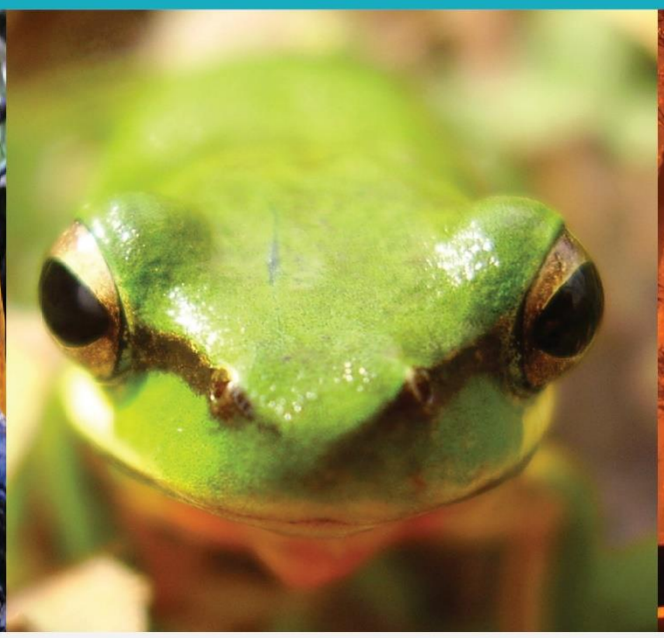
TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY


WATERCOURSE ASSESSMENT REPORT

Planning proposal

Lots 1 & 2 DP 734561, and Lot 6 DP 734561

Barkers Lodge Road

Oakdale

12 March 2024

(REF: 18CR34.2)

WATERCOURSE ASSESSMENT REPORT

Planning Proposal

Lots 1 & 2 DP 734561 and Lot 6 DP 734561 Barkers Lodge Road, Oakdale

Report authors:	Michael Sheather-Reid B. Nat. Res. (Hons.) – Managing Director Caitlin Williams B. Env. Sc. Mgmt.
Plans prepared:	Sandy Cardow
Approved by:	Michael Sheather-Reid (Accredited Assessor no. BAAS17085)
Date:	12 March 2024
Version:	FINAL
File:	18CR34.2

Request an online quote 24/7

Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person, including the client, then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be interpreted without reference to the entire report.

The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

Travers bushfire & ecology has been engaged to undertake a Watercourse Assessment for the proposed residential Planning proposal within Lots 1 & 2 DP 734561 and Lot 6 DP 734561 Barkers Lodge Road, Oakdale. This lot will hereafter be referred to as the 'study area'.

This watercourse assessment report has been prepared by *Travers bushfire & ecology* to verify the presence of existing watercourses within the study area or within close proximity to the boundary and associated buffers in the form of a vegetated riparian zone (VRZ). The VRZ identified within this report is in accordance with the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018).

It has been identified that a watercourse is present within the site. The watercourse is a first order stream with a defined channel that goes under the adjoining road on the northern boundary. The mapped watercourse to the south that runs between two dams, did not present as a watercourse but did show signs of potential overflow from the dam to the west to the dam in the east during times of heavy rain/flooding, following the natural contours of the land.

Under the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018), waterfront land requires a buffer from top of bank. As evident in Figure 2-1, the watercourses within the lot are mapped as 1st order streams.

Travers bushfire & ecology concludes that the proposed development will impact on the watercourses onsite at Oakdale however mitigation measures can be followed to ensure future works do not decrease the riparian values.

The assessment concludes that the proposed development works can be implemented in accordance with the *NSW Natural Resources Access Regulator - Guidelines for controlled activities on waterfront land - Riparian corridors (2018).* Recommendations have been made regarding future works.

GLOSSARY OF TERMS

BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act (2016)*
BC Reg	*Biodiversity Conservation Regulation (2017)*
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BPA	bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
CM Act	*Coastal Management Act 2016*
DAWE	Department of Agriculture, Water and the Environment.
DCP	development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEH from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy (superseded by DAWE)
DPIE	NSW Department of Planning, Industry and Environment
EEC	endangered ecological community
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act (1979)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act (1999)*
FM Act	*Fisheries Management Act*
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
LLS Act	*Local Land Services Act (2013)*
NES	national environmental significance
NPW Act	*National Parks and Wildlife Act (1974)*
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEH	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	plant community type
PFC	projected foliage cover
RFS	NSW Rural Fire Service
ROTAP	rare or threatened Australian plants
SAII	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	species impact statement
SULE	safe useful life expectancy
TEC	threatened ecological community
TPZ	tree preservation zone
TSC Act	*Threatened Species Conservation Act (1995) – Superseded by the Biodiversity Conservation Act (2016)*
VMP	vegetation management plan
WM Act	*Water Management Act (2000)*

TABLE OF CONTENTS

Figures

Tables

1. INTRODUCTION

Travers bushfire & ecology (TBE) has been engaged to prepare a Watercourse Assessment for the proposed residential planning proposal within Lots 1 & 2 DP 734561 and Lot 6 DP 734561 Barkers Lodge Road, Oakdale. This lot will hereafter be referred to as the 'study area'.

This watercourse assessment verifies the existing watercourses on site and to identify any potential impacts on the watercourses within the proposed development.

