

**RMCG**

MARCH 2021

# **Wastewater management for Lakeshore Caravan Park redevelopment**

Final Report with redactions

CRC Constructions

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Victoria — Tasmania — ACT — NSW

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# 1 Introduction

## 1.1 ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Dja Dja Wurrung people as the Traditional Owners of the Country on which this project was conducted. We recognise their continuing connection to land, waters and culture and pay our respects to their Elders past, present and emerging.

Moreover, we express gratitude for the knowledge and insight that Traditional Owner and other Aboriginal and Torres Strait Islander people contribute to our shared work.

## 1.2 BACKGROUND

The Lakeshore Caravan Park is to be redeveloped and shall include a variety of accommodation types and associated guest facilities. Due to the distance from reticulated services, the development will be responsible for the management of all wastewater produced on the site.

The accommodation and dining facilities will all contribute to wastewater production. Seasonal variations to visitor numbers will result in variable flows on a monthly basis. Wastewater will be collected from all site facilities via an onsite reticulated sewer system. There will be a centralised treatment plant which will treat the wastewater to sufficient quality for irrigation of grassed areas.

## 1.3 PURPOSE

The purpose of this report is to:

- Explain the regulatory requirements for installing and operating an onsite wastewater treatment system.
- Estimate the wastewater production and sizing of an onsite wastewater treatment system.
- Recommend a wastewater treatment system.
- Determine how recycled water can be used onsite.
- Estimate the irrigation area and recycled water storage capacity required.

## 2 Regulatory requirements

EPA requirements govern several aspects of this development. These are:

- EPA approval to install the onsite wastewater treatment plant (this is a Development Licence).
- The capacity of a storage dam for holding recycled water prior to irrigation. (This is often referred to as a Winter Storage.)
- The irrigation of recycled water.

According to Environment Protection Regulations 2021, a premise which treats more than 5,000 L/day of wastewater is a Scheduled Premise – A03 (Sewage treatment). The site will require a Development Licence from EPA before works can be undertaken. This is required to demonstrate to EPA that you can manage your environmental risks and comply with the law. Note that no construction works are permitted until a Development Licence is granted by EPA. This includes construction unrelated to the onsite wastewater treatment system.

The Development Licence application is very structured and set by EPA. The process starts by submitting a Permission Pathway Form. This was submitted to EPA on 8 October 2021. The EPA promptly acknowledged this submission and confirmed that a development licence would be required. A copy of this correspondence is provided in Appendix 1.

It is preferred that the Planning Application (to City of Greater Bendigo) and the EPA Development Licence application are submitted concurrently. This enables local government and state government agencies to cross-reference information and gives confidence that all regulatory aspects are being addressed.

Management of recycled water should comply with EPA guidelines including:

- Publication 891.4 Code of practice – onsite wastewater management
- Publication 1910.2 Victorian guideline for water recycling
- Publication 1911.2 Technical information for the Victorian guideline for water recycling

