RMCG

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Waterway Management Plan for Carisbrook

Final

Central Goldfields Shire

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Foot bridge at
Bland Reserve

Acknowledgments

TRADITIONAL OWNERS

The authors acknowledge the Traditional Owners, the Dja Dja Wurrung, of the land and waters of which the Tullaroop Creek flows. We respectfully recognise their Elders past, present and emerging and their ongoing connection to this site.

CARISBROOK COMMUNITY

Development of this waterway management plan would not be possible without the contributions and dedication of the Carisbrook community, and the support of Central Goldfields Shire Council and North Central Catchment Management Authority. A particular thank you goes to Alex Stonemen from the Friends of the Creek and Carisbrook Historical Society for the detailed accounts of the historic, cultural and natural history of Tullaroop Creek through Carisbrook.

This plan was developed by RM Consulting Group with the support of Sentient Design, Water Technology and the Dja Dja Wurrung Clans Aboriginal Corporation.

1 Tullaroop Creek

1.1 INTRODUCTION

The township of Carisbrook is located at the confluence of Tullaroop Creek (also referred to as Deep Creek) and McCallum Creek within the broader Loddon River catchment in central Victoria, approximately 170 km from Melbourne. The combined catchment area of the two creeks at Carisbrook is approximately 1,240 km^2. The smaller McCallum Creek catchment encompasses the towns of Waubra, Talbot and Majorca, whilst Tullaroop Creek catchment includes Clunes, Creswick, Learmonth and Springmount to the south – refer Figure 1-2.

The section of the creek involved has a history of being used by the town as a recreational area. It also has a history of significant flooding such as the severe flooding event in January 2011, which was estimated as a 1 in 135 AEP[1] flood event[2].

Figure 1-1: Looking upstream along the creek at the Railway Bridge

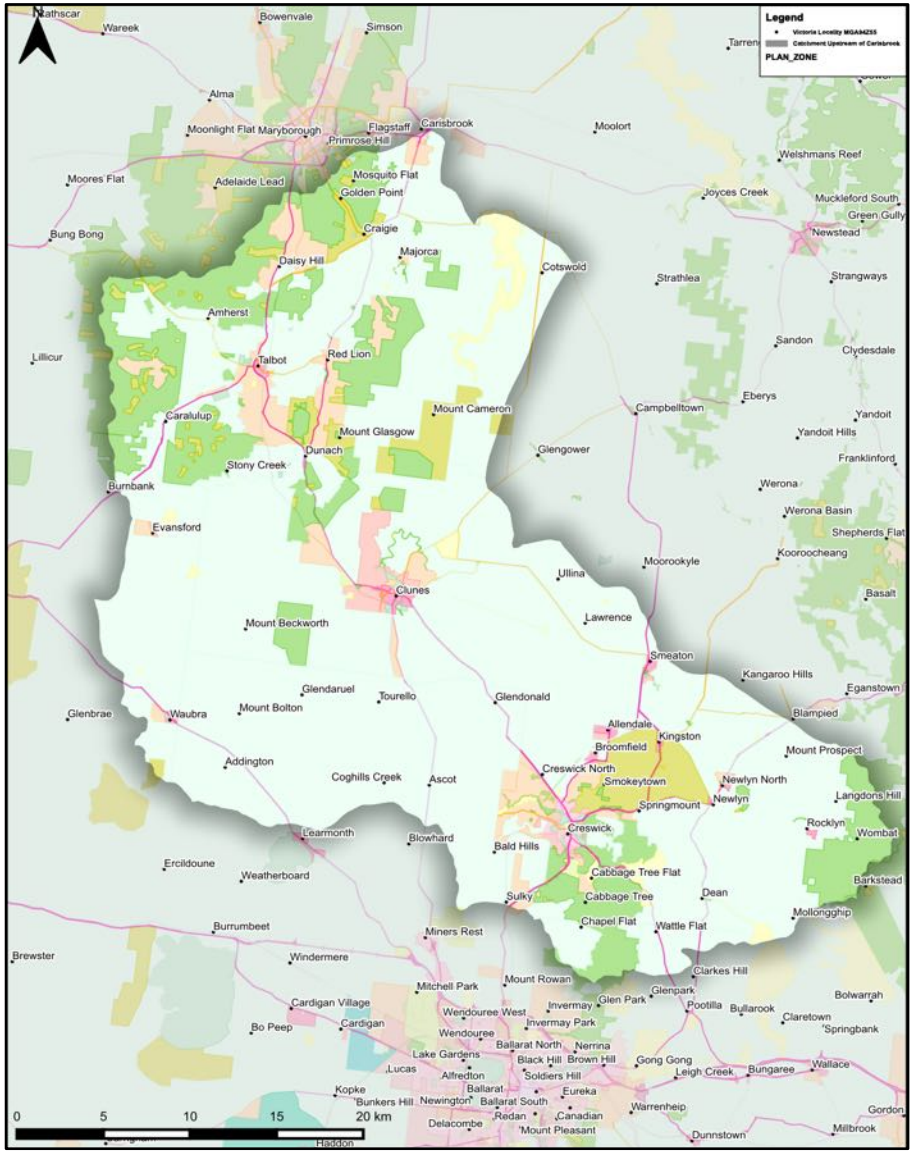

Figure 1-2: Map of the Tullaroop catchment upstream of Carisbrook

[1] AEP – Annual Exceedance Probability

[2] Water Technology, 2013

1.2 PURPOSE

The objectives of the plan are to:

- Facilitate an extensive engagement process with the Central Goldfields Shire, Carisbrook community, and key stakeholders to identify priorities for the future management of the Tullaroop Creek and two public reserve areas being Bucknall and Bland Reserves
- Develop a strategic waterway management plan for Tullaroop Creek through Carisbrook that defines the long-term vision, strategic objectives and actions for the creek based on the outcomes of the community and stakeholder consultation.

More specifically, the plan addresses the following issues:

- Long term protection and restoration of Tullaroop Creek through Carisbrook and its immediate surrounds including Bucknall and Bland Reserves
- Open space design and management, encouraging recreational use
- Protection and improvement of the landscape character and condition of the open space within the creek reserves
- Opportunities for education and community involvement
- Planning and development issues and the impact these have on the creek corridor.

The plan also recommends:

- Management practices to protect the values of the project area and assist in mitigating the impacts of flood events (including the various Authority responsibilities and permit requirements to enable the waterway management plan to be implemented).
- A set of key principles for managing planning and development issues impacting the creek environment.

1.3 PROJECT SITE

The core project site extends from a point approximately 50m south of the Pyrenees Highway (Simpson Street), and the railway bridge approximately 850m north-west of the Highway (*shaded green*). The area includes two public reserve areas being Bucknall and Bland Reserve. The broader project area for mitigating flood impacts extends upstream to Camp Street and downstream of the railway line (*shaded yellow*) (Figure 1-3 below).

Figure 1-3: Overview of project site

ENVIRONMENTAL VALUES

The Tullaroop Creek was assessed under the Third Index of Stream Condition in 2010, which found the subject reach through Carisbrook (Tullaroop Reach 18) as being in poor condition[3]. Despite lower ratings for water quality, the reach scored highly for aquatic life. Carisbrook sits downstream of the Tullaroop Reservoir, which provides regulated passing flows along this section of the creek, which scored a moderate rating for hydrology.

Vegetation Condition

An assessment of the southern section of the creek's vegetation, fauna and habitat values was also undertaken in 2019 by Okologie Consulting for the Central Goldfields Shire. In their report[4], they highlight DELWP mapping of modelled pre-1750 Ecological Vegetation Classes (EVCs) for the project area would have been predominantly comprised of Creekline Grassy Woodland (EVC 68), with Plains Grassy Woodland (EVC 55) in the immediate surrounds. Current (2005) EVC mapping within the project area shows a modified cover of these woodland communities[5]. A subsequent assessment was undertaken by Water Technology in 2021[6] as part of this management plan. This assessment found the creek line is dominated by an overstorey of mixed aged River Red Gum *(Eucalyptus camaldulensis*). Thinning of River Red Gums post flood has left a relatively open stand of trunks while the canopy remains mostly continuous along both banks throughout the project reach. Wirilda (*Acacia provincialis*) is the dominant shrub throughout the project reach. Other dominant native species observed within the reach include: Blackwood (*Acacia melanoxylon*) – a long lived large sub-canopy tree; Bottlebrush (*Callistemon sp.*) – a medium sized shrub; Common Reed (*Phragmites australis*) – a semi-aquatic perennial reed which can grow in water up to about 1.5 m deep; and Cumbungi (Typha sp.) – a robust emergent aquatic plant will only persist where there is near permanent water present.

