Q24

Q41

Q19
Q18

ug
Ha

Q13

n
hto

R

e
iv

Q40

Q17

r

Q43

Q15
Q14
Q16
Q1

Q12

Q44

Q6

Q2
Q27

Q3
1

7,818,000

7,818,000

Q28

Q38

7,820,000

7,820,000

Q35
Q34

Q5
Q4

Q25
Q26
2
Q45
Q11

Q7

4

Q46

3

7,816,000

6
Q9

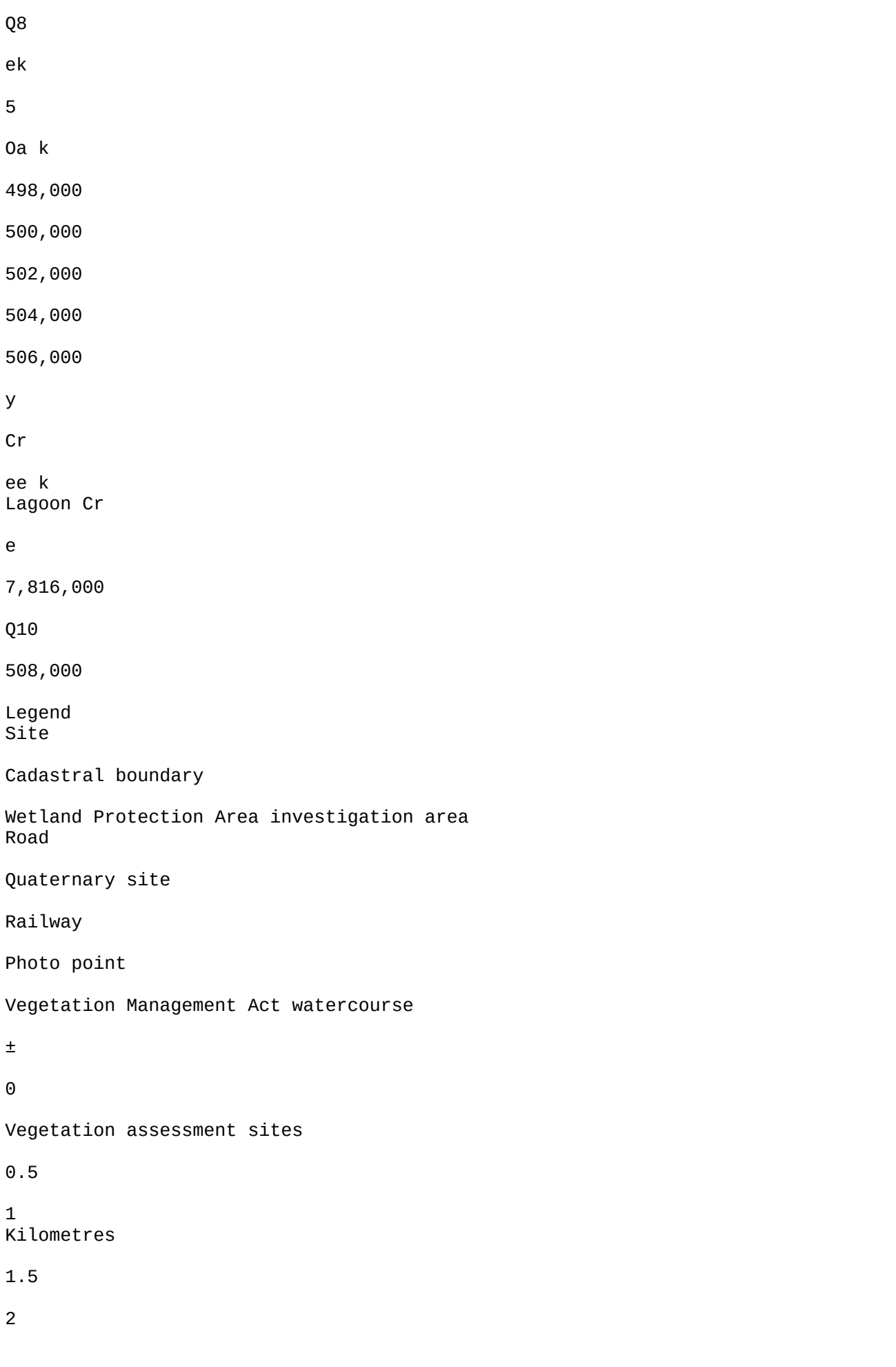

Q8
ek
5
Oa k
498,000
500,000
502,000
504,000
506,000
y
Cr
ee k
Lagoon Cr
e
7,816,000
Q10
508,000
Legend
Site
Cadastral boundary
Wetland Protection Area investigation area
Road
Quaternary site
Railway
Photo point
Vegetation Management Act watercourse
±
0
Vegetation assessment sites
0.5
1
Kilometres
1.5
2