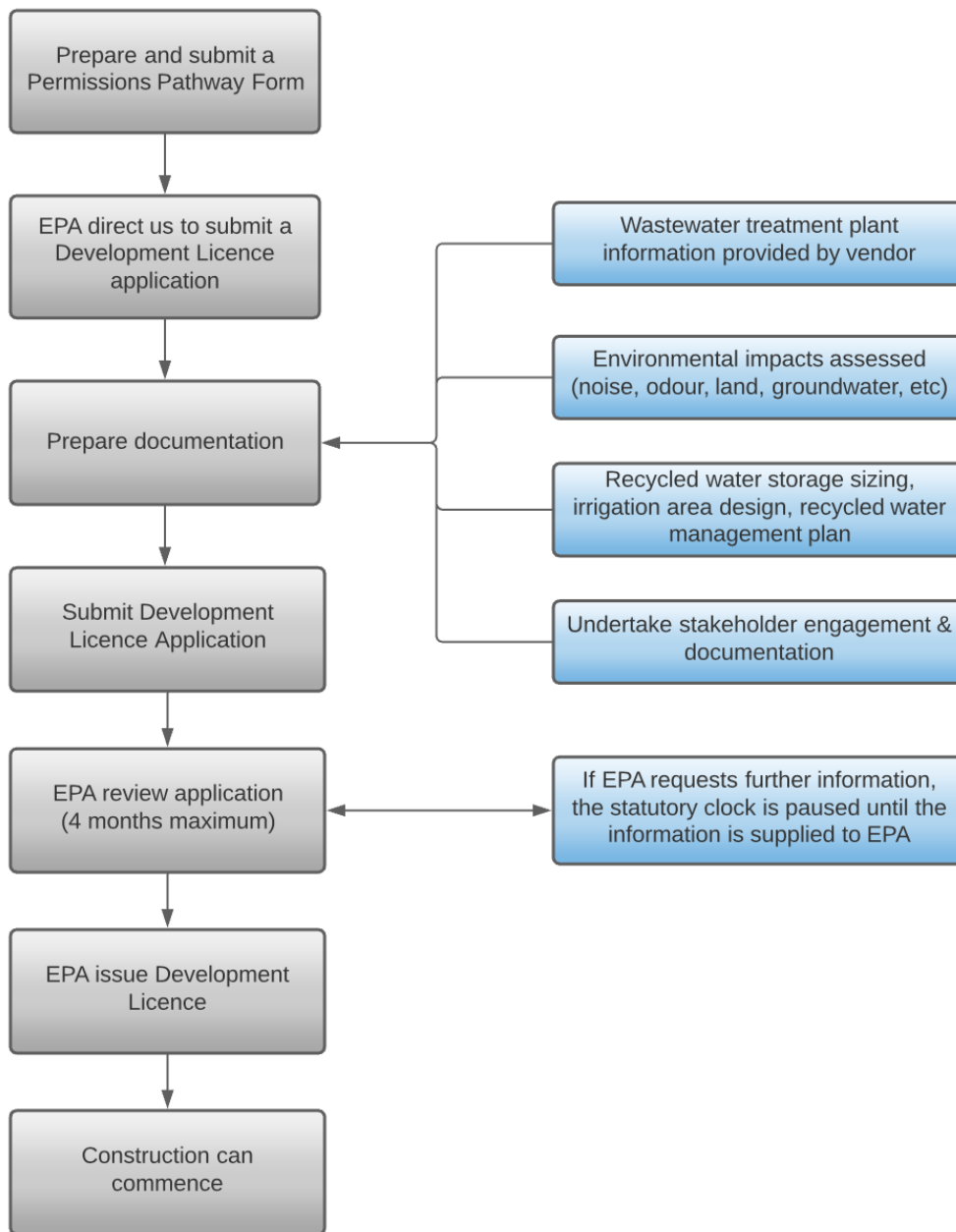
Further details of how recycled water produced at the Lakeshore Caravan Park will be managed are provided in Section 5.

A Health and Environment Management Plan (HEMP) is needed when irrigating with recycled water. This is an operational document used to guide the beneficial reuse of treated effluent via onsite irrigation. A HEMP will need to be submitted to support the Development Licence Application.

In summary, the Lakeshore Caravan Park will need to:

- Submit a Permissions Pathway Form to EPA
- Prepare a Development Licence Application (including HEMP) and submit to EPA. The application fee of \$66,645 is due at this time.
- Have EPA approve the Development Licence.

A flowchart showing the work required to achieve this is provided in Figure 2-1.



**Figure 2-1: EPA approval process and necessary documentation**

### 3 Wastewater production estimates

Wastewater production estimates for developments such as these can be difficult to calculate, primarily due to the uniqueness of each development. The accommodation types, standards and accompanying facilities can vary enormously. The inclusion of day spas, pools, gyms, private baths, restaurants and function centres can result in wide variations in wastewater production.

The EPA Victoria Code of Practice for Onsite Wastewater Management (Publication 891.4, 2016) provides the most up to date and comprehensive data for estimating wastewater production for developments of this type. A summary of the estimates and the assumptions made in the calculations is provided in Table 2-1. Complete calculations are provided in Appendix 2.

**Table 3-1: Calculated wastewater production at full occupancy**

FACILITY	DETAILS	FLOW RATE L/DAY
Cabins	Per guest and staff with outsourced laundry	74,000
Caravan/camping sites	Per guest and staff with outsourced laundry	57,600
Restaurant	70 seats inside, 70 seats outside, commercial kitchen	4,200
Caretaker residence	Household with full water-reduction fixtures	600
Office	Per employee	40
Kiosk	Shop, per employee	30
Camp kitchen	Based on meeting hall with kitchenette	500
<b>Total</b>		<b>136,670</b>

Based on the expected monthly occupancy rates, the expected variation in actual wastewater production is provided in Table 2-2. This demonstrates how the occupancy rate varies the wastewater production and is used to size a WWTP that can treat wastewater over a range of volumes.

