

Central Queensland Coal Project

Appendix 21 - Waterway Barrier Works Assessment

**Supplementary
Environmental Impact
Statement**



30 November 2018

Planning and Assessments

Department of the Agriculture and Fisheries

Mineral House

41 George Street

Brisbane Qld 4000

Dear Sir / Madam

Review of waterway barrier works mapping intersecting the Central Queensland Coal Project (ML80187)

The purpose of this letter is to provide the appropriate information required for a review and amendment to the 'waterway for waterway barrier works' mapping associated with lands required for the Central Queensland Coal Project – portions of Lot 10 on MC493 and Lot 11 on MC23. It is noted the waterways are located within a mining lease and are therefore not triggered for assessment under the Planning Regulation 2017. However, the mapped features are still subject to environmental offsets under Schedule 2 of the Environmental Offsets Regulation. It is our belief that some of the waterways within the Mining Lease area do not represent fish habitat or pathways for fish movement across the wider area, and therefore should not be subject to environmental offsetting for their loss.

Should you require additional information I can be contacted on 0418 872 181 or by email nharris@cqcoal.com.au

Nui Harris

Managing Director

Central Queensland Coal Pty Ltd and Fairway Coal Pty Ltd

Introduction

This review has been prepared following site visits to the Mamelon Station property (located on Lot 10 MC493 and Lot 11 MC23) and collection of onsite data. Mamelon Station is the location of the proposed Styx Coal Project (the Project). The purpose of this review is to provide sufficient information for the Department of Agriculture and Fisheries (DAF) to confirm that the spatial layer showing waterways with risks of impacts on fish movement on the property is not representative of site conditions, and therefore should not be subject to environmental offsets resulting from significant residual impacts to the waterways from the layout of the mine.

Scope

The assessment included a desktop and field works review of the mapped waterways within and upstream of the Project Mining Lease (ML) against the 'waterways for waterway barrier works' spatial mapping layer and the *Guide for determination of waterways using the spatial data layer Queensland waterways for waterway barrier works* (2013) (the Guide).

Deep Creek and Tooloombah Creek lie adjacent to the ML and are mapped as 'major' risk waterways for potential barrier impacts. A number of smaller waterways within the ML are mapped as 'low' (green) or 'moderate' (orange) risk waterways. A single small section of a drainage line (in the Deep Creek catchment) to the south of the highway is mapped as 'high' risk (red) (Figure 1). It is noted that within the ML these waterways have been subject to substantial modification with a number of farm dams and berms/flooded pasture areas built across the mapped waterways.

Legislative Requirements

The *Fisheries Act 1994* (the Act) deals with the use, conservation and improvement of Queensland's fisheries resources and fish habitats. The Act seeks to ensure adequate provision for fish movement and habitat access during development processes. The Act includes a broad definition of waterway, however, to better delineate a waterway for the movement of fish DAF have produced the Guide.

On the data layer, these waterways are depicted as a coloured stream network from the upstream limit, downstream to the tidal or wetland conclusion. Streams that are not coloured on the data layer are not considered waterways. Waterway barrier works on these streams do not require approvals or assessment under the Act. The Guide acknowledges that as the mapping has been derived from pre-existing products, there may be inaccuracies that have continued from these base layers.