Fauna species

Whilst the Okologie report listed no threatened fauna species being recorded during their field assessment, the Victorian Biodiversity Atlas[7] contains records of 19 listed threatened fauna species in the local area. The Protected Matters Search Tool[8] also identified 20 EPBC Act listed fauna species or species habitats (terrestrial) as likely to occur within the local area. However, they concluded there was a low likelihood of occurrence for any listed threatened fauna species due to the modified condition of the creek's habitat.

Despite this assessment, there are many anecdotal reports and sightings captured by the Friends of the Tullaroop who have recorded more common native species using the creek, such as water rats (or Rakali) (*Hydromys chrysogaster*), Platypus (*Ornithorhynchus anatinus*), Ring-tailed Possums (Pseudocheirus peregrinus) and Common Brush Tail Possums (Trichosurus vulpecula), as well as, a diverse range of water birds, birds of prey and parrots.

Figure 1-4: Platypus (*Ornithorhynchus anatinus*)

3 DEPI 2014
4 Okologie Consulting, 2019
5 DELWP 2019a
6 Water Technology, 2021
7 DELWP, 2019a
8 DoEE, 2019

ABORIGINAL CONNECTION TO THE CREEK

The Tullaroop Creek is situated in Dja Dja Wurrung Country. Traditional Aboriginal culture revolved around relationships to the land and water – relationships that hold deep physical, social, environmental, spiritual and cultural significance. Rivers were, and remain, the veins of Dja Dja Wurrung Country, and provide food and medicine, and places to camp, hunt, fish, swim and hold ceremonies. They are places that are central to their creation stories, and many of their cultural heritage sites are associated with waterways – burial sites, birthing sites and middens.[9]

> *Dja Dja Wurrung People have lived on our traditional lands and cared for our Country over many thousands of years. For us, Country is more than just a landscape, it is more than what is visible to the eye, it is a living entity that holds the stories of creation and histories"*[10].

A Dja Dja Wurrung Tullaroop Creek site assessment was undertaken by a Djandak Project Manager, Dja Dja Wurrung Elder and a Dja Dja Wurrung Water Policy Officer on 25 November 2020 to observe the health and cultural values of the waterway and surrounding landscape, and to provide a Djaara voice to the area. Key elements of their report[11] have been captured in this plan.

An ACHRIS (Aboriginal Cultural Heritage Register and Information System) desktop assessment did not reveal any registered cultural heritage sites within the assessment area, however, this does not conclude the absence of cultural heritage along Tullaroop Creek, but more often than not indicates the lack of surveys in the area. An ACHRIS assessment further along Tullaroop Creek, identified cultural heritage registered in the form of a stone arrangement, scarred trees, grinding groves and artefact scatters. Additionally, Dja Dja Wurrung have secured freehold title to a nearby property in Carisbrook under negotiations for their Recognition and Settlement Agreement held with the State of Victoria. These sites collectively form a known place of high cultural significance and a special place for Dja Dja Wurrung men. This would indicate that Dja Dja Wurrung people used this area on an ongoing basis and the local waterways would have provided important resources.

Other sites of interest noted during the assessment included:

- Very old established Gum trees along with the Box-Ironbark trees lining the creek are important for the broader preservation of Dja Dja Wurrung cultural landscapes
- An area of cultural significance at the junction and floodplain situated under the Simson Street bridge. This was identified as a place of high impact, a possible meeting place for Dja Dja Wurrung ancestors where the water would have flooded through and ancestors would have put out fish nets made from locally scoured weaving plants. The significance of this area is heightened by the identification of a specific mature gum tree that provides a culturally significant location to hold Dja Dja Wurrung ceremonies. Mature cultural plants typically used in smoking ceremonies were also identified within this location, as well as native reeds and sedges used in weaving and other cultural activities. The combined presence of these plants in one location indicates a place of high cultural value for the Dja Dja Wurrung which would benefit from the inclusion of interpretive signage to identify the cultural values of this location.
- The identification of a ring tree located near the railway bridge. The established gum tree is located on the banks of the creek with the branches culturally manipulated to form the shape of a ring. Dja Dja Wurrung ancestors would weave the branches of young trees over time to form an identifiable tree that was recognised as a symbol or marker for that location.

[9] RMCG, 2019
[10] Dja Dja Wurrung Clans Aboriginal Corporation, 2014
[11] Dja Dja Wurrung Clans Aboriginal Corporation, 2020

SHORT HISTORY OF CARISBROOK

It is reputed[12] that Carisbrook's name came from 'Carrie's Brook', named after Caroline Bucknall, the daughter of E.G. Bucknall, an early local pastoralist, who also lent his name to the Bucknall Reserve. However, before the town was surveyed in 1851 there was a police camp and lock up named Camp Carisbrook, implying that the name could have had another origin.

Carisbrook was toward the edge of the Maryborough goldfields, but a good water supply from the Tullaroop Creek underpinned its prosperity. Local landowners Joyce and Simson opened a flour mill in 1856. The first store opened in 1853 and an Anglican church and school began in 1855. There were bakeries, a brewery, four hotels, brickyards and several stores when Carisbrook was proclaimed a borough on 7 August 1857. A railway station was opened when the line was constructed in 1874. Carisbrook competed with Maryborough for a few years for district leadership, but Maryborough's centrality in the goldfields gave it prosperity that was unavailable to predominantly agricultural Carisbrook. At about the time of its peak census population of 1,236, Carisbrook was described in the Australian handbook, 1903.

On 1 October 1915, when the borough's population was fewer than 1000, it was united with the Tullaroop shire. The area's agricultural economy kept the town's population from falling under 300, and civic works such as tree planting and improvement of reserves (including the Tullaroop Creek) took place. The railway station and goods shed are no longer used.

In September 2010 and again in January 2011 many parts of regional Victoria experienced widespread severe flooding. In Carisbrook the town was completely inundated from floodwater in Tullaroop Creek with 800 people evacuated and many homes damaged. More than 190 houses, two churches and a club were inundated.

Carisbrook's census population in 2016 stands at 856 (representing 8.5 % growth since 2011), with new residential housing being developed to the east of the township.

As an historic township, Carisbrook includes a number of sites listed on the Register of the National Estate, including the log police lock up (c1852) on the western side of Tullaroop Creek (refer figure 1-4) and Junction Lodge (c1873).

Figure 1-4: View to Tullaroop Creek of the historic Carisbrook log jail

[12] https://www.victorianplaces.com.au/carisbrook

MANAGEMENT TODAY

The Creek area is reserved Crown land managed by the Central Goldfields Shire Council and the Department of Environment Land Water and Planning (DELWP). Bland and Bucknall reserves including the car park and grass area are managed by the Council, and the remainder managed directly by DELWP. (refer Figure 1-5 which shows the creek reserve and sections subject to Water Frontage Licences).[13] The railway reserve at the end of the northern end of the Creek reserve is managed by Vic Track Corporation and the Pyrenees Highway at the southern is managed by the Department of Transport.

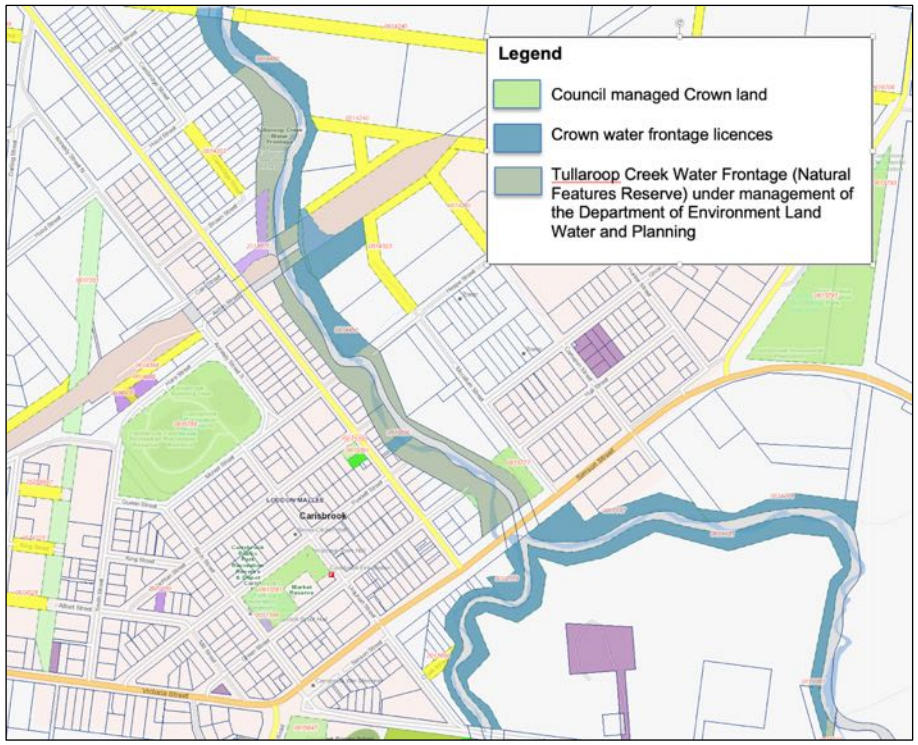

Figure 1-5: Crown land tenure (including water frontage licences)

[13] http://mapshare.vic.gov.au/MapShareVic/index.html?viewer=MapShareVic.PublicSite&locale=en-AU

ADJOINING LAND USE

The western side of the creek heading north west downstream from Bland reserve adjoins established residential development of Carisbrook and the historic Carisbrook log jail.