Figure 1-1 – Study area

(Source: SIX Maps)

1.1 Proposed development

The proposed development is for a planning proposal within Lots 1 & 2 DP 734561 and Lot 6 DP 734561 Barkers Lodge Road, Oakdale. For the purposes of this report we have relied upon the concept subdivision plan for assessment.

The proposed rezoning includes :

R2 – Low-Density Residential (208 residential lots)
C2 – Environmental Conservation (1 lot)
C3 – Environmental Management (2 lots)

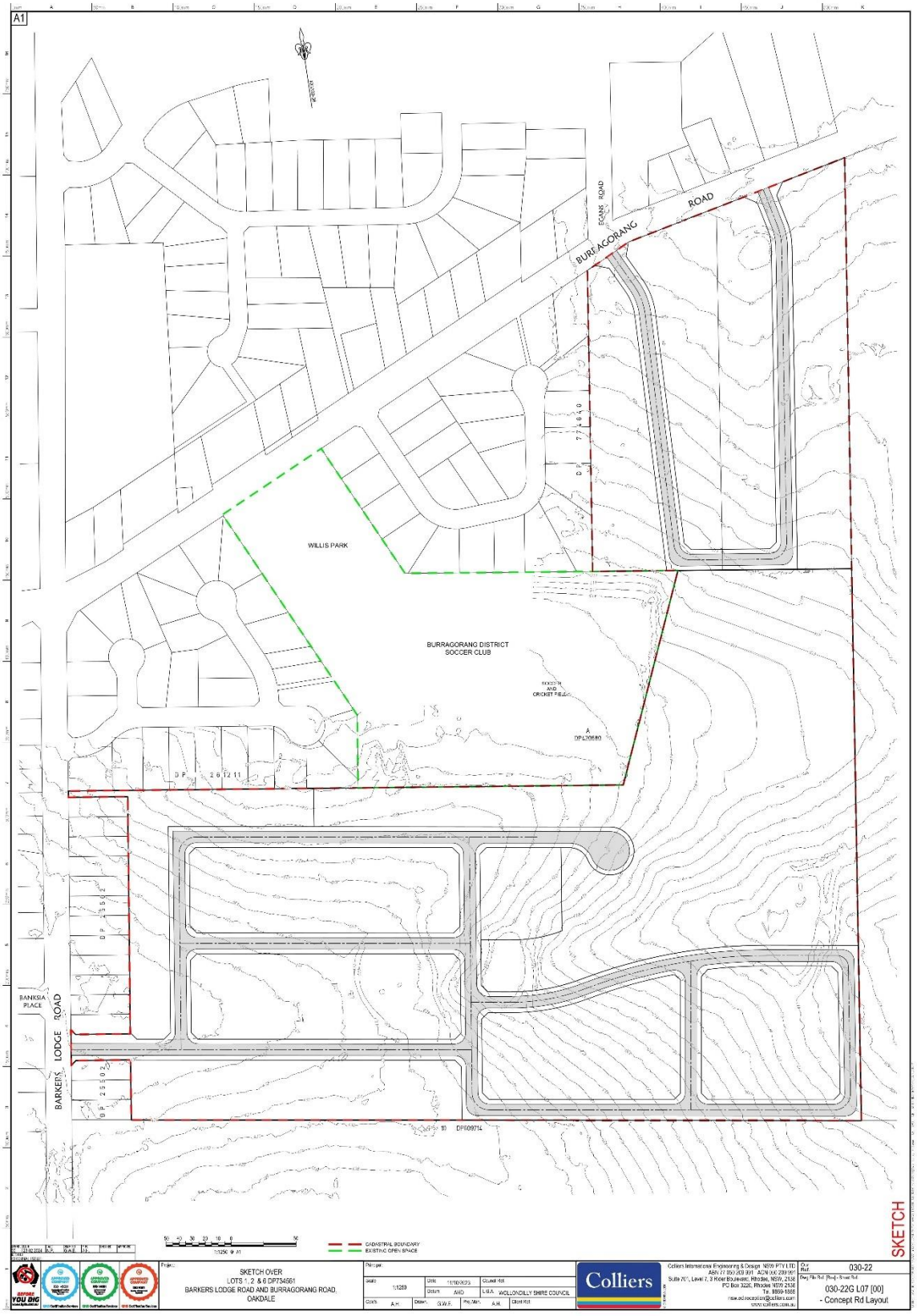


Figure 1-2 – Concept Subdivision

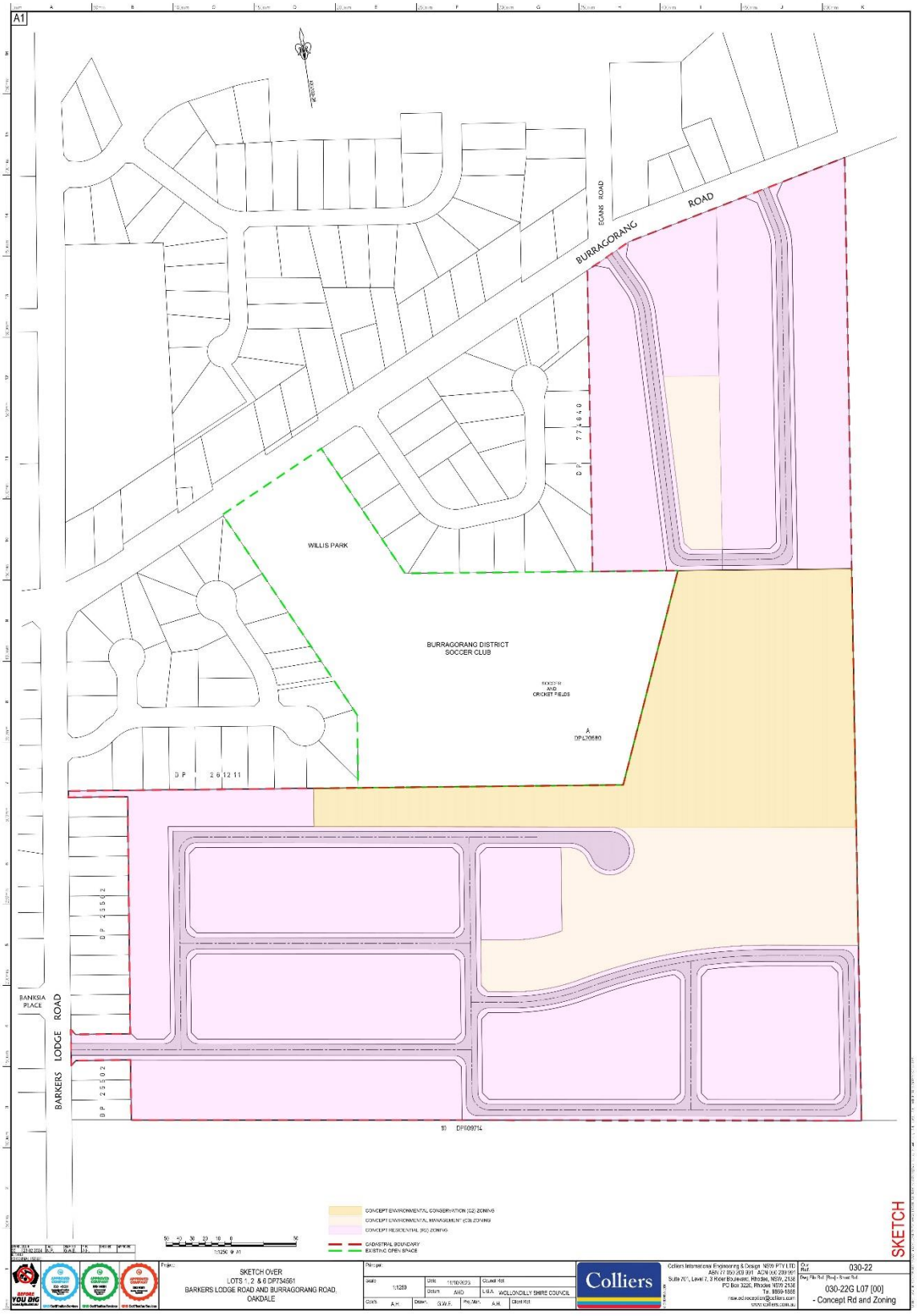


Figure 1-3 – Proposed zonings

1.2 Site description

Table 1-1 provides a summary of the planning, cadastral, topographical, and disturbance details of the subject site.

Table 1-1 – Site features

Location	Lot 1 and 2 DP 734561 and Lot 6 DP 734561 Barkers Lodge Road, Oakdale, NSW
Location description	The site is located approximately 600 m east of Oakdale Public School. The site is surrounded on the western side by existing urban development and by Burragorang Road to the north. Low intensity farming operations are located along the eastern and southern boundaries.
Area	22.7ha
Local government area	Wollondilly Shire Council
Zoning	RU1 – Primary production
Grid reference	365533 E, 6335935 N
Clearing	Study are is zoned RU1– Primary Production Small Lots, under the NSW Planning Portal Spatial Viewer. Site is currently vacant.

1.3 Riparian features

Aerial photography and mapping obtained from the NSW Land and Property Management Authority's (LPMA) *Spatial Information Exchange* (*SIX Viewer*), *Google Earth Pro* and topographic mapping indicates that there are watercourses in/within close proximity to the site.