These calculations have been cross-checked with the average daily water consumption of the Nagambie Lakes Leisure Park. This is a similar development to that planned at Lakeshore and recent billing information was available. The estimated annual wastewater production for Lakeshore is 30% higher than the annual water use at Nagambie. Therefore, the estimates provided in Table 3-2 can be considered as conservative (high), and further refinement to wastewater treatment plant (WWTP) sizing should be done in consultation with the selected treatment plant vendor.

**Table 3-2: Daily wastewater production based on occupancy rates**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Occupancy rate	80%	70%	65%	65%	35%	35%	35%	50%	70%	70%	75%	80%
Daily wastewater production, kL/day	109	96	89	89	48	48	48	68	96	96	103	109
Total annual production, ML/year												<b>30.93</b>

The strength of wastewater is measured primarily by the biological oxygen demand (BOD). The more concentrated the wastewater, the higher the BOD. This impacts on the treatment capacity required. It is estimated that the BOD load for the Lakeshore Caravan Park development will be **622 mg BOD/L**. This calculation is also based on the EPA Victoria Code of Practice for Onsite Wastewater Management and is considered a conservative (high) estimate.

# 4 Wastewater treatment

## TREATMENT REQUIREMENTS

Onsite wastewater treatment is expected to be provided by a package-type aerobic wastewater treatment system. This will typically include screening, primary sedimentation and biological treatment for the reduction of carbonaceous material and nitrogen. Phosphorus can be removed by precipitation with alum. After biological treatment, the wastewater is allowed to settle, separating most of the solids from the liquid.

Solids will accumulate in the primary treatment tank. It is expected that these solids are removed via a licenced septic waste truck and transported to either the Bendigo Water Reclamation Plant or the Kyneton Water Reclamation Plant for further treatment, as directed by Coliban Water.

Further details regarding sludge removal will be determined once a WWTP vendor has been selected and the specifications of the actual WWTP are known. Sludge disposal location and cost can then be confirmed with Coliban Water. Initial engagement with Coliban Water has indicated that small volumes of sludge managed with licenced septic transporters are unlikely to present any issue for them to accept.

The treated effluent is proposed to be reused for onsite sub-surface irrigation only. The treated effluent is expected to meet Class B quality requirements, along with targets for phosphorus and nitrogen concentrations. The expected treated effluent quality is provided in Table 4-1.

**Table 4-1: Treated water quality parameters**

TREATED WATER QUALITY PARAMETERS	
< 20 mg/L BOD	<100 orgs/100 mL <i>E. coli</i>
< 30 mg/L suspended solids	< 3 mg/L total phosphorus
pH between 6.5 and 8.5	< 10 mg/L total nitrogen

Further information about recycled water use is provided in Section 5.

## PERFORMANCE CONSIDERATIONS

The choice of treatment system will be influenced by the unique aspects of the Lakeshore Caravan Park.

**Seasonal loads:** Influent flow to the wastewater treatment plant will vary in volume and strength, depending on the number of guests and visitors to the site. The expected occupancy rates have been provided to the equipment vendors and they have based their systems on this variation. The wastewater treatment plant will be required to meet the treated water quality throughout the year.

**Nutrient reduction performance:** Wastewater contains organic material and nutrients (primarily nitrogen and phosphorus). Small-scale wastewater treatment plants typically reduce the organic material, with some opportunistic reduction in nutrients. However, the concentration of nutrients in treated effluent will be problematic at this site, as the area available for irrigation is limited. Therefore, the wastewater treatment plant must be capable of reducing nutrients to meet the specified limits.

**Odour management:** Due to the proximity to guest accommodation, the wastewater treatment plant should be designed to minimise odours. Odourous air should be captured and treated to reduce the impact on community amenity.



In summary, there are many aspects to consider in the selection of a wastewater treatment system. Equipment vendors are capable of accounting for this site's unique needs and meeting regulatory and performance specifications set by the purchaser.