The eastern side of the creek adjoins rural residential property adjoining Bucknall reserve and further downstream to the north east an agricultural grazing property, which also holds a Water Frontage Licence over the creek.

LAND USE PLANNING PROVISIONS

The majority of the creek is subject to Public Park and Recreation Zone under the Central Goldfields Planning Scheme, and is subject to the following overlays below (and shown in Figure 1-6):

- Schedule 209 (Carisbrook area) to the Heritage Overlay (HO209), which aims to protect the historic character of Carisbrook.
- Schedule 1 to the Environmental Significance Overlay (ESO1), which aims to
  - Prevent pollution and increased turbidity of water in water storages, watercourses and channels.
  - Restrict and regulate developments which may interfere with the use of water for agricultural, domestic or other purposes.
  - Preserve existing native vegetation and to promote regeneration of native vegetation.
  - Contribute to the enhancement of water quality throughout the Murray-Darling Basin.
  - Maintain the ability of streams and watercourses to carry natural flows.
  - Protect and encourage the long-term future of flora and fauna habitat in and along watercourses and water storages.

- Schedule 1 to the Land Subject to Inundation Overlay (LSIO1), which aims to:
  - To identify land in a flood storage or flood fringe area affected by the 1 in 100 year flood or any other area determined by the floodplain management authority.
  - To ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity.
  - To protect water quality in accordance with the provisions of State Environment Protection Policy (Waters of Victoria).
  - To ensure that development maintains or improves river and wetland health, waterway protection and flood plain health.

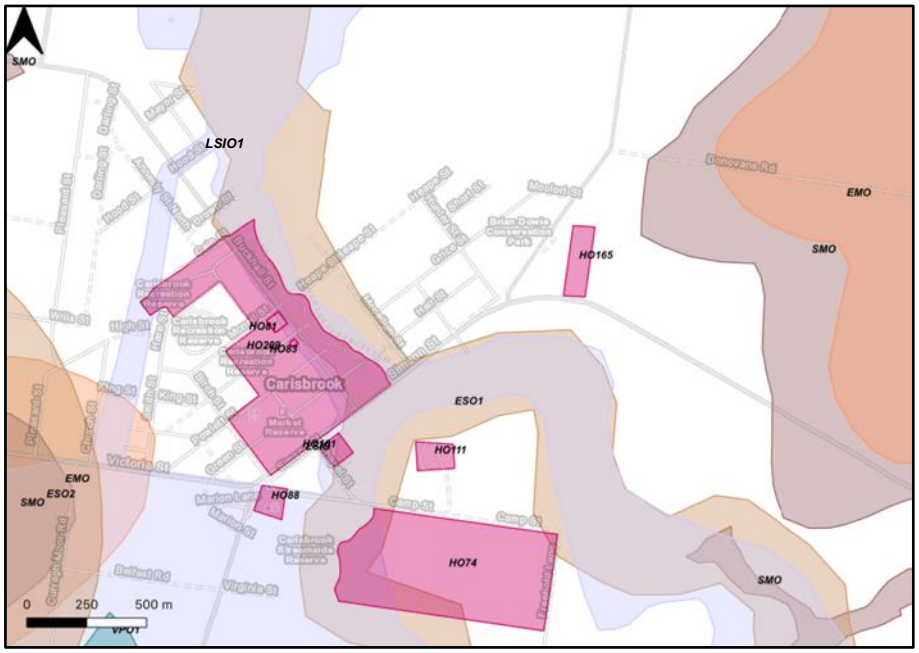

Figure 1-6: Planning overlays

COMMUNITY USE AND RECREATION

The creek is well used by local residents and visitors. On the western bank, an unsealed shared trail runs from Bland Reserve from the pedestrian bridge (at Green Street) and along the toe of the creek embankment to McNeil Street, becoming undefined to the railway bridge at the northern ed of the reserve. This walking track, which adjoins the town of Carisbrook appears the most popular – but is undefined for a third of its length. Another trail on the eastern bank of the creek, joined by a pedestrian bridge at the end of Green Street, continues the walking track at Heape Street, where the track heads north east away from the township. There are four access points down to the trail from the Township of Carisbrook, McNeil, McLaughlin, Powlett and Greens Streets. On the eastern side of the creek, the creek can be accessed from Heape Street and from the Bucknall Reserve off McCallum Street.

There is a well used playground in Bland Reserve, together with a car park at the end of Green Street. Bucknall Reserve, which is joined to Bland Reserve via a pedestrian bridge has been historically planted out with ornamental exotic trees and contains a toilet block and car park for public visitor's use.

The local Friends of Carisbrook Creek Community Group has been extensively involved in the planning and management of the reserve's vegetation and walking trails, and have established seating and a series of interpretive signs along the eastern bank of the creek to highlight its history and environmental values, including past floods.

STRATEGIC DIRECTIONS

The creek and surrounding catchment are also the subject of a number of broader regional and issue-specific strategies and plans developed by the North Central CMA, Council, Central Highlands Water, the Dja Dja Wurrung Clans Aboriginal Corporation and the Victorian Government.

These strategies, which have been considered in developing management recommendations include:

- **North Central Regional Catchment Strategy (2013-2019)** provides long-term vision for Natural Resource Management (NRM) within the North Central Catchment Management Authority region, including the Tullaroop catchment. The RCS sets regional priorities for the management of natural assets, sets overall direction for investment and coordination of effort by landholders, partner organisations and the wider community. It provides a framework that supports and encourages participation in protecting and enhancing our environment.
- **North Central Waterway Strategy (2014-2022)** - provides a single, regional planning document for waterway management and a high-level regional works program to guide investment. The Strategy is an important framework for the North Central CMA in partnership with other agencies, Traditional Owners and the community to manage the region's waterways, including the Tullaroop Creek and builds upon the 2013-19 North Central Regional Catchment Strategy.
- **North Central Floodplain Strategy (2018-2028)** – provides a single, regional planning document for floodplain management within the North Central CMA region, and a high-level regional work plan to guide future investment priorities. This strategy, which was developed by the North Central CMA in partnership with local government, including the Central Goldfields Shire, informs future management of flood risk within Carisbrook, in line with the 2013 Carisbrook Flood and Drainage Management Plan Final Study Report.
- **Biodiversity 2037 (DELWP, 2017)** – provides the Victorian Government's overarching strategy for investing together to protect the environment, linking society and the economy to the environment, working with Traditional Owners and Aboriginal Victorians and better protection and management of regional biodiversity.
- **Central Highlands Integrated Water Management Strategic Direction Statement (DELWP, 2019)** – identifies collaborative IWM opportunities that can improve resilience and liveability in cities and towns in the region, including the following outcomes:
  - Healthy and valued waterways, wetlands and waterbodies
  - Healthy and valued landscapes
  - Avoided or minimised existing and future flood risks.
- **Maryborough Integrated Water Management Plan (2018)** - report prepared for Central Highlands Water, Central Goldfields Shire and North Central Catchment Management Authority. The Maryborough Integrated Water Management Plan explores and sets out recommendations for future water management in the Maryborough area, including Carisbrook. The Plan examines the whole urban water cycle, including the management of stormwater, wastewater, water supplies and waterways. It also considers how water can be managed to deliver community benefits such as enhanced amenity, greener open spaces and street trees and enhanced recreational opportunities.
- **Dhelkunya Dja - Dja Dja Wurrung Country Plan (2014-2034) –** the Country Plan will provide direction for the Dja Dja Wurrung Clans Aboriginal Corporation and the Traditional Owner Land Management Board to build partnerships with key stakeholders and to increase the involvement of Dja Dja Wurrung Traditional Owners in the effort to achieve their goals for Country. It is about re- affirming their aspirations and describing the future of their people, the Traditional Owners of Dja Dja Wurrung Country. It recognises the importance of their cultural heritage – significant places and landscapes, stories and language, customs and practices and responsibilities for looking after Country. It describes the pathway the Dja Dja Wurrung community has determined it needs to take to rebuild and prosper.