Where required, measures need to be taken to provide appropriate riparian protection for any future development to maintain water quality and to conserve riparian vegetation and associated fauna habitat.

Hydroline mapping identifies that there are watercourses that run across the site, as seen in Figure 2-1 and Figure 3-1 and are classified as a 1st order stream.

1.4 Watercourse validation

The *Water Management Act 2000 (WM Act)* – NSW under dictionary defines 'rivers' and also states what other connecting systems should be included in any such definition. A river includes:

1. Any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved;
2. Any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph (1) flows; and
3. Anything declared by the regulations to be a river, whether or not it also forms part of a lake or estuary but does not include anything declared by the regulations not to be a river.

Nine Part test based on Taylor and Stokes (2005 a,b) to assess the presence or absence of fluvial features that are usually present in a bona fide stream or river.

1. Are there definable channel banks and a channel bed?

2. Are there fluvial bedforms e.g. pools, riffles, sediment point bars, etc and if so, what are they?
3. Is there any evidence for substantial erosion from water flow within the drainage feature?
4. Are there any spring lines that may indicate seasonally intermittent or perennial flow?
5. Is the catchment large enough to sustain perennial or intermittent groundwater flow?
6. Are there any indicators of prolonged wetness within the drainage feature?
7. If surface flow is present, is it continuous and how extensive across the base of the drainage feature is it? Are there any visible aquatic habitats that might sustain aquatic fauna?
8. Are there any aquatic flora present that would require periods of uninterrupted moisture?