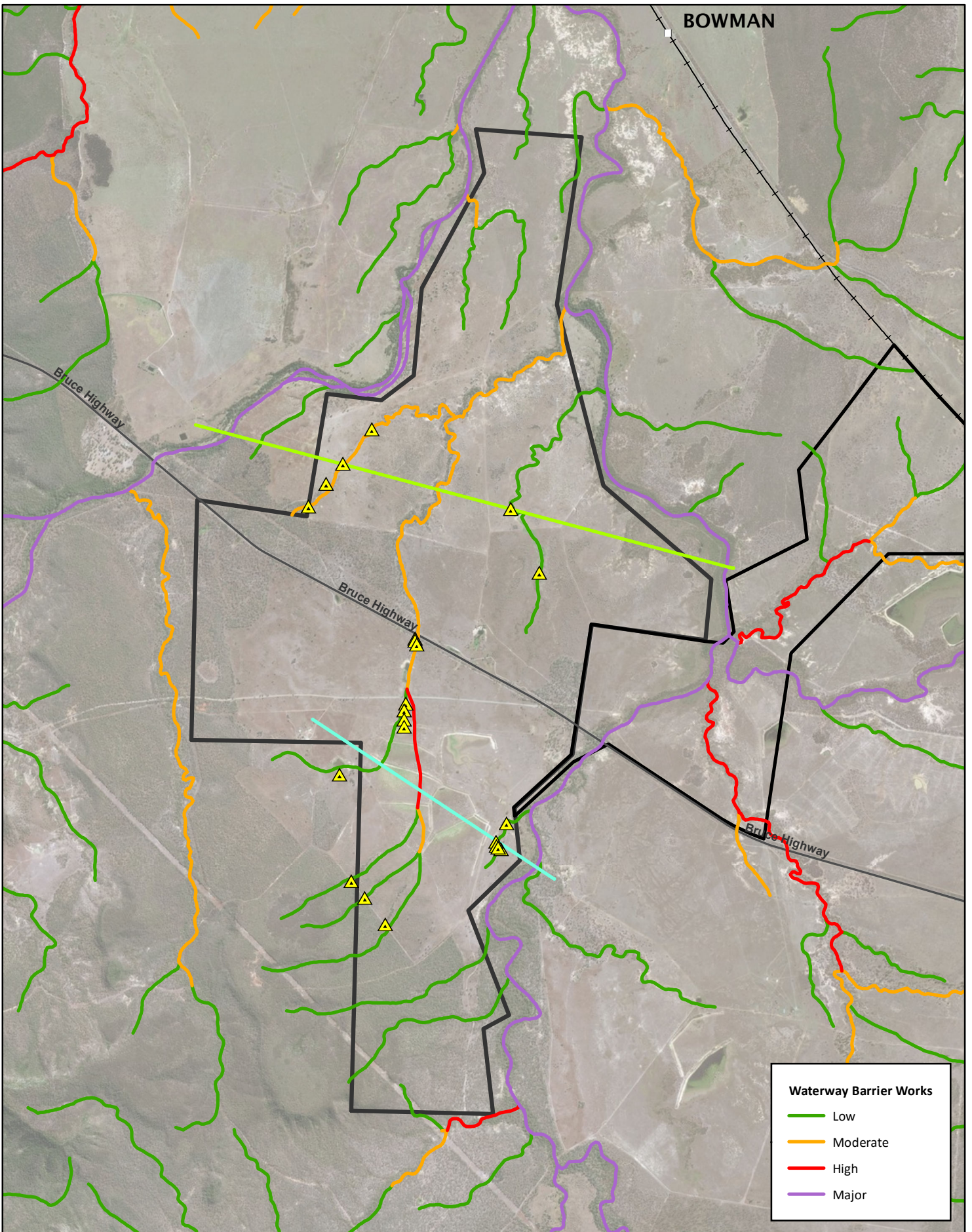
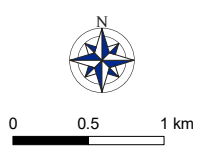


Figure 1
ML and waterway barrier mapping



- Legend**
- Photo assessment points
 - Elevation cross-section north (Figure 3)
 - Elevation cross-section south (Figure 4)
 - Project ML
 - Main road

Scale @ A4 1:50,000
Date: 29/11/18
Drawn: J Parnwell

DATA SOURCE
Waratah Coal, 2018
QLD Open Source Data, 2018



Method

The determination of waterways has previously utilised the definition of the upstream limit as presented within the Fish Habitat Management Operational Policy (Waterway Barrier Works Development Approvals). To determine whether waterways within the Project area is above or below that upstream limit, features relevant to fisheries resources, such as the following physical and hydrological attributes, have been considered:

- Defined bed and banks;
- An extended, if non-permanent period of flow;
- Flow adequacy; and
- Fish habitat at or upstream of the site.

An assessment of these attributes at the proposed Project site has been undertaken during a desktop review and field assessments carried out on 31 August and 28 September 2018. Central Queensland Coal provides an assessment in the following sections against each attribute including the use of aerial imagery where considered necessary.

The focus of this assessment is on those waterways as indicated by survey points on Figure 1. Site photograph points were established where a channel was observed in close proximity to the lines indicated by the waterways mapping layer. The text in the following (results) section refers to specific sections of creek line associated with the numbered survey points.

Results

A response against each attribute is provided in the following sections.

Defined Bed and Banks

‘The bed and banks need to be continuous upstream and downstream of the site rather than isolated and broken sections of a depression.’

1. The Project ML is bisected by the Bruce Highway (labelled in Figure 1). The waterways upstream (south) of a dammed area to the south of the highway have been heavily modified. A number of berms have been constructed across the original waterways in order to create flooded pasture areas for cattle grazing which has effectively removed the channel. When wet the bermed areas have become densely vegetated with an introduced weed – Olive Hymenachne (*Hymenachne amplexicaulis*) (listed as a category 3 weed under the State’s *Biosecurity Act 2014*). The bed and banks have been removed and are no longer continuous in this system as indicated in aerial imagery and site inspections. Refer Attachment 1 for site photos associated with several survey points associated with this system – WB8, WB9, WB11, WB12 and WB13.

In addition, a minor waterway feeding into Deep Creek to the east of the waterways described above is an eroded gully with no defined bed and banks. Refer Attachment 1 for site photos associated with a survey point located along this feature – WB10.