Ultimately, the performance of the chosen treatment process must be able to provide treated wastewater suitable for onsite, subsurface irrigation.

## **VENDOR EVALUATION**

An initial investigation of onsite wastewater treatment plant suppliers has been undertaken and a summary of potential suppliers is provided in Table 4-2. Complete quotations are provided in Appendix 3.

### **Paragraphs removed due to commercial sensitivity.**

We recommend the client visits several reference sites to gain further understanding of how their wastewater treatment plants work, the design and installation considerations, and the long-term operational requirements.

The following factors will need to be considered prior to installation:

- Site preparation and design details
- Power consumption
- Chemical use and storage
- Frequency of sludge removal and truck access for this
- Supply lead-time
- Technical support, staff training and expected maintenance.

### **Vendor evaluation table removed due to commercial sensitivity.**

# 5 Recycled water management

## 5.1 APPROACH

The approach selected for recycled water management is subsurface irrigation within the Lakeshore site, combined with storage of recycled water during wet weather. Advantages with this approach include:

- Irrigation of a greater area on the Lakeshore site, improving amenity of recreation areas and greening the site to minimise bushfire risk.
- Subsurface irrigation delivers wastewater direct to plant roots to maximise uptake of water and nutrients. It also minimises the potential for human contact, ensures visual amenity is not impacted and enables flexible garden designs to work around other infrastructure on the site.
- The existing wastewater lagoons are refurbished for storage of wet weather flows taking advantage of existing infrastructure.
- The system can be automated to minimise management input.

Other options considered and reasons they were not pursued are listed below:

- Evaporation basins will not be effective in this climate. Whilst they may work effectively in dry years, there is not sufficient solar drying at this site in the average to wet years.
- Supply to third party sites for agricultural irrigation would be possible. However, there is no irrigation in the nearby area, so this option is expected to have a higher cost (piping the recycled water) and higher risk due to relying on inexperienced managers.

## 5.2 WATER AND NUTRIENT BALANCES

Modelling has been undertaken to determine an appropriate balance between irrigation area and wet weather storage to ensure the system has capacity for containment of wastewater in the 90<sup>th</sup> percentile wet year and sustainable management of the nutrient load.

Modelling is based on the wastewater production estimates outlined in Section 3. Inflows will vary through the year, peaking in the summer tourist season. This aligns with the peak plant demand for irrigation and minimises the volume of storage required.