Is an artificial drainage a watercourse?

1. Is the subject watercourse natural or artificial? If natural then it is a watercourse and should exhibit the above characteristics. If artificial move to the next question.
2. If artificial, is it in alignment with a former natural alignment based on contours? If yes, then it is a watercourse that has been artificially modified but is still a watercourse. If no, then the drainage line is not a watercourse.

Summary of inspection outcomes

Water course feature	Confirmed or absent	
	Lot 1 and 2 DP 734561	Lot 6 DP 734561
Are there definable channel banks and a channel bed?	Yes	Not observed – presents as a swale
Are there fluvial bedforms e.g. pools, riffles, sediment point bars, etc and if so, what are they?	Yes	Not observed
Is there any evidence for substantial erosion from water flow within the drainage feature?	Yes – Minor, closer to the road	Not observed
Are there any spring lines that may indicate seasonally intermittent or perennial flow?	Not observed	Not observed
Is the catchment large enough to sustain perennial or intermittent groundwater flow?	Intermittent flow with minor seepage	Unlikely
Are there any indicators of prolonged wetness within the drainage feature?	Yes – Pools present, however they are likely temporary	Not observed
If surface flow is present, is it continuous and how extensive across the base of the drainage feature is it? Are there any visible aquatic habitats that might sustain aquatic fauna?	No surface flow was present. Water was pooling - See photo 3-3.	No surface flow
Are there any aquatic flora present that would require periods of uninterrupted moisture?	The channel is cut through grass, going under the driveway and connecting to the under-road drainage.	Not observed
Is an artificial drainage a watercourse?		
Is the subject watercourse natural or artificial? If natural then it is a watercourse	Natural stream formation with concrete structure to	Not applicable

and should exhibit the above characteristics. If artificial move to the next question.	allow for the watercourse to flow under the driveway and into the neighbouring lot.	
If artificial, is it in alignment with a former natural alignment based on contours? If yes, then it is a watercourse that has been artificially modified but is still a watercourse. If no, then the drainage line is not a watercourse.	There are drainage culverts connecting the watercourse as it goes under the driveway and continues to flow to outside the study area.	Not applicable

2. MAPPED WATERCOURSES

Electronic aerial photography from *Google Earth Pro*, *Spatial Information Exchange and Hydroline* mapping interfaces were viewed to assess the watercourse prior to the site inspection. The *Hydroline* database (Figure 2-1) is viewed as the key legislative map of watercourses for assessment purposes under the *WM Act*.

Based on the desktop assessment, the watercourses looked to have run through both the lots, impacting on the concept subdivision layout. It was determined, however, that the watercourse to the south of the site is a swale as there is no defined watercourse present between the two dams or to the west of the western most dam. The watercourse in the north is defined with pool and riffles evident.

Figure 2-1 – Mapped Watercourses

(Source: Water Management (General) Regulation 2018 Hydro Line spatial data)

3. VALIDATION OF WATERCOURSES

The site inspection was undertaken on 29 May 2023 to verify the classification of the stream orders, presence onsite and any potential impacts on the watercourse.

For each potential watercourse present, the following features were assessed:

- the presence of a defined channel (either intermittent or continuous) along the alignment of the watercourse;
- the presence or absence of other stream features such as pool and riffles and fans
- the extent of riparian dependent vegetation;
- the presence of vegetation with environmental value;
- the presence of noxious weeds and degree of weed infestation;
- the presence of any ponded water; and
- the potential connectivity between any riparian vegetation and upstream or downstream riparian vegetation.

For the purpose of wetland boundary definition, the following features were used to define the extent of the wetland and its boundary:

- any observed endangered protection wetlands
- any observed tidal influences
- any observed estuarine features
- topographic constraints and presence of non-wetland vegetation types
- presence of any groundwater dependent ecosystems that also correspond with a wetland vegetation type.

The existing top of bank has also been verified by ground truthing to ensure accurate assessment of setbacks and potential riparian impacts, both direct and indirect. All boundaries have been located with a sub 1m accurate differential GPS. The extent of watercourses and top of bank has been mapped by walking the boundary, comparison against regional mapped vegetation and interpolation of contours generated from *LiDAR* data. In this case the *LiDAR* data is considered to be reliable as an indicator of the potential flow path but not fully indicative of the extent of watercourses.

3.1 Northern Watercourse

A 1st order stream is present and a 10m VRZ buffer. This watercourse runs through the northern most portion of the site existing though a culvert under the road of Lot 2 DP 734561.

3.1.1 Options to Manage

Management options include:

- Retain and protect with a 10m VRZ from top of bank;
- Ensure stable and dissipated runoff from the surrounding lands either as diffuse overland flow or appropriately sized and stabilised stormwater outlet through a level spreader to avoid concentrated flows and erosion;
- Scour protection to reduce erosion impacts for any works within the watercourse channel;
- As a first order stream it can potentially be removed provided an equivalent riparian offset is provided; and

- Converted to a stormwater treatment or urban wetland system which would require engineer advice.