2. Two waterways to the north of the highway are also considered for assessment. One is a waterway mapped as ‘moderate risk’ located in the west of the ML as a branch of the main waterway running through the area. Refer Attachment 2 for site photos associated with four survey points along this drainage line – WB1, WB3, WB6 and WB7. A second waterway mapped as ‘low risk’ occurs in the east of the ML as a minor tributary of Deep Creek. Refer Attachment 2 for site photos associated with a number

of survey points along this drainage line – WB2 and WB4. Neither waterway is considered to have the features described above to be considered as fish habitat.

An Extended, if Non-permanent flow

Flow must continue beyond the duration of a rain event and have some reliability commensurate with rainfall. Distinguish between channels just funnelling immediate localised rainfall and waterways that have flow arising from an upstream catchment.'

The mapped drainage features sit on the Deep Creek floodplain and outside the effective flow area. The catchment area of the subject waterways is small and topography relatively flat. Deep Creek itself is a steeply incised channel and highly ephemeral. Figure 2 below shows the channel of Deep Creek is approximately 10 m below the adjacent bank height where the Bruce Highway crosses the creek (based on recent LIDAR survey).

Figures 3 and 4 provide a comparative elevational cross-section of the drainage features crossing the subject property. The cross-sections are depicted from above in Figure 1 for visual reference to the landscape. The cross-section to the north of the highway (Figure 3) crosses (approximately) through two of the photo points depicted in Attachment 2. The cross section at WB7 demonstrates the depth of the feature is 2.5 m below the surrounding landscape with channel slopes extending 100's of metres from the deepest point. The cross section at WB2 crosses the feature twice where an 'S' bend occurs. The depth of the feature is less than 2 m below the surrounding landscape with gentle channel slopes and an overall width of approximately 70 m.

The cross-section to the south of the highway (Figure 4) shows the approximate position of the mapped 'risk' features demonstrating there is no channel at all in these areas. The cross section at WB10c (refer Attachment 1) demonstrates the depth of the feature is 3 m below the surrounding landscape with gentle channel slopes extending across an overall width of over 100 m. There is no evidence of a bank on this feature.

The subject features sit substantially above the Deep Creek channel area and only occasionally receive rainfall episodes allowing flows sufficient for fish passage. These features are only inundated during heavy rainfall events and the entire area is better defined as a flood inundation area. None of these creeks can be expected to flow for an extended period of time. The catchment of the waterways in question is small and barely extends beyond the Project ML. The upper catchment drains rocky hills that do not hold water and do not provide features suitable as fish habitat.