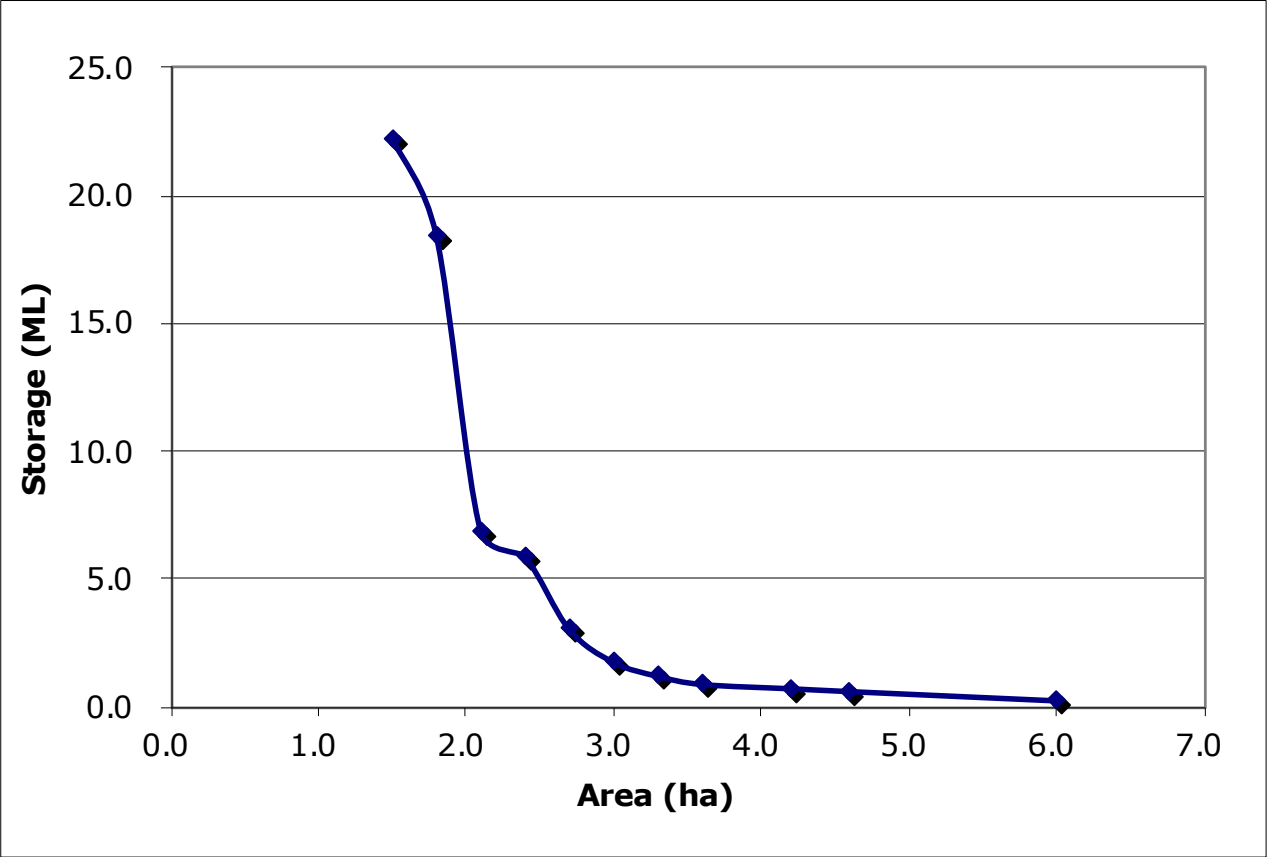
The approach used for water balance modelling combines the methods outlined in the *Victorian Land Capability Assessment Framework* (2<sup>nd</sup> Edition, MAV, DEPI & EPA, 2014) and the *Guidelines for Wastewater Irrigation* (EPA Publication 168, 1991).

Key input data and assumptions used in the water balance modelling are:

- Local climate data – rainfall and evaporation - has been obtained from <https://www.longpaddock.qld.gov.au/silo/>. Modelling considers a 20 year period from 1998 – 2018 to test the impact of wet and dry years.
- Runoff is the proportion of rainfall that does not percolate into the soil profile. A rainfall runoff factor of 0.8 has been assumed. Landscaping design will aim to shed rainfall from areas irrigated with recycled water (refer to Section 5.3) making this a conservative assumption.
- A crop factor allows conversion of pan evaporation into evapotranspiration, thereby allowing the calculation of irrigation demand. Modelling assumes grassed or lawn areas as the main land use for irrigated areas. A crop factor of 0.8 has been applied.
- Percolation through the soil is dependent on soil texture and permeability. *A Study of Land in the Campaspe River Catchment* (Lorimer and Schoknecht, 1987) indicates the presence of yellow duplex

soils with loamy topsoil over mottled yellow clay subsoils with low permeability. The design percolation rate is limited by the subsoil texture. The Design Irrigation Rate (DIR) for medium to heavy clay soils as specified by EPA Publication 891.4 *Code of practice – onsite wastewater management* is 2 mm/day.

There are various combinations of storage and irrigation area that meet wet year containment requirements as shown in Figure 5-1. The nutrient balance calculations below are used to assist in determining the preferred combination.



**Figure 5-1: Modelled irrigation area and storage combinations**

A nutrient balance has been calculated below for nitrogen and phosphorus. This assumes the maximum nutrient levels in the wastewater as outlined in Table 4-1.

**Table 5-1: Nutrient balance for recycled water irrigation**

PARAMETER	NITROGEN	PHOSPHORUS
Wastewater volume		30.93 ML/yr
Wastewater nutrient content (max)	10 mg/L	3 mg/L
Total nutrient applied	309.3 kg/yr	92.8 kg/yr
Nutrient loss to atmosphere <sup>1</sup>	20%	-
Nutrient uptake in plants <sup>2</sup>	120 kg/ha	30 kg/ha
Minimum area required for reuse	2.06 ha	3.09 ha

We recommend provision of a minimum of 3.1 ha of irrigation to ensure sustainable management of nutrients. This can be developed in combination with 1.6 ML of storage to achieve containment in a 90<sup>th</sup> percentile wet year.