Travers bushfire & ecology note that there is potential to negotiate with NRAR to remove this first order stream in exchange for VRZ provided on the southern retained Stream.

3.1.2 Watercourse photos

The following images are typical of the watercourse and swale observed.

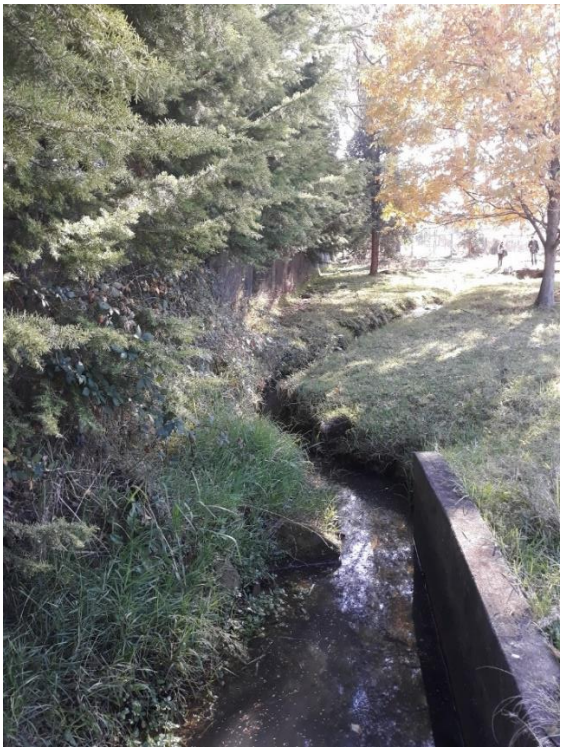


Photo 3-1 – 1st order stream – defined channel with artificial wall which flows from the neighbouring lot.

Photo 3-2 – Pool and riffle with deposits and pebble evidence

Photo 3-3 – Pooling

Photo 3-4 – Culvert allowing waterflow underground from the neighbouring lot

3.2 Southern Watercourse

A 1st order stream is present and a 10m VRZ buffer.

3.2.1 Options to Manage

Management options include:

- Retain and protect with a 10m VRZ from top of bank;
- Ensure stable and dissipated runoff from the surrounding lands either as diffuse overland flow or appropriately sized and stabilised stormwater outlet through a level spreader to avoid concentrated flows and erosion;
- Scour protection to reduce erosion impacts for any works within the watercourse channel; and
- As a first order stream it can potentially be removed provided an equivalent riparian offset is provided;
- Converted to a stormwater treatment or urban wetland system.

3.2.2 Watercourse photos

The following images are typical of the watercourse and swale observed.

Photo 3-5 – Upper dam

Photo 3-6 – Swale between the two dams, facing east towards the lower dam

Photo 3-7 – Lower dam

Photo 3-8 –Path of potential overflow from the top dam during periods of heavy rain/flooding

3.3 Riparian constraints for the site

The extent of watercourses within the site are presented in Figure 3.1 below.