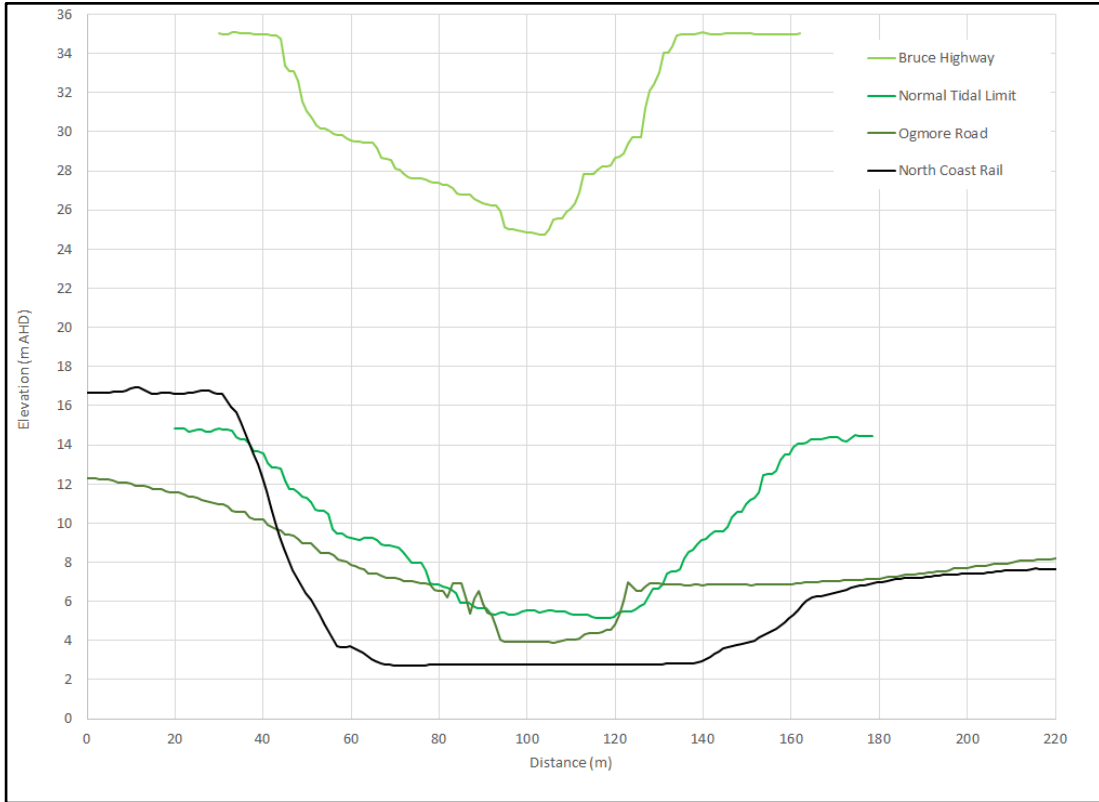


Figure 2 Comparative cross-section of watercourse crossings in area from LIDAR (Deep Creek shown at top)

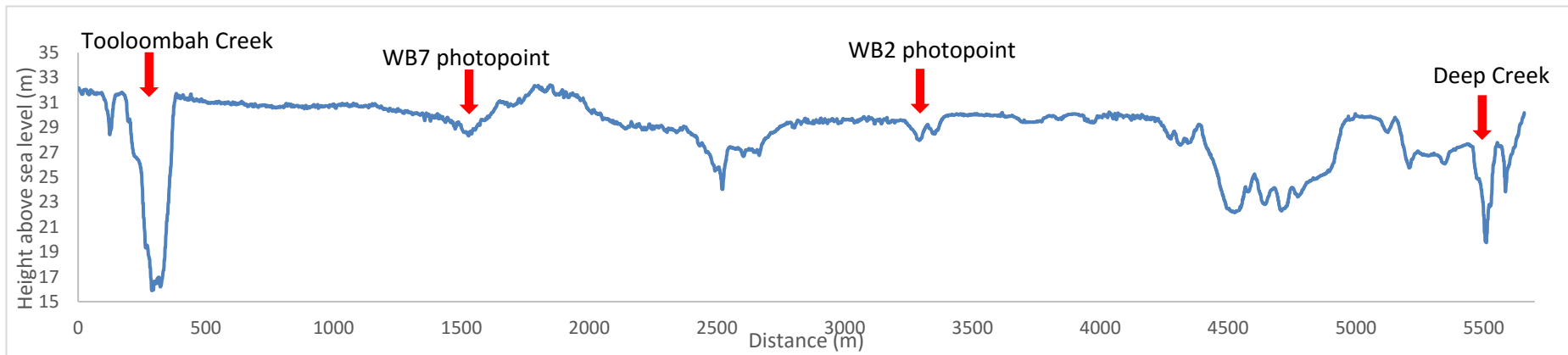


Figure 3 Elevational cross-section of waterway barrier risk features to north of the Bruce Highway

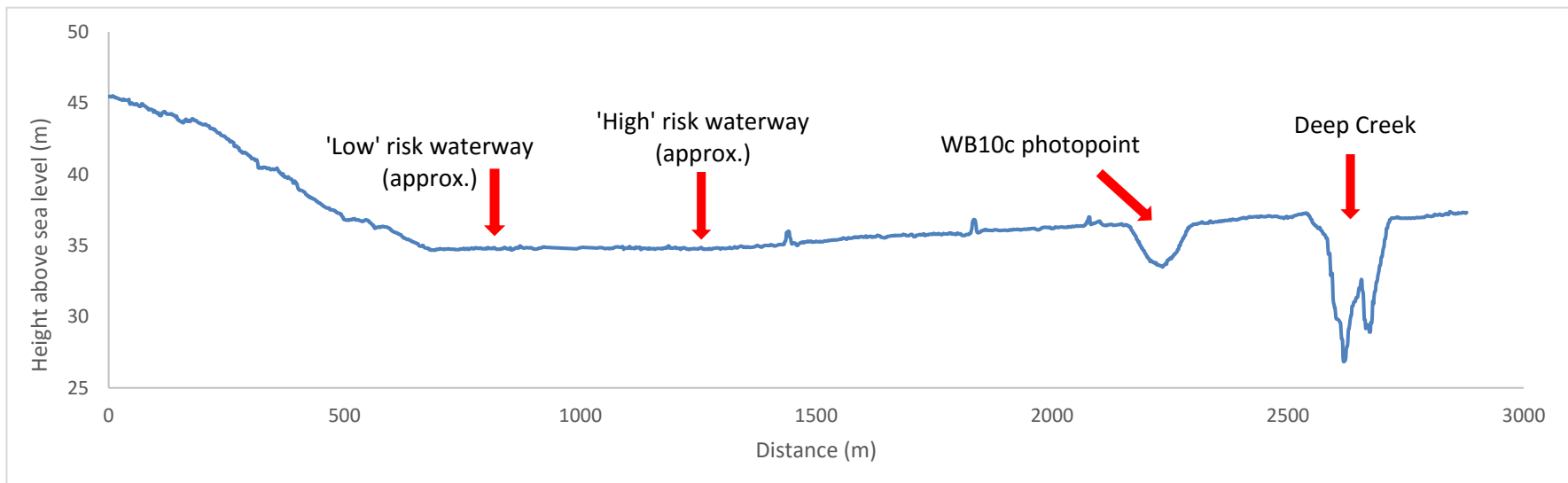


Figure 4 Elevational cross-section of waterway barrier risk features to south of the Bruce Highway

Flow adequacy

‘The flow needs to be sufficient to sustain basic ecological processes and habitats and to maintain biodiversity within or across the feature. Adequacy depends on the ecological function of the channel e.g. waterways that connect to fish habitat like a wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish.’