Figure 3 : Vegetation assessment sites

Haughton River Solar Farm Preliminary constraints analysis (flora)
Map Number: TES29_PCA_03_C
Date: 28 October 2023
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Road, Rail, Watercourse - (c) DNRM 2023

Attachment B
Likelihood of occurrence table (LOOT) – conservation flora species

Table B-1:

Likelihood of occurrence of Commonwealth significant conservation significant flora species to occur in the study area

Common Name (Species Name)	Status	Record Source3	EPBC Act1	NC Reg’n2	V	C	PMST	Habitat Preferences	Likelihood to occur in the study area
Black Ironbox (Eucalyptus raveretiana)								Distribution: This species occurs as scattered and disjunct populations in central coastal and sub-coastal Queensland, from Dipperu National Park southwest of Mackay, north to Charters Towers, Bowen, and Ayr, in and 100 km around Rockhampton and near the Mackenzie River north of Duaringa. It is known from 23 main locations and there are many more sub-populations (Brooker and Kleinig 2008; DotEE 2017d) Habitat preferences: This eucalypt occurs on the banks of rivers, creeks and moderate sized watercourses on clayey or sandy loam and is often associated with White Paperbark (Melaleuca leucadendra) and/or Weeping Paperbark (M. fluviatilis) fringing open forest in coastal streams where it tends to displace Queensland Blue Gum (E. tereticornis) as the emergent eucalypt species (TSSC 2008a). It is known to occur at an altitudinal range between 1-300 m in areas with annual rainfall between 650-1100 m (DotEE 2017d). Notable features: This is a large eucalypt with the smallest fruit of any eucalypt (DotEE 2017d). Dispersal mode: Gravity, wind and/or water dispersed – no specific morphological features that aid secondary dispersal. Ants may also disperse seeds.	CONFIRMED: This species was recoded within the study area in vegetation fringing the Haughton River; however, these well outside the study area.
Dichanthium setosum (no common name)					V	C			

PMST

Distribution: This grass species is known from inland New South Wales and Queensland. In Queensland the species has been recorded in the Leichardt, Morton, North Kennedy, and Port Curtis regions.
Habitat preferences: It grows on heavy basaltic black soils and redbrown loams with clay subsoil. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnant and highly disturbed pasture (DotEE 2017e).
Notable features: This is a perennial grass that commences growing in spring, flowers in summer and becomes dormant in late autumn (DotEE 2017e).

17

Low:
Natural grassland habitat is not present within the study area.

Common Name (Species Name)	Status EPBC Act1	Record Source3	Habitat Preferences	Likelihood to occur in the study area
NC Reg’n2 Dispersal mode: Wind and mammal dispersed – awned seeds assist with wind movement and attachment to mammals.				
Leichhardtia brevifolia (syn. Marsdenia brevifolia) (no common name)	V	V	PMST, WildNet	Distribution: This species is known from three main localities, near Townsville, Springsure and north of Rockhampton (TSSC 2008c). Habitat preferences: It is known to grow on serpentine rock outcrops or crumbly black soils derived from serpentine as well as granite soils and dark acid agglomerate soils. Occurs in eucalypt woodland, often with Broad-leaved Ironbark (Eucalyptus fibrosa), Corymbia xanthope (no common name), Granite Ironbark (E. granitica), Rustyjacket (C. leichhardtii), White Mahogany (E. acmenoides) or Narrow-leafed Ironbark (E. drepanophylla) (DotEE 2017f; TSSC 2008c).	Low: The underlying geology preferred by this species is not present in the study area.
Dispersal mode: Most likely mammal and bird dispersed as fruits are quite large. Notable features: This species of Marsdenia lacks a ring of tissue between the petals and the stamens of its flowers (DotEE 2017f).				
Mt Stuart Ironbark (Eucalyptus paedoglauca)	V	V	PMST, WildNet	Distribution: Occurs on near Townsville in an area of only approximately 400 km2. Habitat preferences: Grows on ridges or hill slopes on shallow sandy-loam soils in remnant vegetation. Notable features: Flowers in April and May (TSSC 2008e).	
Tephrosia leveillei (no common name)				

V

C

PMST

Low:
This is a distinctive species, which
was not recorded during the field
assessment. No ironbarks were
recorded in the study area.

Dispersal mode: Gravity, wind and/or water dispersed – no specific morphological features that aid secondary dispersal. Ants may also disperse seeds.

Terrain within the study area also
appears to be unsuitable.

Distribution: This low growing legume is currently known from the area between Chillagoe and Forty Mile Scrub.

Low:
Suitable habitat not present within
the study area.