### 5.3 IRRIGATION OF RECYCLED WATER

Subsurface irrigation is to be installed. This delivers recycled water direct to plant roots to maximise uptake of water and nutrients. It also minimises the potential for human contact, ensures visual amenity is not impacted and enables flexible garden designs to work around other infrastructure on the site.

A minimum irrigation reuse area of 3.1 ha is required based on water and nutrient balance modelling. The landscape design will identify the area that is to be developed for irrigation, however this will primarily consist of the degraded area to the north-east of the site, which was previously used as a motor bike track. This area is mostly cleared of native vegetation.

Based on the native vegetation study completed by Biosis, much of the site contains high value native vegetation. These areas will be avoided for recycled water irrigation.

To ensure there is no contamination of the water in Lake Eppalock, which is for potable (drinking) use, a minimum setback (buffer) distance of 300m will be provided between the full supply level and the areas irrigated with recycled water. This meets setbacks listed in EPA Publication 891.4.

There is a ridge running through the site as shown in Figure 5-2. Areas to the north of this ridgeline drain away from the lake. A significant portion of the recycled water irrigation will be targeted to areas north of the ridgeline as it is outside the catchment area of Lake Eppalock.

<sup>1</sup> 20% of total nitrogen applied will be lost through mineralisation, volatilisation and denitrification in the soil (MAV, 2014).

<sup>2</sup> Plant uptake figures based on the low end of the range for home lawn application of 120 - 200 kg/ha for nitrogen and 25 – 105 kg/ha for phosphorus (from *Irrigation of Amenity Horticulture with Recycled Water*, Stevens, Smolenaars and Kelly, 2008)



**Figure 5-2: Ridgeline denoting catchment boundary for Lake Eppalock**

Setbacks in line with EPA Publication 891.4 are also required from buildings and service infrastructure to ensure protection of human health and the surrounding environment. These include:

- 3 m to buildings or allotment boundary upslope
- 1.5 m to buildings or allotment boundary downslope
- 1.5 m to water supply pipelines
- 3 m to children’s playground or in-ground swimming pool.

Key design requirements for irrigation include:

- Drip systems shall be installed at 100 – 150 mm depth into 150 – 250 mm of topsoil
- Use of subsurface drip line designed specifically for effluent irrigation
- Adequate filtration must be incorporated into the system prior to drip irrigation
- pressure compensation/regulation will be required to ensure even distribution and low application rates across the variety of gradients and elevations
- use of soil moisture monitoring to control application times and rates
- cut-off drains to be provided upslope of irrigation areas to minimise stormwater run-on
- irrigation areas to be designed to shed rainfall (subject to erosion risk being appropriately managed).

To achieve the topsoil depth outlined above it is expected that **topsoil will need to be imported** to the site. Site inspection indicates that the topsoils have been eroded from large portions of the site due to previous land disturbance.

It is important that the plants selected for the irrigation reuse area are high water and nutrient use species. For example, lawn areas work well for effluent reuse, particularly where clippings are removed to increase nutrient export.

No fertiliser should be applied to the site (nutrients will be provided through the wastewater), unless future soil or plant tissue testing identifies a deficiency.

#### **5.4 WINTER STORAGE**

The existing effluent lagoons will be refurbished for use as winter storage. It is recommended that 1.6 ML of storage capacity is provided.

Storage design requirements include:

- Storage to be lined (e.g. with compacted clay) to achieve a permeability of less than  $1 \times 10^{-9}$  metres per second to minimise seepage and protect groundwater.
- Perimeter to be fenced to prevent access.
- Embankment design to prevent stormwater ingress.

#### **5.5 COST ESTIMATE**

**Cost estimate removed due to commercial sensitivity.**

# Appendix 1: EPA pathways form submission



# Permission pathway form

Environment Protection Act 2017

Publication F1021 June 2021

## About this form

Use this form to get Environment Protection Authority Victoria's (EPA) opinion about which permission pathway is most suitable for your proposed prescribed permission activity.

Completing the permission pathway process is not compulsory. It is designed to assist applicants in the preparation of a final permission application and has no application fees. It is also not a statutory decision.