The area dries out between flood events and is normally used as a grazing paddock for cattle dominated by a mix of native grass species and the introduced Buffel Grass (*Cenchrus ciliaris*). The only waterway features in the area of the mapping that would provide refuge habitat qualities suitable for fish are artificially dammed areas on the creek lines as waterholes along the creek lines dry out.

Fish habitat at, or upstream of the site

‘Most in-stream features would provide habitat for fish under adequate flow conditions or, in the case of pools, during dry periods, so it is important to have some knowledge of the fish species for the site and their habitat usage, particularly in headwater streams. Periodic connectivity to upstream, off-stream fish habitat would also count.’

All of the mapped waterways in the Project area are short, with catchments that barely occur beyond the boundary of the Project area. There is no ‘headwater’ fish habitat within or upstream of the Project. The mapped creek system to the south of the highway drains low rocky hills which do not hold water or waterholes except for any length of time and therefore do not support fish habitat. The adjacent large creeks (Tooloombah Creek and Deep Creek) have extensive catchments that extend well upstream of the waterways in question in this assessment.

Conclusion

Field assessments have identified the Spatial Data Layer mapping for this location is incorrect. The drainage features highlighted are situated within a highly disturbed paddock which retains no or very little canopy vegetation. The shallow depression associated with the main waterway system assessed (south of the Bruce Highway) displays very limited upstream connectivity due to substantial modification. The features highlighted display little to no consistency with a defined channel capable of providing for fish movement.

In summary, the proponent believes the following features are mapped as incorrect and request an assessment from the DAF on the validity of the waterway barrier mapping:

- All mapped waterways located upstream of the dammed area located to the south of the Bruce Highway (to the north of survey point WB8d);
- The western tributary of the central channel bisecting the ML which is currently mapped as ‘moderate risk’; and
- The minor tributary off Deep Creek in the east of the ML which currently mapped as ‘low risk.’

Attachment A – Styx Coal Project waterways on south side of Bruce Highway

The observations in this attachment pertain to all mapped waterways located across the site to the south of the Bruce Highway (refer Figure A1). It is proposed here that these waterways (including those sections located upstream of the project) do not provide habitat for fish.

The following images depict the landscape features directly north and south of the bermed area which includes two mapped drainage lines including a 'high risk' (red) area and 'low risk' (green) polyline (indicated on Figure A1 as survey points labelled WB8a-d). Note, aerial imagery and site inspection shows there is now no channel in the red area. An indistinct channel occurs in the area of the green line which becomes more defined closer to the downstream dammed area north of survey point WB8d. There is approximately 240 m between the points WB8a and WB8d.

Photos taken 30 August 2018. Photos taken at WB8A point (top of berm).