Bland Reserve
Playspace

2 What we heard?

The Carisbrook community was encouraged to contribute their views as a foundation to shape the development of this waterway management plan. The consultation period was open between 27 September and 14 October 2020. Due to the COVID-19 restrictions in place at the time, planned face-to-face workshops were deferred. Instead, an interactive map was developed for residents to pinpoint their ideas, observations and issues. 12 residents shared their insights through this map (Figure 2-1). These residents, alongside an additional 24 community members completed an online or hardcopy survey.

Figure 2-1: Tullaroop Social Pinpoint Map[14]

2.1 FINDINGS

VISION

Community members were asked to think about how they wanted to see the creek in 10-20 year's time. Many residents hoped to see the creek return to its look and feel from their youth; more swimming, more wildlife, more vibrance. While others focused on the promotion of natural and cultural values. A sample of responses is included below.

*"**Natural** environment that is **resilient** in coping with climate change and providing **community access** for people and their pets to enjoy it."*

*"A waterway that retains its **natural feel**, good connection to the waterway, space where people feel safe to **walk and enjoy**, a **healthy waterway** with fish and other animals. Not overgrown with exotics"*

*"A healthy waterway, **acknowledged and protected** the community and local government."*

*"I want my **children to return with their children** and remember the place and recognise it and appreciate the improvements."*

*"Like what it was 20-50 years ago. Children and adults could **swim** there. **Water flowed** and was **clean**. Platypus were there. Not a flood or fire danger to town."*

"I would like to see the community as well as visitors to the town utilise the creek area for all sorts of **recreation** and **gatherings**. Creek areas within town areas should benefit the people in the town".

[14] https://rmcg.mysocialpinpoint.com/tullaroop-creek/map#/

ACTIVITIES AND USE

Frequency and type of use of the creek is diverse among respondents (Figure 2-2 and Figure 2-3), reflecting the range of opportunities available for such a natural asset so close to the community.

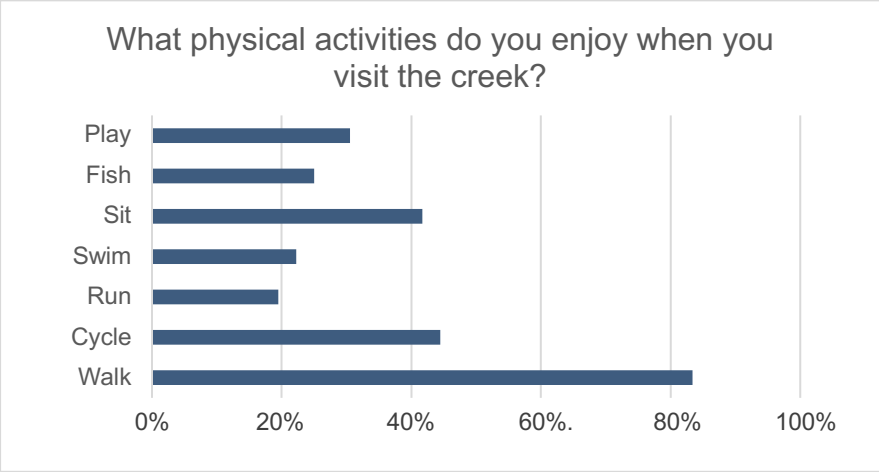

Figure 2-2: Physical activities

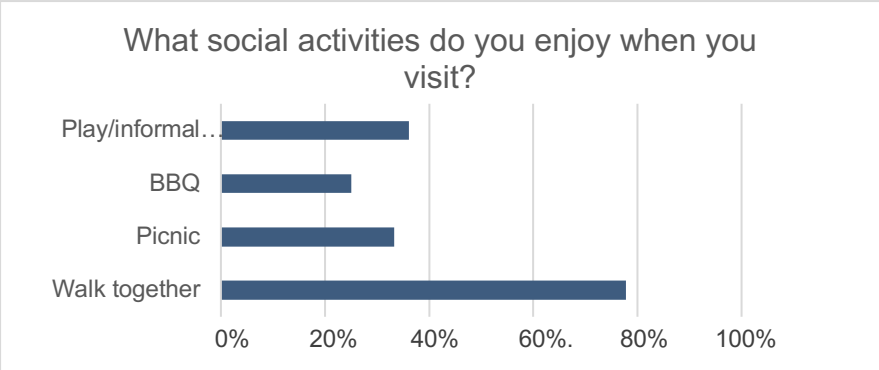

Figure 2-3: Social activities

FUTURE MANAGEMENT

The following word map from the Social Pin Point comments highlights key aspects of the creek the community would like protected or enhanced.

Below is a snapshot of other key aspects the community raised, which have been used to inform the objectives and management actions under this plan.

A majority of feedback provided on the interactive map focused on opportunities for extending and connecting the walking trail. Suggestions included extending the track from Heape Street, across this viaduct and back to the log Jail. Issues arising from private land ownership were noted, but respondents overwhelming saw significantly recreational and community benefit in exploring options for an extension.

Clearing vegetation within the waterway (exotic weeds and native reeds) was highlighted as an opportunity to increase flows and improve access for swimming. Several residents identified waterway constraints as a potential flood risk, while others focused on the aesthetic appeal of improved waterway flows.

A range of views were presented on the presence of non-native vegetation (trees) in the two reserves. Some considered these 'exotics' to be deeply intertwined with the recent 'spirit' of the park, while others hoped to promote a more native or natural feel to the park.

Acknowledgement and promotion of the creek's cultural heritage was highlighted as an important gap. Several respondents suggested more work must be done to incorporate and pay respect to the Traditional Owners of the Country, the Dja Dja Wurrung People.

2.2 MANAGEMENT ISSUES

In response to a desktop review, multiple site inspections and community feedback, the following highlight some of the key management issues identified.

Informal or limited public access throughout the creek reserve

Whilst there are well maintained unsealed walking/ cycling tracks along much of the creek reserve and a pedestrian bridge linking the Bucknall and Bland Reserves, the track becomes informal towards the northern end of the western bank and is unpassable on the eastern side due an existing Water Frontage Licence, just south of the railway bridge. Accordingly, there is no easily means to walk the entire length of the track, nor is it suitable for disability access, which is important providing access to all, including elderly members of Carisbrook.

Figure 2-4: Fenced area at the north eastern end of the reserve

Stormwater erosion off Carisbrook township

Stormwater outfalls from Carisbrook (see Figure 2-5) flow overland directly to the creek through a series of stormwater outlet pipes that are causing erosion at their discharge points.

Figure 2-5: Stormwater outfall off McNeil Street

Flood protection and vegetation management

Following the major flood events of 2010-11 (refer Figure 2-6), North Central Catchment Management Authority, in collaboration with the Central Goldfields Shire and the local community developed the 2013 Carisbrook Flood and Drainage Management Plan[15], which included reducing the impact of vegetation (such as exotic vegetation, thinning of native vegetation and fallen trees between Camp Street and downstream of the railway line). The purpose of the plan was to better understand the impacts of flooding on the township and identify options to reduce the potential impacts to the community.

The Central Goldfields Shire was successful in obtaining funding to implement the recommendations of the plan, which included reducing the impact of vegetation (such as exotic vegetation and fallen trees near the Pyrenees Highway bridge) in the Tullaroop and McCallum Creeks in line with the management recommendations of the Carisbrook Flood Management Plan.

Under these recommendations, Council has identified the need to undertake ongoing management and maintenance of vegetation through the reserve to mitigate any further effects of future flooding, whilst protecting significant areas of native vegetation, which it wishes to retain, protect and enhance.

[15] Water Technology, 2013

There is also sediment build up underneath the Pyrenees Highway bridge that will need careful examination and maintenance to enable adequate flow convenance during high stream flows reduce erosion at the base of the bridge.

Figure 2-6: Carisbrook in flood in 2011[16]

Biodiversity protection and weed management

The Tullaroop Creek is valued for its natural environment, which includes its River Red Gum dominated Creekline Grassy Woodland, and the habitat it provides for a range of instream and riparian species. The importance of protecting this stream environment, is captured in a range of broader strategies (refer page 10 above) and recent vegetation assessments[17][18], and is central to the character and well-being of the Carisbrook community. The recent vegetation assessment[19] found that despite the extensive clearing of exotic vegetation post flooding, a few species continue to emerge from seed distribution. Desert Ash (*Fraxinus angustifolia*) have been observed throughout the project reach, particularly at the upstream end, and Poplar and Blackberry have also observed across the project area.