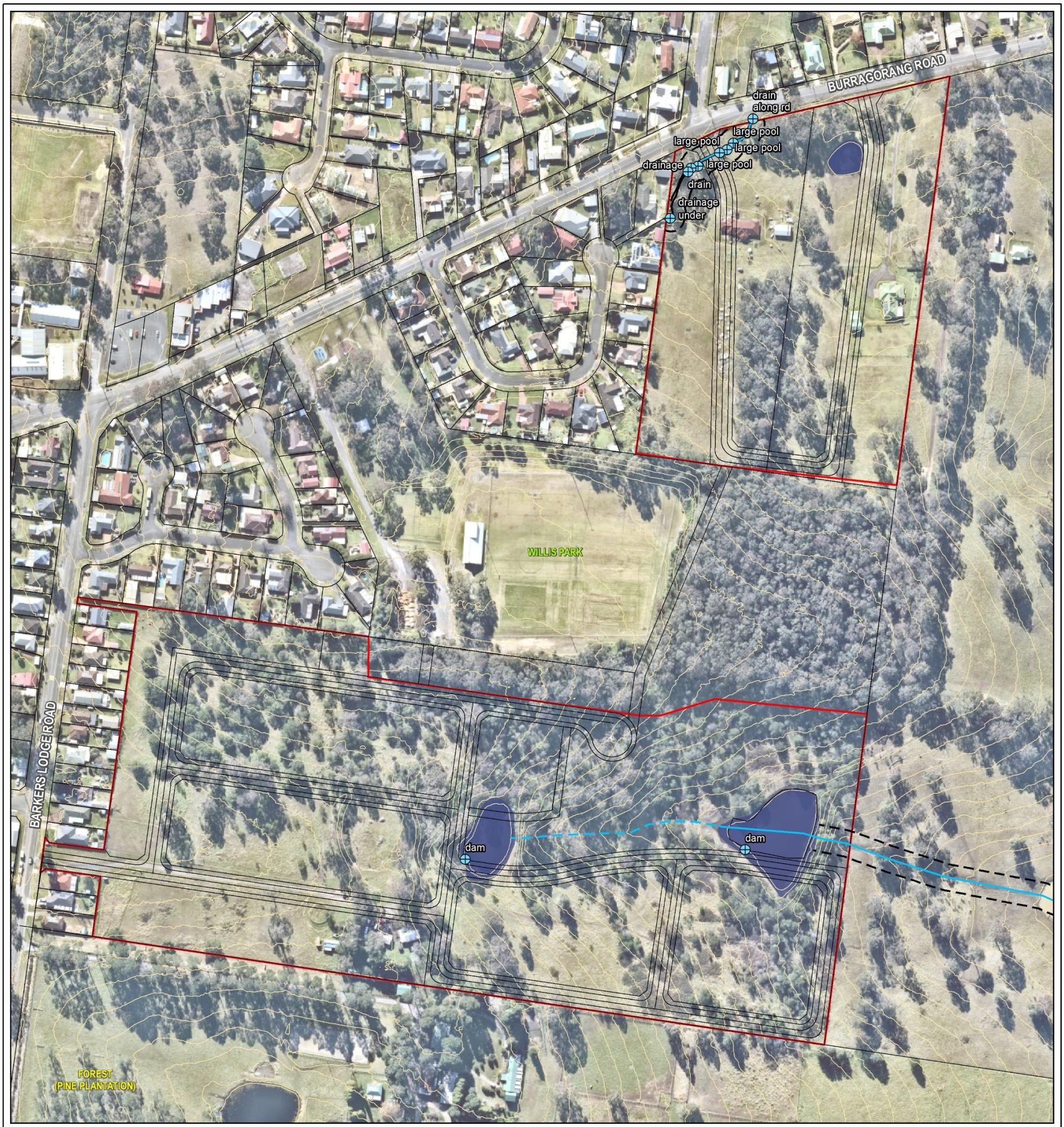


Figure 3-1 – Validated watercourses and riparian constraints based on site inspection

Figure 3-2 – Riparian Buffer Northern Watercourse

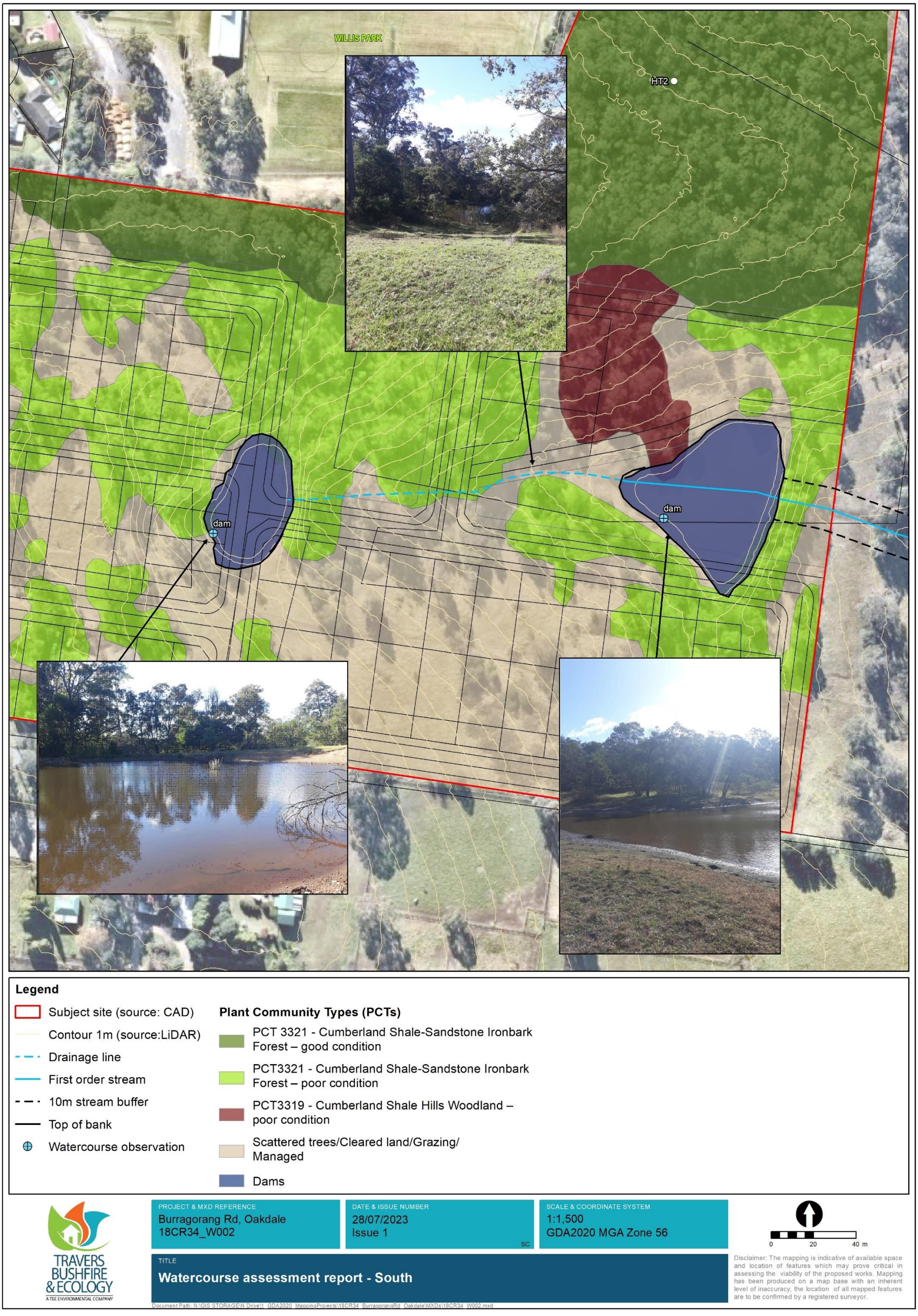


Figure 3-3 – Riparian Buffer Southern Watercourse

4. RIPARIAN CONTROLS

4.1 Objectives for riparian corridor management

The overarching objective of the controlled activities provisions of the *WM Act* is to establish and preserve the integrity of riparian corridors (*NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018)). Ideally, the environmental functions of riparian corridors should be maintained or rehabilitated by applying the following principles:

- Identify whether or not there is a watercourse present and determine its order in accordance with the Strahler System.
- If a watercourse is present, define the riparian corridor / VRZ on a map in accordance with Table 4-1.
- Seek to maintain or rehabilitate a riparian corridor / vegetated riparian zone with fully structured native vegetation in accordance with Table 4-1.
- Seek to minimise disturbance and harm to the recommended riparian corridor / VRZ.
- Minimise the number of creek crossings and provide a perimeter road separating development from the riparian corridor / VRZ.
- Locate services and infrastructure outside of the riparian corridor / VRZ. Within the riparian corridor / VRZ, provide multiple service easements and / or utilise road crossings where possible.
- Treat stormwater run-off before discharging into the riparian corridor / VRZ.

A range of works and activities on waterfront land and in riparian corridors are allowed to better meet the needs of the community, providing that they cause minimal harm, as outlined in the riparian corridor matrix below.

4.2 Riparian corridors

Controlled activities are certain types of activities that are carried out on waterfront land and defined as a controlled activity under the *WM Act.* Controlled activities include works for detention basins, cycle ways and pathways, stormwater outlets, essential services and road crossings. Refer to the Natural Resource Access Regulator (NRAR), Guidelines for controlled actives on waterfront land for controlled activities permissible within different stream orders.

The NSW Infrastructure administers the *WM Act* and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land as a consequence of carrying out the controlled activity.

Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40m of the highest bank of the river, lake or estuary. This means that a controlled activity approval must be obtained before commencing works within the VRZ. Approval applications can be located on the Water NSW website.

In 2018, new rules commenced regarding controlled activities within riparian corridors. The new rules amend the riparian corridor widths that apply to watercourses, providing more flexibility in how riparian corridors can be used and making it easier for applicants to determine the controlled activity approval requirements. Key aspects of the changes include:

- Provision of greater flexibility in the allowable uses and works permitted within riparian corridors.
- The core riparian zone and vegetated buffer have been combined into a single VRZ.
- The width of the VRZ within the riparian corridor has been pre-determined and standardised for 1st, 2nd, 3rd and 4th order and greater watercourses.
- Where suitable, applicants may provide an offset for this activity by connecting an equivalent area to the riparian corridor within the development site.
- The riparian corridors matrix enables applicants to determine what activities can be considered in riparian corridors.

As stated in the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018), a riparian corridor (RC) forms a transition zone between the land, also known as the terrestrial environment, and the river or watercourse or aquatic environment. Riparian corridors perform a range of important environmental functions such as:

- providing bed and bank stability and reducing bank and channel erosion
- protecting water quality by trapping sediment, nutrients and other contaminants
- providing diversity of habitat for terrestrial, riparian and aquatic plants (flora) and animals (fauna)
- providing connectivity between wildlife habitats
- conveying flood flows and controlling the direction of flood flows
- providing an interface or buffer between developments and waterways
- providing passive recreational uses

The protection, restoration or rehabilitation of vegetated riparian corridors is important for maintaining or improving the shape, stability (or geomorphic form) and ecological functions of a watercourse (*NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018)).

4.3 Riparian corridor widths

A VRZ width based on stream order as classified under the Strahler System of ordering watercourses and using current 1:25 000 topographic maps (see Figure 4-1 and Table 4-1). The width of the VRZ should be measured from the top of the highest bank on both sides of the watercourse (*NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018)). This has been mapped using our GPS onsite and can be seen in Figure 3-1.

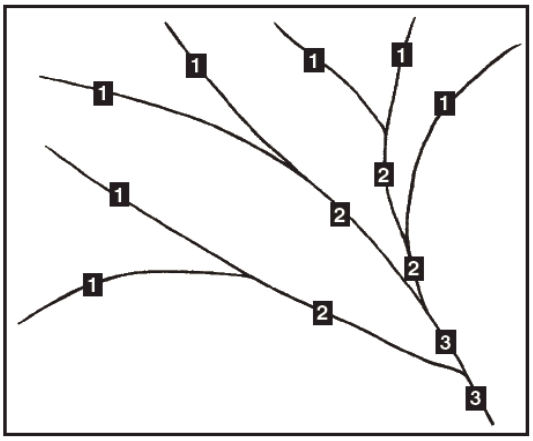


Figure 4-1 – The Strahler System

Table 4-1 – Recommended riparian corridor widths

Watercourse type	VRZ width (each side of watercourse) (metres)	Total RC width (metres)
1st order	10	20 + channel width
2nd order	20	40 + channel width
3rd order	30	60 + channel width
4th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40	80 + channel width

Stream order: The watercourse order as classified under the Strahler System based on 1:25,000, 1:50,000 or 1:100,000 topographic maps, whichever is the smallest scale available. A full list is provided at Part 2, Schedule 2 of the *Water Management (General) Regulation 2011.*

Adherence to the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018) is subject to the approval and the development consent authority. Consequently, alternative solutions are assessed based on their performance in terms of achieving riparian management objectives. Where a watercourse does not exhibit the features of a defined channel with bed and banks, Infrastructure NSW may determine that the watercourse is not waterfront land for the purposes of the *WM Act.*

The proposed riparian setbacks are consistent with the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018). Riparian corridors will provide hydraulic and ecological functions and assist in maintaining ecological connectivity upstream and downstream of the site.