Photo looking south from WB8a across bermed area



Photo looking west from WB8a across low slope of berm



Photo looking north from WB8a showing some erosion but no channel

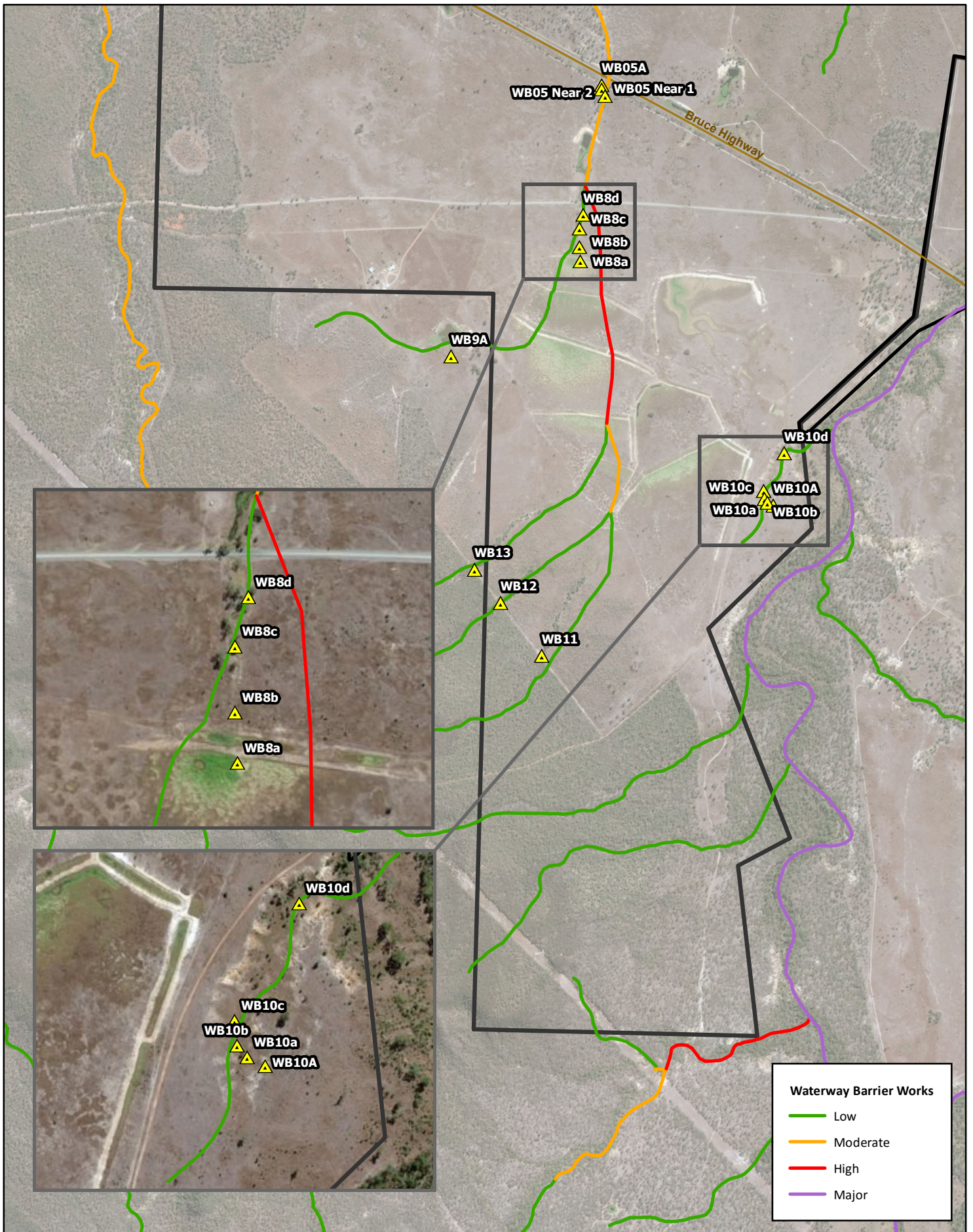


Figure A1
Waterway barrier assessment points (south of Bruce Highway) for Styx Project



Legend

- Photo assessment points
- Project ML
- Main road

0 0.25 0.5 km

Scale @ A4 1:25,000
Date: 22/11/18
Drawn: J Parnwell

DATA SOURCE
Waratah Coal, 2018
QLD Open Source Data, 2018



Photos taken at WB8b point (north of berm) – no channel indicated in either view



Photo looking south from WB8b towards bermed area and WB8a



Photo looking north from WB8b

Photos taken at WB8c point – depression observed but no discernible channel indicated in either view



Photo looking south from WB8c towards WB8b



Photo looking north from WB8c towards downstream dammed area and WB8d



Photo looking south from WB8c towards WB8b



Photo looking north from WB8c towards downstream dammed area and WB8d

The following photos depict a point located upstream and south-west of the bermed areas. The point is located near a farm dam adjacent to a mapped 'low risk' waterway (indicated on Figure A1 as survey point WB9). Aerial imagery indicates a low overflow area emanating from the dam at this point. However, there is no 'channel' indicated in the site photos or on aerial imagery.

Photos taken 30 August 2018.



WB9 - looking north from survey point towards dam



WB9 – looking east from survey point along mapped drainage line



WB9 - looking south from survey point

The following photos depict points located along 'low risk' waterways (indicated on Figure A1 as survey points WB11, WB12 and WB13) located upstream of the bermed areas and survey points WB8a-d. These waterways drain a low rocky hill/plateau and are highly ephemeral. The photos indicate very minor channelisation (at best described as a drainage area) and do not represent potential or temporary fish habitat. Photos taken 27 September 2018.



WB11 - looking upstream (south-west) along channel from survey point



WB11 – looking downstream (north-east) along channel from survey point



WB12 - looking upstream (south-west) along channel from survey point



WB12 – looking downstream (north-east) along channel from survey point



WB13 - looking upstream (south-west) along channel from survey point



WB13 – looking downstream (north-east) along channel from survey point

The following depicts a minor channel/gully (described as ‘low risk’ under the mapping) draining a very small catchment which is separate from the catchment described by the previous survey point photos and feeds into Deep Creek (indicated on Figure A1 as survey points labelled WB10a-d). This area comprises a relatively steep eroded gully which does not have any defined bed or banks or provide any potential pooled areas before draining to Deep Creek. There is approximately 260 m between the points depicted - WB10a and WB10d. Photos taken 31 August 2018.