Landscape and signage

The Bucknall and Bland Reserves are popular with the local community and visitors to Carisbrook, and are inextricably linked to the history of the Tullaroop Creek. However, many of the original exotic trees planted within the reserves, such as the poplars are now showing signs of stress or senescence, and from some vantage points are blocking natural view lines to the creek, and the reserve's connection to the creek. Physical access to the creek is also important for past recreational practices such as swimming and fishing, however, this access is no longer easily accessible in this area due to regrowth of exotic vegetation and native reeds.

The reserve also has extensive interpretive signage, established by the Friends of the Tullaroop Creek, that promotes its natural values and features and the local history of the Carsibrook. Although still intact, the signage could be renewed and expanded (refer Figure 2-7).

As part of a process of renewing this signage, there is an opportunity to better capture and promote Traditional Owner connections to the creek.

Figure 2-7: Trail signage along Tullaroop Creek.

[16] Water Technology, 2013
[17] Okologie Consulting, 2019
[18] Water Technology, 2021
[19] Ibid

3 The Plan

3.1 LONG-TERM VISION

Tullaroop Creek is the centrepiece of Carisbrook:

- known for its peaceful landscape and natural values;
- a place where its history and cultural connections past and present are understood and respected; and
- where all can enjoy safe access.

3.2 STRATEGIC OBJECTIVES

The Waterway Management Plan for Carisbrook is guided by five objectives. These objectives form the main areas of focus under which a series of goals and management recommendations have been identified.

1. Further develop and maintain the Bland and Bucknall reserves as a significant open space for passive use
2. Develop the Creek Corridor to better support active recreation activities
3. Build a connection with the place
4. Protect and enhance the creek's natural values
5. Improved governance and risk management, including management of flood risk.

The management recommendation's underpinning the objectives are presented in the following sections. Broad timeframes for implementation have been assigned to each action and include: Short (1–3 years), Medium term (4–7 years), (8-10 years), and ongoing.

These recommendations should be read alongside the four open space site plans for the creek in Appendix 1 (two at a scale of 1:2000 and two more detailed plans for the Bucknall and Bland Reserves at a scale of 1:1000).

3.3 OBJECTIVE 1: FURTHER DEVELOP AND MAINTAIN THE BLAND AND BUCKNALL RESERVES AS A SIGNIFICANT OPEN SPACE FOR RECREATIONAL USE

GOALS

- Improve accessibility
- Respond to community preferences regarding presentation
- Restore the relationship to the Creek and maintain significant view lines
- Upgrade the play space.

CONTEXT

Through the public consultation phase, 83% of respondents identified accessibility for all as very important with a focus on improved condition of the existing gravel paths to be Disability and Discrimination Act (DDA) compliant.

Many of the original exotic trees planted within Bucknall Reserve, such as the poplars are now showing signs of stress or senescence, and from some vantage points are blocking natural view lines to the creek, and the reserve's connection to the creek. Many in the community also identified the grass environments of both reserves and available shade as also very important to be maintained.

As part of the plan to improve the landscape character and sight lines across the reserves, new trees should be selected to replace specimens in poor health. Species selection should give consideration to the historic landscape character of the reserves.

The consultation also identified physical access to the creek as important for historical recreational purposes such as swimming and fishing and encouraged the removal or maintenance of reeds from the creek's edges. To allow greater community use of the creek at key locations, any reed removal would need to be accompanied by firm, well graded and appropriately finished areas and subject to relevant planning and other approvals (refer section 3.7).

Both reserves would also benefit from upgrades to the existing interpretive signage, which although extensive and detailed is in need of renewal. This would provide an opportunity to better promote the site's Traditional Owner connections alongside the creek's natural values and local history.

The play space in Bland Reserve is popular with visitors to the creek, and when the facility reaches the end of its service life, it should be upgraded to a local space that incorporates a more natural style and safety features.

PRINCIPLES

The following management recommendations will be undertaken according to the following principles:

- All planned new or upgraded reserve infrastructure must consider potential impacts on trade and visitation in the town of Carisbrook
- Preference should be given to the use of natural and unobtrusive materials for any infrastructure installations and upgrades; and where appropriate, engage specialist expertise to assist with the design of new structures (or major upgrades) such the toilet block or play space
- Ensure any planned removal or maintenance of regenerating reeds or cumbungi (*Typha domingensis*), is targeted to specific locations requiring creek access, is the minimum necessary to afford such access and accords with the requirements for native vegetation removal under Section 52.17 of the Central Goldfields Shire Planning Scheme
- Any replacement trees in the reserves should give consideration to historic landscape character of the reserves.

MANAGEMENT RECOMMENDATIONS

GOAL	NO.	RECOMMENDED ACTION	TIMEFRAME
OBJECTIVE 1 - Further develop and maintain the Bland and Bucknall reserves as a significant open space for community use			
Improve accessibility	**1.1.1**	Ensure Disability and Discrimination Act (DDA) compliant paths connect key infrastructure including car park, seats, picnic tables, bridge and toilets.	Medium
	1.1.2	Install asphalt or concrete paths in areas where gravel cannot be maintained.	Medium
	1.1.3	Ensure reserve environment is developed in line with Crime Prevention through Environmental Design (CPTED) guidelines to increase perception of safety.	Medium
Respond to community preferences regarding presentation	**1.2.1**	Maintain as a predominantly grassed environment with shade trees.	Short
	1.2.2	Ensure that improvements are designed to achieve the community's preference for a neatly maintained environment.	Short
Restore the relationship to the Creek and maintain significant view lines	**1.3.1**	Improve physical access to the creek by removing regenerating reeds at targeted locations from the creek's edges and grassing to the water's edge.	Ongoing
	1.3.2	Allow for community use of the Creek for recreational purposes such as swimming and fishing by providing firm, well graded and appropriately finished areas.	Short
	1.3.3	Open up views across the creek, by removing strategic exotic vegetation, including poplar trees.	Medium
	1.3.4	Install interpretive signage focusing on historic images of the Creek and verified first person recollections.	Medium
	1.3.5	Install interpretive signage focusing on the local history of the Traditional Owners.	Medium
	1.3.6	Install new reserve trees to replace specimens in poor health, selecting species with consideration of the site's historic landscape character.	Medium
Upgrade the play space	**1.4.1**	When the existing facility reaches the end of its service life, upgrade to a local space that incorporates natural style features.	Long

3.4 OBJECTIVE 2: DEVELOP THE CREEK CORRIDOR TO BETTER SUPPORT RECREATION ACTIVITIES

GOALS

- Improve accessibility
- Explore the creation of a circular walking track
- Restore the relationship to the Creek.

CONTEXT

Through the public consultation phase, 83% of respondents identified accessibility for all as very important with a focus on improved condition of the existing gravel paths to be Disability and Discrimination Act (DDA) compliant. For example, asphalt or concrete paths should be installed in areas where gravel cannot be maintained.

There are several locations where bench seating has been set up for walkers to rest and enjoy the creek environs. These appear to be still in relatively good condition and would not be a priority for replacement at this stage.

The consultation also identified physical access to the creek as important for historical recreational purposes such as swimming and fishing and encouraged the removal or maintenance of regenerating reeds from creek's edges. To allow greater community use of the creek at key locations, any reed removal would need to be accompanied by firm, well graded and appropriately finished areas and subject to relevant planning and other approvals (refer section 3.7).

A number of the community respondents identified extending the gravel walking track to the railway line both sides of creek to establish a circular walking track or loop to facilitate improved user (pedestrian or cycling) experience using the rail bridge as a crossing point.

If the bridge cannot be used as a pedestrian bridge, then this would require a detailed investigation to install a second crossing that considered flow conveyance and fish passage.

This circular trail option would also need to examine a review of the Crown Water Frontage Licence east of Creek with a view to negotiate and provide public access.

PRINCIPLES

The following management recommendations will be undertaken according to the following principles:

- Any future pedestrian creek crossing at the northern end of the project site must consider impacts on flows, flooding and fish passage and the immediate environment, and be of a form sympathetic to the historic and natural landscape character of the creek.
- Preference should be given to the use of natural and unobtrusive materials for any new signage (aligned to avoid obstruction in floods); and where appropriate, engage specialist expertise to assist with their design.
- Ensure any planned removal or maintenance of regenerating reeds or cumbungi (*Typha domingensis*), is targeted to specific locations requiring creek access, is the minimum necessary to afford such access and accords with the requirements for native vegetation removal under Section 52.17 of the Central Goldfields Shire Planning Scheme.
- Where grades permit at the specified locations, remove vegetation, smooth and grass slopes to the water's edge to allow for efficient ongoing maintenance by the Shire.