The pathway outcome is based on the information submitted to us. This decision may change, however, if EPA detects discrepancies in the information provided, discovers risks that were not previously realised, or where significant stakeholder concerns are identified. EPA will inform applicants when there is a need for more information.

For some situations, it may not be necessary to complete a permission pathway form to receive a pathway outcome. Where the required permission is clear, an applicant seeking a permission opinion can do so as part of a meeting or by corresponding with EPA.

## Permission pathway outcomes

Permission pathway outcomes include:

- no permission is required
- prescribed exemption applies
- application for a permission is required.

If your pathway outcome is that you need to apply for a permission, EPA will specify the type of permission required. Permission types include a development licence (either fast-track or standard), operating licence, pilot project licence, permit, registration, or an exemption from a licence or permit. No permission is required when the activity is not regulated through a prescribed permission by EPA.

## How to complete this form

You need to provide both clear and sufficient information about your proposed prescribed activity.

If you're completing this form for the permission applicant, you must have the authority to make this submission on their behalf.

Further guidance on how to complete this form is provided in EPA's publication *Permissions proposal pathway guideline* (publication 1995). If you require more information, you can contact EPA by emailing [contact@epa.vic.gov.au](mailto:contact@epa.vic.gov.au) or calling 1300 372 842 (1300 EPA VIC).

A completed form and all supporting evidence should be submitted by email to [permissions@epa.vic.gov.au](mailto:permissions@epa.vic.gov.au)

Please note that incomplete forms will be returned to the applicant with a request to provide further information.

## Section A: Applicant details

Company or business name	CRC Constructions Pty Ltd		
CEO (or equivalent) name	Adam Dickens		
CEO (or equivalent) email	Adam.dickens@jayco.com.au	CEO (or equivalent) contact number	0420743042
Primary contact name	Chrissy McNeill		



# Permission pathway form

Environment Protection Act 2017

Primary contact email	Chrissy.mcneill@crconstructions.com.au		Primary contact number	0438298456
ABN or ACN	ABN	14006877176	ACN	006877176
Registered office address	1 Jayco Drive Dandenong South Vic 3175			
Billing email address	1 Jayco Drive Dandenong South Vic 3175			
List the ID(s) of any current permission (for example, licence, permit, registration) or other approvals (for example, authorisation of discharge or disposal, BEPs) at this location relating to this activity.				
None				
If a consultant/environmental auditor has been engaged to prepare the pathway, please provide details:				
Consultant/environmental auditor name	Hilary Hall, Senior Consultant, RMCG			
Email	hilaryh@rmcg.com.au		Contact number	0422 608 303

## Section B: Key questions

1 PROPOSED ACTIVITY	
<p>1.1 What type of activity is proposed at the premises? Refer to Appendix 1 in EPA publication Permissions proposal pathway guideline (publication 1995) for category of prescribed activities.</p>	
A03 Sewage treatment and A14 Reclaimed wastewater supply or use	
Proposal/activity name	Lakeshore Caravan Park
Capital cost of proposal/activity	\$10 Million
1.2 Provide a description of what your proposed activity is.	The existing Lakeshore Caravan Park is to undergo a major redevelopment. All existing infrastructure has been demolished and new facilities are proposed, including on-site cabins, caravan and camping sites with shared and private bathroom facilities. Additional buildings include restaurant/café, function rooms, play equipment, etc. The site is on land leased to the proponent from Goulburn-Murray Water.
1.3 Identify if it is a fixed or mobile activity.	Fixed <input checked="" type="checkbox"/> Mobile <input type="checkbox"/>
1.4 Provide the address(es) for the activity.	655-657 Knowsley-Eppalock Road, KNOWSLEY 3523
<p>1.5 Is the proposed activity for the purpose of technology development or as a pilot project? This includes activities that relate to the research, development or testing of a new technology, equipment, plant, process or system. If these conditions apply, provide relevant information; for example, the scale, dimension, purpose and duration.</p>	