Habitat preferences: it has been recorded from:
•

Cullen's Ironbark (Eucalyptus cullenii) woodland on alluvial plains

•

Variable-barked Bloodwood (Corymbia erythrophloia) and Cooktown Ironwood (Erythrophleum chlorostachys) woodland with Bushman's Clothes-peg (Grevillea glauca)

18

[NOTE: Tephrosia leveillei is very
closely allied to T. flagellaris, and
taxonomic work has resulted in T.
leveillei being reclassified as T.
flagellaris with the previous taxon no
longer recognised in the Queensland

Common Name (Species Name)	Status EPBC Act1	Record Source3	Habitat Preferences	Likelihood to occur in the study area
NC Reg’n2 •				
Eucalyptus spp. and Corymbia spp. tall open forest over dense Bunch Spear-grass (Heteropogon contortus) on red sand (DEWHA, 2008f). Notable features: low growing perennial herb to 30 cm tall. Flowers are solitary or paired on leaf axils (DEWHA, 2008f). Dispersal mode: Gravity, wind and/or water dispersed – no specific morphological features that aid secondary dispersal. Ants may also disperse seeds.				

1. NC Reg’n is Nature Conservation (Plants) Regulation 2020: V = vulnerable, C = least concern
2. EPBC Act is Environment Protection and Biodiversity Conservation Act 1999: V = vulnerable

Census of Vascular Flora and Fungi (Laidlaw 2022)]

Table B-2:

Likelihood of occurrence of State significant conservation significant flora species to occur in the study area

Species Name	Status	Record Source3	Habitat Preferences	Likelihood to occur in the study area
	EPBC Act1	NC Reg’n2		
Backhousia tetraptera	–	CR	WildNet	Limited to two disjunct populations steeply incised mountain gullies associated with the southern slopes of Mt. Stuart (Townsville) and Leichhardt Creek (to the north-west of Blue Hills)	Low: Suitable habitat not present within the study area
Cerbera dumicola	–	NT	WildNet	Closest record west of Ravenswood. Known to occur on lateritic jump ups	Low: Suitable habitat not present within the study area
Commersonia reticulata	–	V	WildNet	Grows in rangeland woodland or open forest, from near Mount Garnet to Townsville	Low: Suitable habitat not present within

the study area

—

V

WildNet

Occurs on vine forest margins or in sclerophyll forest adjacent to vine forest. It grows among boulders and on soils derived from granite or limestone from Townsville, south to Eidsvold.

Low:

Corchorus hygrophilus

Croton magneticus

—

V

WildNet

Grows in deciduous vine thickets (dry rainforest) on soils derived from sandstone, granite, or acid agglomerate substrates between Greenvale to near Collinsville

Low:
Suitable habitat not present within
the study area

Dubouzetia saxatilis

—

V

WildNet

Limited to the cliff faces of steep peaks to the south-west of Townsville (east of Pinnacles NP)

Low:
Suitable habitat not present within
the study area

Graptophyllum excelsum

—

NT

WildNet

Occurs in semi-evergreen vine thickets, although near Chillagoe the species has also been recorded growing in grassy woodland in association with Eucalyptus cullenii and Corymbia erythrophloia

Macropteranthes leiocaulis

—

NT

WildNet

Occurs in dry rainforests and vine thickets from the Binjour Plateau (near Gayndah) to Mingela (SW of Townsville)

WildNet

Confined to shrubland on outcrops of granite-like rocks, on skeletal soil, and is associated with shrubs such as Leptospermum brachyandrum, Leptospermum petersonii subsp. lanceolatum, Corymbia trachyphloia and Melaleuca pearsonii

Sannantha papillosa

—

V

20

Suitable habitat not present within the study area

Low:
Suitable habitat not present within the study area
Low:
Suitable habitat not present within the study area
Low:
Suitable habitat not present within the study area

Species Name	Status	Record Source3	Habitat Preferences	EPBC Act1	NC Reg’n2	Likelihood to occur in the study area
Scleromitrion polycladum (syn. Oldenlandia polyclada)	_	NT	WildNet	Distribution closest to the study area in Mt Ellenvale SF growing on steep slopes in association with vine thicket		Low: Suitable habitat not present within the study area
Solanum sporadotrichum	_	NT	WildNet	Grows in association with semi-evergreen vine thicket, notophyll rainforest or littoral rainforest or in eucalypt open forest or woodland on soils that are moderately to very fertile		Low: Suitable habitat not present within the study area

1. NC Reg’n is Nature Conservation (Plants) Regulation 2020: CR = critically endangered, E = endangered, V = vulnerable, NT = near threatened
2. EPBC Act is Environment Protection and Biodiversity Conservation Act 1999: V = vulnerable; - = not listed

14th November 2023

Burdekin Shire Council

To whom it may concern,

CAMBRIDGE RENEWABLE ENERGY PARK (CREP) – VIEWSHED ANALYSIS & PRELIMINARY VISUAL ADVICE

INTRODUCTION & PURPOSE OF THIS LETTER

Urbis have been engaged to prepare viewshed mapping, preliminary visual analysis and potential visual impacts on the surrounding public and private domain. This information is intended to inform Council's assessment of potential visual risks and the need for further visual analysis.