MANAGEMENT RECOMMENDATIONS

GOAL	NO.	RECOMMENDED ACTION	TIMEFRAME
OBJECTIVE 2 - Develop the Creek Corridor to better support recreation activities			
Improve accessibility	**2.1.1**	Review and upgrade gravel paths to a higher standard of DDA compliance.	Medium
	2.1.2	Asphalt or concrete paths should be installed in areas where gravel cannot be maintained.	Medium
	2.1.3	Ensure reserve environment is developed to in line with CPTED guidelines to increase perception of safety.	Medium
Explore the creation of a circular walking track	**2.2.1**	Review Crown land licence east of creek to provide public access.	Medium
	2.2.2	Extend the gravel walking track to the railway line both sides of creek.	Long
	2.2.3	Review any encroachments into the creek reserve.	Long
	2.2.4	Install a waterline-level connection across the creek at the northern end of the creek reserve that will not impede water flow, and also allows movement of aquatic species up and downstream.	Long
	2.2.5	Connect the creek's circular paths to surrounding streets, and to the confluence of the Tullaroop and McCallum Creeks.	Long
	2.2.6	Install DDA seating and interpretive signage at strategic points along the track.	Medium
Restore the relationship to the Creek	**2.3.1**	Provide greater physical access to the creek for users by reducing the areas of woody weeds, non-eucalypt seedlings and regenerating reeds along the creek corridor at targeted locations.	Ongoing

3.5 OBJECTIVE 3: BUILD A CONNECTION WITH PLACE

GOALS

- Improve accessibility
- Reflect on the Creek's history in the development of Carisbrook
- Acknowledge the importance and ongoing connection of the Creek to its Traditional Owners, Dja Dja Wurrung and Aboriginal Victorians
- Restore the relationship to the Creek.

CONTEXT

History and connection to the creek

As detailed in Section 1, Tullaroop Creek has long been associated with the history and development of Carisbrook.

For local people, the history of the settlement of Carisbrook continues to be an important part of the Tullaroop story. The community is particularly interested in history at Carisbrook and its heritage (including the log jail), its natural landscape and recent major events such as the 2010-11 floods. Through the community surveys, the importance of the creek to the recreation life of the Carisbrook was revealed, highlighting swimming, fishing and family gatherings that took place over more recent history.

There is an opportunity to improve this connection and history through an upgrade of the existing interpretive signage with focus on the town's history and natural values, improved access to the creek for recreational activities. The neighbouring heritage precinct on the western section of the creek provides an opportunity for increased visitor use and regional tourism experiences – by connecting to the planned loop trial and upgraded signage.

Ongoing community involvement and participation through a reinvigorated Friends Group is critical to this outcome.

Traditional Owner connections

There are many steps the Council can take to acknowledge the past, build relationships and incorporate the significance of Aboriginal culture and history into the management of Tullaroop. Commencing discussions with Dja Dja Wurrung elders will be central to this process and it is essential that discussions be guided by what Traditional Owners would like to see at Tullaroop Creek, not what others think should occur. This means asking questions such as, "What does acknowledgement and recognition look like for Aboriginal people?" and "How would they like their stories represented?"

Over time it is hoped that more substantial activities will take place, which may include cultural walks, the sharing of Elders' stories with visitors to creek and revegetation with bush foods.

PRINCIPLES

The following management recommendations will be undertaken according to the following principles:

- Set up an ongoing partnership with the creek's Traditional Owners, Dja Dja Wurrung about Aboriginal heritage matters and Traditional Owner connection to the creek.
- Support active community engagement with the Creek through volunteer groups such as Friends of Tullaroop Creek and Landcare, and encourage greater participation from younger members of the community.
- Preference should be given to the use of natural and unobtrusive materials for any new signage (aligned to avoid obstruction in floods); and where appropriate, engage specialist expertise to assist with their design.

MANAGEMENT RECOMMENDATIONS

GOAL	NO.	RECOMMENDED ACTION	TIMEFRAME
OBJECTIVE 3 - Build a connection with the place			
Provide environmental education	**3.1.1**	Install new interpretive signage (that builds on existing signage) along the circular Creek track to provide information on healthy waterways, local ecosystems, flora and fauna and flood management.	Short
Reflect on the Creek's history in the development of Carisbrook	**3.2.1**	Install interpretive signage to the reserves focusing on historic images of the Creek and verified first person recollections.	Short
Acknowledge the importance and ongoing connection of the Creek to its Traditional Owners, Dja Dja Wurrung and Aboriginal Victorians	**3.3.1**	Install interpretive Dja Dja Wurrung signage focusing on Traditional Owner connection and cultural values. Signage should include an acknowledgment of the Traditional Owners of the land and interpretive signage informing visitors of the cultural heritage of the site, food and fibre in the area and the traditional uses of these plants.	Medium
	3.3.2	Commence discussions with the Traditional Owners Dja Dja Wurrung to inform future management actions as a step towards acknowledging the past and building future partnerships. This should include Dja Dja Wurrung involvement in management and monitoring of the waterway over time, including any future management plans being developed for the area.	Ongoing
	3.3.3	Undertake a detailed cultural heritage survey of the area by Dja Dja Wurrung, to ensure all cultural heritage sites identified during the assessment are recorded and protected.	Short
	3.3.4	Dja Dja Wurrung to lead revegetation of food, fibre and medicine plants into the Tullaroop Creek waterway and surrounding landscape.	Medium
Enhance community partnerships	**3.4.1**	Encourage and support private and public community gatherings.	Medium
	3.4.2	Encourage and support the activities and agency of the Friends group.	Short

3.6 OBJECTIVE 4: PROTECT AND ENHANCE THE CREEK'S NATURAL VALUES

GOALS

- Increase understanding of the native flora and fauna
- Identify, protect and enhance native vegetation
- Reduce the spread and impact of weeds and pest animals
- Promote integrated water management principles for stormwater management.

CONTEXT

Amongst the main reasons that people visit the creek is the opportunity "to be in nature" and to appreciate the natural history of the site. This was reflected in the community responses to the survey. The protection of remnant native vegetation and the planting of more native vegetation also rated highly amongst community as important management actions for the creek.

There is a need to protect and enhance existing remnant indigenous vegetation including Floodplain Riparian Woodland and Riparian Woodland Communities. There is a challenge for the Council to strike a balance between revegetating to increase the biodiversity of the creek to protect and enhance the natural values, whist managing flood risk and retain the existing recreational use and views.

Minor stormwater erosion is occurring on the western bank of the creek. In line with Integrated Water Management principles[20], the stormwater outfalls should be reviewed with view to adopt more water sensitive design outcomes, that minimise erosion, and the establishment of swale drains and filter strips planted with native species and pools for aquatic habitat. This could be enhanced by a stormwater education campaign promoting the connection between stormwater run-off and the creek's health.

PRINCIPLES

The following management recommendations will be undertaken according to the following principles:

- Ensure only indigenous plant species are used in revegetation works, except in the Bland and Bucknall Reserves.
- Ensure native grasses and low understorey species are included as part of revegetation work, to encourage greater biodiversity outcomes. This will contribute to more diverse plantings that over time will provide greater habitat values for native wildlife, from ground-dwelling mammals to birds.
- Focus revegetation in areas that protect significant view lines of the creek
- Adopt the 1999 Urban Stormwater Best Practice Environmental Management Guidelines in managing stormwater outfalls to the creek
- Undertake revegetation works in a manner sympathetic to the principles of good floodplain management. This should include low understorey species and overstorey trees with a light scattering of mid storey shrubs.
- The aim of the planting should be to out compete weed species, provide for easier maintenance and a self-managing system whilst not exacerbating flood risk.