To promote ecological as well as hydraulic functions, the riparian corridors can be revegetated over the life of the project which allows for progressive revegetation and regeneration works.

Preparation of a VMP for the riparian corridors is recommended to accurately define the planting densities, spacing and species to be used within each riparian corridor and to integrate with any other vegetation management works or landscaping within the site.

4.4 Permissible works and activities within riparian corridors

The following riparian corridor matrix enables applicants to identify certain works and activities that can occur on waterfront land and in riparian corridors. Applicants should note that the matrix relates to controlled activity approvals under the *WM Act* only. They are still required to

comply with other relevant government legislation, such as threatened species, flood planning levels and fisheries guidelines.

Table 4-2 – Riparian corridor matrix

Stream order	Vegetated Riparian Zone (VRZ)	RC off-setting for non RC uses	Cycleways and paths	Detention basins		Stormwater outlet structures and essential services	Stream realignment	Road crossings		
				Only within 50% outer VRZ	Online			Any	Culvert	Bridge
1st	10m	●	●	●	●	●	●	●		
2nd	20m	●	●	●	●	●		●		
3rd	30m	●	●	●		●			●	●
4th +	40m	●	●	●		●			●	●

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on ground truthing and desktop assessment, there is one watercourse within the site. Under the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018), waterfront land requires a buffer from top of bank.

As evident in Figure 3-1, two mapped watercourses have been ground truthed, resulting in the southernmost watercourse being identified as a swale (not a watercourse) as there were no defined channels, pools, riffles or fluvial deposits. The eastern most mapped watercourse has been mapped commencing downstream of the eastern Dam, as seen in figure 3-3. The dam forms part of the watercourse and is online. This buffer sits within the site however it does not impact on the proposed development footprint.

Permissible activities as identified by the *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018) can be undertaken within the outer 50% of the riparian corridor, however, offsetting is required subject to the nature of the works.

All works within the riparian protection zone and ongoing management will be in accordance *NSW Department of Industry - Guidelines for controlled activities on waterfront land - Riparian corridors* (2018) and the issued General Terms of Approval for future development applications.

A Controlled Activity Approval will be required for all works within waterfront land as defined under the *WM Act* (2000) and its Regulations.

5.2 Recommendations

The concept subdivision involves works within the mapped watercourses onsite. To mitigate any direct and/or indirect impacts caused by the proposal, we recommend:

- To retain the watercourses as mapped and include a riparian buffer of 10m from top of bank in both cases as shown on Figure 3-2 and figure 3-3. Alternatively, the northern first order watercourse can be removed or modified. Subject to approval it is permissible that alteration of the watercourse could be in the form of stormwater drainage. A riparian offset is however recommended
- Convert first order streams to urban wetlands to provide conditioning of water from the landscape.
- Retain any existing riparian vegetation especially on the easter most dam for ecological function.
- The revegetation and regeneration of native vegetation in riparian zone and establish grassed swale in drainage lines feeding the stream.
- Implementing stormwater outlet works in accordance with NSW Department of Industry - Guidelines for controlled activities on waterfront land that catch and divert potential runoff through stormwater treatment devices and utilising existing drainage networks where possible;
- Ensure all stormwater outlets dissipate the energy of water before delivery to any riparian zones.

TBE concludes that the concept subdivision will impact on the riparian zones of the watercourses mapped onsite however sustainable options can be integrated into the urban design to enhance habitat, riparian function and provide riparian and wetland habitat. We

confirm that it is permissible (subject to approval) to remove first order streams with a riparian offset e.g. the northern watercourse in order to support a pragmatic development proposal.

6. REFERENCES

NSW Department of Industry (2018), Guidelines for controlled activities on waterfront land – Riparian corridors - https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/156865/NRAR-Guidelines-for-controlled-activities-on-waterfront-land-Riparian-corridors.pdf

NSW Department of Planning and Environment (2020), State Environmental Planning Policy (Coastal Management) 2018) - https://webmap.environment.nsw.gov.au/PlanningHtml5Viewer/?viewer=SEPP_CoastalManagement

NSW Government (2020) Coastal Management - https://www.planning.nsw.gov.au/Policy-and-Legislation/Coastal-management

NSW Government (2020) MinView - https://minview.geoscience.nsw.gov.au/#/?lon=150.8120&lat=-33.48738&z=13&bm=bm1&l=

NSW Government (2020) Water Management Act, 2000 No 92 - https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092

State of NSW and Department of Planning, Industry and Environment (2021), eSPADE NSW Soil and Land Information - https://www.environment.nsw.gov.au/eSpade2Webapp