PROJECT OUTLINE & CONTEXT

CREP seeks to establish a hybrid renewable energy park on rural land located at Keith Venables Road, Upper Haughton, Queensland in partnership with the landowner Davco Farming (Davco).

The site is 5,992ha in total. Following the completion of Phase 1 of the project regarding site constraints analysis, CREP are looking to pursue a development application for a staged Solar Farm over Lots 1, 2 and 6. Phase 2 (masterplan) is currently on hold.

The site is surrounded predominantly by agricultural land uses, as well as an existing solar farm and substation. The immediate surrounding land uses include:

North – Immediately north is agricultural land and Major Creek. Further north is Mount Elliot and Alligator Creek, while beyond is Townsville City.

East – Immediately east of the site is agricultural land uses with Mount Kelley, Ayr Township and Ayr Airport further east.

South – South of the site is predominantly areas of rural and agricultural land and Oaky Creek.

West – Immediately west is agricultural land and the Foots Hill Station event venue. Further west is Flinders Highway and the Mingela State Forest.

Figure 1 - Project masterplan.

POTENTIAL VISIBILITY

Urbis have used elevation and topographical data to understand the potential visibility to any part of the site or proposed development. The potential visual catchment is the theoretical area within which parts of the site including the proposed solar array (approximately 5.2m above natural ground level) may be visible.

The visibility of any proposed development varies depending on constraints such as the blocking effects of topography, vegetation, and any intervening built form. Visibility refers to the extent to which the proposal would be physically visible, identifiable for example as a new, novel, contrasting element or alternatively as a recognisable but compatible feature.

The below viewshed map (Figure 2) shows the likely visibility based on a 2P configuration at maximum tilt (60 degrees) to the top of the panels and is based upon topography only (no vegetation).

Figure 3 shows the surrounding topography and identifies vegetation surrounding the stie (from analysis of aerial photography).

Figure 2 - Viewshed mapping showing potential visibility of the proposal Lots 1, 2 & 6 (based on topography only). Source: Urbis

Figure 3 - Elevation and surrounding vegetation (3km extent). Source: Urbis

- The surrounding topography is predominately flat, with the nearest elevated ridgeline located approximately 9km to the north which is heavily vegetated and does not appear to be publicly accessible.

- The largely flat elevation surrounding the site limits its visibility from medium and long distance locations as intervening vegetation will likely block the array given its limited height.

- The number of residential dwellings within a close and medium distance is limited, with two dwellings within 3 kilometres identified.

- 14 dwellings are identified between 3-10kms away, predominately north of the site, with a cluster of dwellings beyond 10kms to the north of Old Coach Road.

- Potential visibility of the panels is most likely available from areas immediately surrounding the site boundary, as well as from the east, south-east and south.

- The number of residential dwellings to the east and south is limited (5 identified dwellings) and are located between 1 and +10kms away with varying levels of vegetation within the properties which could screen views towards the site ranging from partial to minimal (based on analysis of aerial imagery).

- The largest number of dwellings potentially affected are located to the north of the site likely have mid to low visibility of the proposal due to topography.

- Visibility of the proposal from northern dwellings is likely further decreased due to intervening vegetation and distances, particularly to those dwellings further then 10kms away.

- Aerial analysis shows a high level of intervening vegetation between dwellings and the site (in addition to the vegetation immediately surrounding dwellings) which would likely block or highly filter views of the site and would increase over greater distances.

Public domain locations with views towards the site are limited and are likely restricted to publicly accessible roads to the east including Barratta Road, Kieth Venables Road & Stockham Road.

Vegetation surrounding the site includes riparian vegetation around Haughton River to the north and west, as well as large expanses of vegetation to the north, east, south and west.

CONCLUSIONS

1. The likely visual catchment of site (Lots 1, 2 & 6) based on analysis of the viewshed map and aerial photography is considered low and constrained from both the private and public domain locations.
2. Visibility from, and the potential visual impact on private dwellings is likely low due to:

- Vegetation immediately surrounding the dwellings;
- Intervening vegetation within the wider landscape;
- Distances between the dwellings and proposal site.

3. Visibility from the public domain and likely visual impacts is likely low given:

- The limited number of publicly accessible roads surrounding the site;
- Intervening vegetation between roads and the site would likely block views from these locations.

4. Surrounding vegetation likely creates a significant filtering and blocking effect which is further
increased by the vegetation often extending over large areas of land and creating a visually dense
screening effect.
Please feel free to contact me to discuss any aspects of this preliminary advice.

Yours sincerely,

Nick Sisam
Associate Director
+61 2 8233 9975
nsisam@urbis.com.au