[20] DELWP, 2019

MANAGEMENT RECOMMENDATIONS

GOAL	NO.	RECOMMENDED ACTIONS	TIMEFRAME
OBJECTIVE 4 – Protect and enhance the creek's natural values			
Increase understanding of the creek's native flora and fauna	4.1.1	Undertake a comprehensive flora and fauna assessment.	Short
	4.1.2	Install new interpretive signage (that builds on existing signage) along the existing creek track to provide information on healthy waterways, local ecosystems, flora and fauna, Traditional Owner values and flood management.	Short
Identify, protect and enhance native vegetation	4.2.1	Prioritise key areas for native vegetation management, protection and enhancement based on flood risk and biodiversity.	Short
Reduce the spread and impact of weeds and pest animals	4.3.1	Undertake staged weed control program to promote active regeneration of floodplain riparian woodland communities on the creek side of the existing paths, using the path as a management boundary to minimise reinvasion of ground layer weeds from the adjoining residential and rural residential areas.	Short
	4.3.2	Prioritise management of weeds (exotic plant species) to reduce flood risk.	Ongoing
Promote Integrated Water Management outcomes	4.4.1	Target source litter control and promote education about the impacts of stormwater run-off on the creek, and the opportunities presented through Integrated Water Management.	Medium
	4.4.2	Restore the eroded stormwater outlet at McNeil Street in line with the 1999 Urban Stormwater Best Practice Environmental Management Guidelines.	Medium

3.7 OBJECTIVE 5: IMPROVED GOVERNANCE AND RISK MANAGEMENT

GOALS

- Establish and coordinate a creek management reference group with high level community and stakeholder representation
- Establish and maintain and asset management database for the creek
- Establish a risk management plan (including flood and bushfire risk).

CONTEXT

Improved governance

Tullaroop Creek is central to the history, character, landscape and function of the Carisbrook township. It is therefore important that Council can draw on key community members and stakeholders to assist in its ongoing management. This input would be best served through establishment of a creek management reference group that could involve more formalised community and stakeholder involvement, as well as oversight and review of this waterway management plan. The creek management reference group should be supported by an agreed term of reference, meet at least annually, and at a minimum include representation from the Carisbrook community and creek users, Friends Group, key agencies, such as the North Central CMA, DELWP and Traditional Owners, Dja Dja Wurrung.

Council is the Committee of Management for only a proportion of the creek (Bland and Bucknall Reserves) and should work with DELWP to consider extending that status to the entire reserve between the two bridges.

Asset management

As highlighted above, the Creek contains a series of Council owned and/or managed community assets, including toilet blocks, ornamental trees, paths and benches and signage. To ensure an orderly asset maintenance and replacement, the establishment of a spatial asset resister is recommended.

Flood and other risks

It is important that key risks in managing the creek reserve, are captured and implemented. This includes ongoing management of flood risk through targeted vegetation management identified through the 2013 Carisbrook Flood and Drainage Management Plan.

Prior to, and during, the development of the Carisbrook Flood Plan, residents raised concerns about vegetation in the waterways. Residents were particularly concerned about the exotic vegetation that choked the waterways upstream of the Pyrenees Highway, as well as trees that had fallen or had the potential to fall and block the waterways.

The North Central CMA in partnership with the Central Goldfields Shire undertook vegetation removal works in 2011-12, funded by the Victorian Government, to remove exotic vegetation and many fallen trees near the Pyrenees Highway bridge. Flood modelling undertaken in the development of the Carisbrook Flood and Drainage Management Plan demonstrated the benefit of these works and identified the potential for additional works to further reduce the flood risk to Carisbrook. These additional vegetation management works were completed in 2016.

The purpose of the vegetation management is to assist in:

- Reducing the potential for water to break out of McCallum Creek upstream of Carisbrook; and
- Increase the efficiency of water flowing in Tullaroop Creek through the Pyrenees Highway bridge to, and past, the railway bridge.

The report authors note that the vegetation management in combination with the western levee works will protect Carisbrook from large flood events that may occur on average once every 50 years. However, Carisbrook is likely to still experience riverine flooding in a repeat of a January 2011 flood event.

PRINCIPLES

The following management recommendations will be undertaken according to the following principles:

Flood risk management works

- Any works planned to manage flood risk should be supported by the development of a Construction Environment Management Plan (CEMP)[21] that include actions to avoid potential impacts to the creek's ecological values. The CEMP should include as a minimum:
  - Evidence of required statutory approvals (refer below).
  - An induction for contractors regarding ecological values throughout the site.
  - Designated No Go Zones to avoid any disturbance or damage to native vegetation/waterway. No go zones should be fenced with para-webbing or similar material prior to construction.
  - Pruning of any indigenous trees should be undertaken by a qualified arborist.
  - Access restrictions to prevent unauthorised access during works.
  - Standard best practice measures to minimise the spread of soil pathogens, and weeds from machinery or through movement of soil on and offsite.
  - Best practice sedimentation and erosion control measures to minimise impacts to the waterway.
  - The location of construction stockpiles, machinery, and other infrastructure should be away from areas of native vegetation or the waterway.
  - A suitably qualified ecologist should be present during works within the waterway relocate any individual frogs encountered during the works.

[21] Okologie Consulting, 2019

STATUTORY ENVIRONMENTAL APPROVALS

Any works and activities planned under this waterway management plan would require planning approval under provisions of the Central Goldfields Planning Scheme. These include:

Zones:

- Public Park and Recreation Zone (PPRZ)

Overlays:

- Schedule 209 (Carisbrook area) to the Heritage Overlay (HO209)
- Schedule 1 to the Environmental Significance Overlay (ESO1)
- Schedule 1 to the Land Subject to Inundation Overlay (LSIO1)
- Schedule 1 to the Floodway Overlay (FO).

Native vegetation controls – under Section 52.17, which aims to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.

This is achieved by applying the following three step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017):

- Avoid the removal, destruction or lopping of native vegetation.
- Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
- Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.
- To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.

Other statutory approvals may also apply, depending on the works planned for example, Works on Waterways Permits under the *Water Act 1989*, and cultural heritage approvals under *Aboriginal Heritage Act 2006*.

MANAGEMENT RECOMMENDATIONS

GOAL	NO.	RECOMMENDED ACTIONS	TIMEFRAME
OBJECTIVE 5 – Improved governance and risk management			
Establish and coordinate a creek management reference group with high level community and stakeholder representation	**5.1.1**	Establish and coordinate a creek management reference group with high level community and stakeholder representation that meets on an annual basis to oversee and review implementation of the plan.	Short
	5.1.2	Seek opportunities for grant funding to assist Council and the community to protect and maintain the creek, including tourism, environmental, waterway, cultural and arts grants, philanthropic or corporate sector funding.	Short
	5.1.3	Explore opportunities to extend Committee of Management status for the creek reserve with Council.	Long
Establish and maintain and asset management database for the creek	**5.2.1**	Establish and maintain a spatial database on all Council and community assets within the reserve their maintenance schedule, together with an associated risk register.	Medium
Establish and implement and risk management plan for flood, bushfire and public risk	**5.3.1**	Establish a risk management plan to manage ongoing risks to the creek, including public access and use (including regulatory signage, public infrastructure), bushfire risk and flooding risk.	Short
	5.3.2	Undertake priority vegetation management works at strategic locations along the creek to manage ongoing flood risk including the removal of fallen timber, exotic vegetation and regenerating reeds in line with Section 4 of this plan.	Ongoing
	5.3.3	Adopt the required levels of service for maintenance of the waterway for flood conveyance (i.e. for removing regrowth and thinning to maintain flood conveyance) as detailed in Section 4 of this plan.	Ongoing
	5.3.4	Incorporate a Native Vegetation Precinct Plan into the Central Goldfields Planning Scheme for planned vegetation management in line with 5.3.2. and 5.3.3 above.	Short
	5.3.5	Liaise with the Department of Transport on the sediment build up underneath the Pyrenees Highway bridge and investigate the necessary management interventions required to manage flow conveyance and erosion and scour risk	Short

3.8 MEASURING PROGRESS

ANNUAL REVIEW

The Waterway Management Plan for Carisbrook represents a moment in time. It has been prepared based on the priorities, interests and concerns of the day. It is likely that over the next 10 years, to 2031, priorities and opportunities will change, and new issues may emerge.

For this reason, it is important that the actions in this Plan are reviewed annually to:

- Track their progress towards implementation
- Determine if they are still relevant and of priority
- Make changes where required:
- Tweak operational aspects such as reserve maintenance within existing budgets to respond to community preferences
- Negotiate annual activities such as vegetation management/removal with other utilities to maximise coordination of resources
- Prioritise one off actions and developments and program as capital budgets and external grant programs allow
- Ensure Disability Discrimination Act (DDA) compliance can be improved by working to an asset register, and ensuring all upgraded or new infrastructure is compliant

Working through the annual Action Plan template (refer to Section 5) should provide the Council with a regular opportunity to take stock of the actions and reprioritise or make changes as needed

An Annual Review Questionnaire (refer below) has also been provided to guide the Council in reviewing its progress each year. It is recommended that this review process take place at the end of each financial year and as part of the work plan and budgeting for the next year.

A more thorough review of the Management Plan could be considered at the mid-term (in five years' time) and end of plan stages.