WB10b - looking upstream (south) along gully from survey point



WB10b – looking downstream (north) along gully from survey point



WB10c - looking upstream (south) along gully from survey point



WB10c – looking downstream (north) along gully from survey point



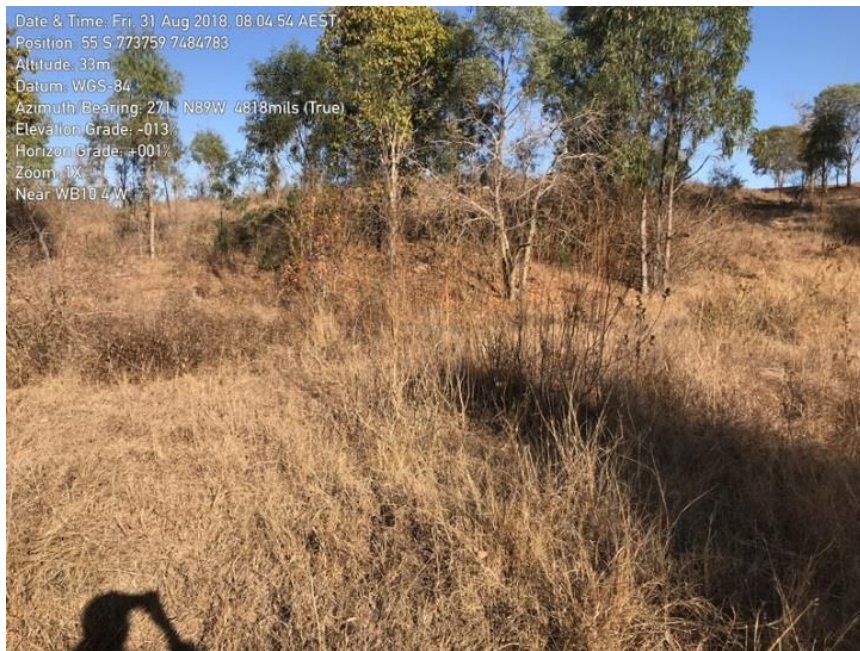
WB10c - looking upstream east across gully from survey point



WB10d – looking downstream (east) along gully from survey point



WB10d - looking upstream (south) along gully from survey point



WB10d – looking upslope (west) from gully survey point showing lack of bank

Attachment B – Styx Coal Project waterways on north side of Bruce Highway

The observations in this attachment pertain to two mapped waterways located to the north of the Bruce Highway (refer Figure A2). It is proposed here that these waterways do not provide habitat for fish.

The following images depict the drainage features of the mapped waterway located in the west of the Mine Lease as indicated on Figure A2 as the survey points labelled WB1, WB3, WB6 and WB7. There is approximately 1 km between survey point WB6 and WB1. The waterway is mapped as a 'moderate risk' (orange) polyline. Site inspection showed the channel is a shallow depression dominated by Buffel Grass and Rubber Vine with some areas of Brigalow regrowth. There is no defined bank at any of these points on the waterway. Photos taken from further south along the same drainage line (from survey point WB7 and further south-west) indicate the channel depression as very slight and almost disappearing at WB1.

Photos taken at WB6 survey point (photos taken 26 September 2018).