ANNUAL REVIEW QUESTIONS

1. What have been the main achievements for the year?
   - What were the main actions implemented? Any highlights?
2. What didn't work so well? Why?
   - Were there any unexpected issues or challenges?
   - Any changes or variations to actions?
   - Did any actions have to be deferred or cancelled?
3. What lessons were learnt?
4. What improvements could be made next time?
5. Overall, how are we tracking against the five objectives?
   - Are there any indicators to suggest that the actions are contributing to the objectives of the Management Plan?

4 Vegetation management

To support actions 5.3.1 to 5.3.4 of this management plan, including the required levels of service by Council for maintenance of the waterway for flood conveyance, a vegetation assessment and management report was undertaken by consulting firm Water Technology[22]. The focus of the report was the maintenance of flow conveyance, while protecting environmental values. The report recommends the following actions be implemented along Tullaroop Creek adjacent to the Carisbrook township:

- Continue the control of all exotic woody species. The current problem species include Desert Ash, Poplar and Blackberry. The removal of seeding parent plants should be undertaken within Crown land and encouraged on adjacent freehold property.
- Remove the majority of River Red Gum seedlings as they regenerate within the project reach. Only allow seedlings to persist in areas where mature specimens senesce, or where large gaps in canopy continuity exists. Lopping of existing trees should not be necessary.
- Manage wattle to current levels of cover. It is recommended to periodically thin wattles to ensure a mixed age of plants persist throughout the project reach, while limiting the expansion of current (winter 2021) cover.
- Allow the maturity of current Blackwood and Bottlebrush specimens but control further recruitment of these species within the project reach.
- Given constant water presence and infrequent flooding, Cumbungi has the potential to colonise the creek low-flow channel. Being a robust perennial emergent aquatic species, this plant has the potential to fill the channel and limit the extent of open water that is usually desired by most communities. It is recommended to limit the presence of Cumbungi to current winter 2021 levels.
- Common Reed is a relatively flexible species, has negligible impact on flood levels and provides bank and bed stability during high flow events. This species does have the ability to capture sediment and colonise shallow channels and therefore may require excavation from the centre of the channel if excessive bed aggradation is occurring.
- Woody debris is a desirable habitat feature within the bed of the creek and within the streamside zone. However, should excessive accumulations occur, wood may need to be removed from the channel or floodplain. Small accumulations or individual logs within the channel should be retained, or realigned if causing flow diversion and/or erosion.

In line with the statutory approvals detailed on page 26 above, any vegetation removal works planned under this waterway management plan may require planning approval under provisions of the Central Goldfields Planning Scheme, including native vegetation controls – under Section 52.17, which aim to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.

Other statutory approvals which may also apply, include Works on Waterways Permits under the Water Act 1989, public land manager's consent and cultural heritage approvals under Aboriginal Heritage Act 2006.

[22] Water Technology 2021

5 Annual action plan

A stand-alone annual Action Plan should be prepared to help guide the Council in delivering the works to realise this waterway management plan, including the vegetation management actions outlined in Section 4. The Action Plan would enable Council to track, modify and prioritise actions as new opportunities and challenges arise.

The annual Action Plan should include the following elements:

- **Action details:** including the strategy, objective and recommendation number, description and timeframe as per Section 3 of this plan
- **Priorities for the year:** this allows the Council to determine which actions are of high, medium or low priority for the year. For example, the Council can determine which immediate actions are high, medium or low priority for that year.
- **Cost:** the likely cost of implementing each action.
- **Completion date:** the expected completion date for each action.
- **Status:** the status of each action according to whether it is completed, underway, deferred or cancelled.
- **Notes:** additional notes can be captured here, including reasons for a deferred or cancelled action.

It is recommended that prior to the commencement of each financial year, the Council dedicates a meeting solely to planning its annual works calendar.

References

DEPI, 2013. *Index of Stream Condition - The Third Benchmark of Victorian River Condition ISC3*, Department of Environment and Primary Industries, East Melbourne.

DELWP, 2017. *Guidelines for the removal, destruction or lopping of native vegetation*. Department of Environment, Land, Water and Planning.

DELWP, 2019a. *NatureKit*. Department of Environment, Land, Water and Planning: http://maps.biodiversity.vic.gov.au

DELWP, 2019b. *Native Vegetation* Information *Management system tool*. Department of Environment, Land, Water and Planning:

DELWP, 2019c. Victorian Biodiversity Atlas. Version 3.2.6 Publication date: 6 December 2019. Department of Environment, Land, Water and Planning: https://vba.dse.vic.gov.au

DELWP, 2020. *Planning Schemes Online. Department of Environment, Land, Water and Planning*: http://planning-schemes.delwp.vic.gov.au

DoEE, 2019. *Protected Matters Search Tool*. Department of Environment and Energy: http://www.environment.gov.au/epbc/pmst/

Dja Dja Wurrung Clans Aboriginal Corporation, 2014. Dhelkunya Dja - Dja Dja Wurrung Country Plan 2014-2034, Dja Dja Wurrung Clans Aboriginal Corporation, Bendigo, Victoria.

Dja Dja Wurrung Clans Aboriginal Corporation, 2020. Dja Dja Wurrung Tullaroop (Deep) Creek Assessment Dec 2020. Dja Dja Wurrung Clans Aboriginal Corporation, Bendigo, Victoria

E2DesignLab & RMCG 2018. *Maryborough Integrated Water Management Plan*. Report prepared for Central Highlands Water, Central Goldfields Shire and North Central Catchment Management Authority.

Okologie *Consulting*, 2019. *Vegetation Assessment for creek improvement works along Tullarook Creek, Carisbrook*, Report prepared for Central Goldfields Shire, Jan Juc, Okologie Consulting Pty Ltd, Victoria, 3228

RMCG, 2019. *Integrated catchment management plan scoping - Tullaroop catchment – Final Report,* Report prepared for North Central CMA, RM Consulting Group Pty Ltd., Bendigo, Victoria.

https://www.victorianplaces.com.au/carisbrook

Water Technology, 2013. *Carisbrook Flood and Drainage Management Plan*. Report prepared for the North Central CMA, Water Technology Pty Ltd. Notting Hill, Victoria.

Water Technology, 2021. *Vegetation Management Report, Tullaroop Creek – draft report. Report* prepared for RM Consulting Group Pty Ltd. Water Technology Pty Ltd. Notting Hill, Victoria.

Appendix 1: Site plans

Waterway Management Plan for Carisbrook

March 2021

LEGEND

- Tullaroop Creek
- Grass
- Organic mulch
- Creekside vegetation
- DDA compliant path
- Car parking
- Regulatory signage
- Bins
- Picnic setting
- DDA compliant park seat
- Desirable view lines
- Interpretive signage history
- Interpretive signage Traditional Owners
- Water recreation access
- Proposed indigenous tree

0 10 20 30 40m

1 to 1000@A4

N

Bland Reserve

Proposed Recommendations

Waterway Management Plan for Carisbrook

March 2021

LEGEND

- Tullaroop Creek
- Grass
- Organic mulch
- Creekside vegetation
- DDA compliant path
- Car parking
- Regulatory signage
- Bins
- Picnic setting
- DDA compliant park seat
- Desirable view lines
- Interpretive signage history
- Interpretive signage Traditional Owners
- Water recreation access
- Proposed indigenous tree
- Proposed character tree

0 10 20 30 40m

1 to 1000@A4

N

Bucknall Reserve

Proposed Recommendations

Waterway Management Plan for Carisbrook

March 2021

LEGEND

- Tullaroop Creek
- Grass
- Organic mulch
- DDA compliant path
- Car parking
- Regulatory signage
- Bins
- Picnic setting
- DDA compliant park seat
- Desirable view lines
- Interpretation environmental
- Water recreation access
- Proposed indigenous tree
- Proposed character tree

0 20 40 60 80m

1 to 2000@A4

N

Tullaroop Creek Nth

Proposed Recommendations

Waterway Management Plan for Carisbrook

March 2021

LEGEND

- Tullaroop Creek
- Grass
- Organic mulch
- DDA compliant path
- Car parking
- Regulatory signage
- Bins
- Picnic setting
- DDA compliant park seat
- Desirable view lines
- Interpretation environmental
- Water recreation access
- Proposed indigenous tree
- Proposed character tree

0 20 40 60 80m

1 to 2000@A4

N

Tullaroop Creek Sth

Proposed Recommendations

This management plan has been prepared by:

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Document review and authorisation

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2.0	Draft	31/03/21	T. Wallis D. Hale	N/A		N/A	L. Hendrickson, CGS
3.0	Public draft (updated)	25/08/21	T. Wallis	N/A		D. Wallis	L. Hendrickson, CGS public draft for consultation
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