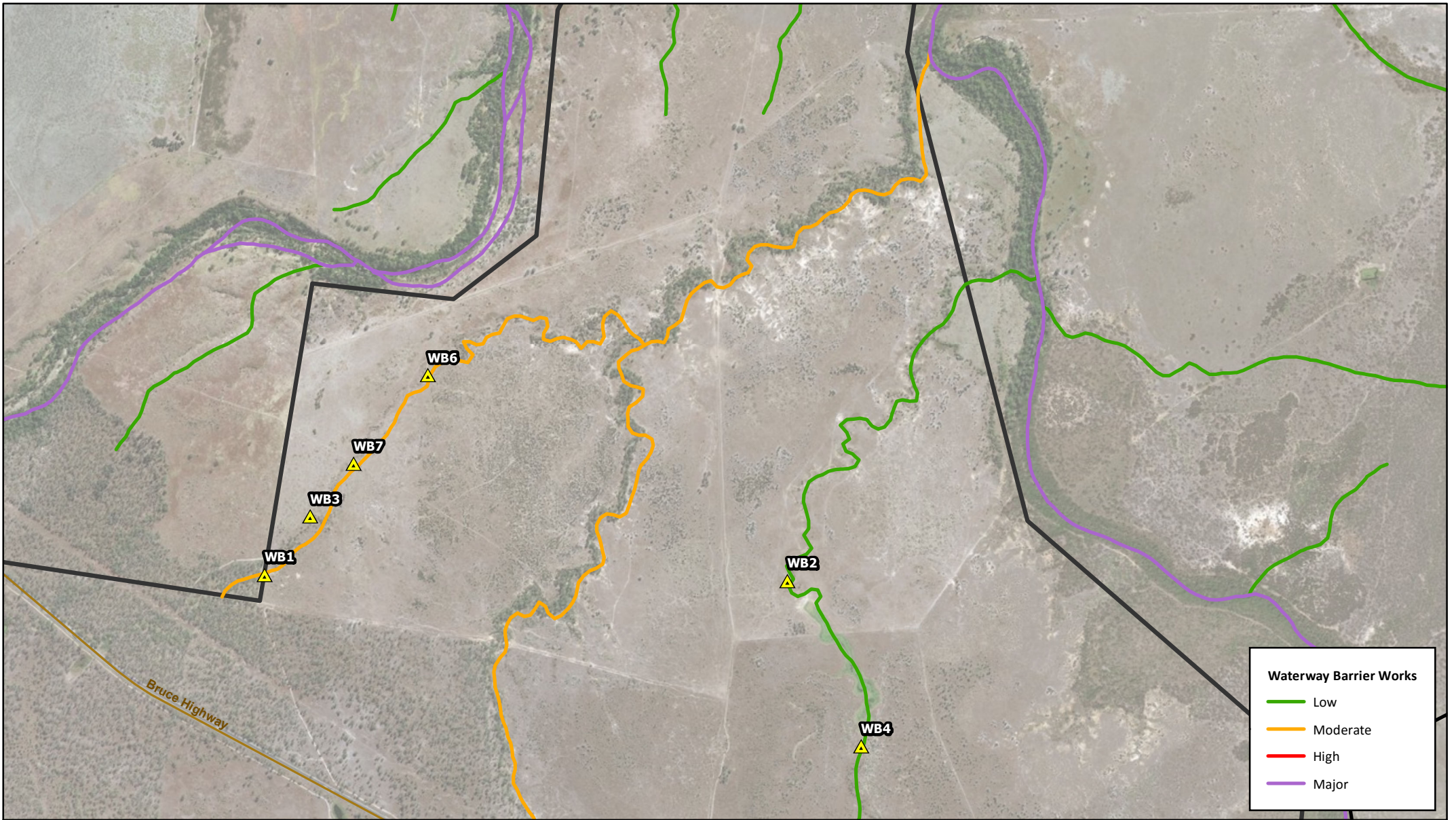
Photo looking north (upstream) from WB6 showing channel depression with no defined banks



Photo looking east from WB6 from channel



Photo looking south (downstream) from WB6 showing channel depression with no defined banks



Waterway Barrier Works

- Low
- Moderate
- High
- Major

Figure B1
 Waterway barrier assessment points
 (north of Bruce Highway) for Styx Project



0 0.25 0.5 km

Legend

- ▲ Photo assessment points
- Project ML
- Main road

Scale @ A4 1:20,000
 Date: 22/11/18
 Drawn: J Parnwell

DATA SOURCE
 Waratah Coal, 2018
 QLD Open Source Data, 2018



Photos taken at WB7 survey point – slight channel present (photos taken 26 September 2018)



Photo looking east from WB7



Photo looking north from WB7



Photo looking west from WB7

Photos taken at WB3 – no channel indicated in any view, reduced to landscape depression (photos taken 31 October 2018)



Photo looking north-east along channel/depression from WB3



Photo looking south-west along channel/depression from WB3

Photos taken at WB1 – no channel indicated in any view, reduced to landscape depression (photos taken 31 October 2018)



Photo looking east along channel/depression from WB1



Photo looking west along channel/depression from WB1



Photo looking north from WB1 with no bank visible

The following photos depict two points located upstream and downstream of a dammed depression mapped as a 'low risk' waterway (indicated on Figure A2 as survey points WB2 and WB4). Aerial imagery indicates a low overflow area emanating downstream from the dam. Downstream of the dammed area there is only a shallow 'channel' indicated in the site photos with no formed banks and better described as a depression. Upstream of the dammed area there is no channel and the 'waterway' is limited to a wide landscape depression. Photos taken 31 October 2018.

Photos taken at WB2 – very minor channel reduced to landscape depression. No banks visible in photos (photos taken 31 October 2018).



Photo looking north-east upstream along channel/depression from WB2



Photo looking south from WB2 towards dam wall



Photo looking west toward channel edge from WB2



Photo looking east toward channel edge from WB2

Photos taken at WB4 – no formed channel and reduced to wide landscape depression (photos taken 31 October 2018).



Photo looking north upstream along depression from WB4



Photo looking south downstream along depression from WB4



Photo looking east from WB4