# Permission pathway form

Environment Protection Act 2017

YES	<input type="checkbox"/> (Provide details below)
NO	<input checked="" type="checkbox"/>
1.6 Explain how your proposal utilises best available techniques or technologies.	The onsite wastewater treatment plant will meet EPA guidelines and Council requirements. The recycled water scheme will include a winter storage designed for 90 <sup>th</sup> percentile wet year containment. The proposed use of recycled water will be used in accordance with EPA guidelines and best practice. Further details of all these elements will be provided in the Development Licence application.
1.7 What emission, discharge or impact to human health or the environment is expected as a result of the proposed activity? Detail: To where (air, land, water), as what (type of substances), from where (point source, diffuse source, etc.) and quantity (per minute/hour/day, etc.).	The onsite wastewater treatment plant will primarily produce recycled water which will be used beneficially. Odours may also be produced, but will be minimised by utilising appropriate treatment technology and suitable sizing. Further details of all these elements will be provided in the Development Licence application.
1.8 If you currently hold a permission for the activity, will there be changes to your permission as a result of this proposal? Highlight the proposed changes and provide supporting evidence to demonstrate how any change will/will not impact the environment.	There is no current permission for onsite wastewater treatment.
1.9 Provide details of the background environmental condition, siting consideration, planning zone and sensitive receptors surrounding the activity. Please provide detailed maps and figures identifying each.	To be provided as part of the Development Licence application.
1.10 Provide details of a risk assessment identifying the hazards to human health and the environment from the activity. How have these risks been eliminated or reduced so far as reasonably practicable?	A risk assessment will be completed as part of the Development Licence application and will be used to inform the design of the onsite wastewater treatment plant, storage of recycled water and use of recycled water.
1.11 Provide details of your engagement, authorisations and permissions for the proposed activity from regulatory authorities other than EPA. Detail your engagement to date and list any authorisation or permission you require, currently hold or are seeking.	Approval will be required from the following authorities, other than EPA: <ul style="list-style-type: none"> <li>- City of Greater Bendigo planning approval</li> <li>- DELWP</li> <li>- Goulburn Murray Water</li> </ul>

## 2 COMMUNITY AND THIRD-PARTY ENGAGEMENT

2.1 Have you identified potential impacted/interested stakeholders, community or third parties and engaged with them regarding this activity?
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# Permission pathway form

Environment Protection Act 2017

YES	<input checked="" type="checkbox"/> (Provide below details of what type, with whom, how and when you engaged)
NO	<input type="checkbox"/> (Provide below reasons and what engagement you plan)
Engagement with neighbours and relevant authorities has been undertaken in relation to the previous planning application. A new engagement plan will be developed as part of the EPA Development Licence application and new planning application. A copy of this engagement plan and a report detailing the engagement activities that have been completed, will be provided as part of the Development Licence application.	
2.2 Describe the outcome of engagement and consultation, the response of stakeholders, any concerns raised and explain how you have resolved these concerns. Provide EPA with evidence that stakeholders know about your proposal, including stakeholder contact information (for example, scanned attendance list with contact information), a copy of or link to engagement material, a stakeholder register (including issues raised/resolved).	
To be provided as part of the Development Licence application.	

## Section C: Supporting evidence

Ensure all commercially confidential material is marked as such in the document itself.

Administrative:

- Certificate of Incorporation (Company), or
- Certificate of Registration (Business) as appropriate.

Plans, maps and diagrams:

- site plan
- locality plan
- planning zone map
- map showing sensitive receptors surrounding the activity
- design drawings
- block flow (BFD), process flow (PFD) and/or piping and instrument (PID) diagrams.

Engagement/consultation:

- evidence of engagement/consultation
- stakeholder register identifying issues and concerns, method and date of engagement, names of participants, any engagement templates, materials and supporting information.

# Permission pathway form

Environment Protection Act 2017

Insert extra rows, as required, by clicking on the '+' button that appears on the right-hand side of the table when you select the final row.

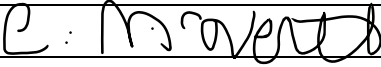
Optional supporting evidence	Commercial-in-confidence?	Relevant question number
Lakeshore Caravan Park Locality Plan	<input type="checkbox"/>	1.4
Click or tap here to enter text.	<input type="checkbox"/>	Click or tap here to enter text.
Click or tap here to enter text.	<input type="checkbox"/>	Click or tap here to enter text.
Click or tap here to enter text.	<input type="checkbox"/>	Click or tap here to enter text.
Click or tap here to enter text.	<input type="checkbox"/>	Click or tap here to enter text.

## Section D: Declaration

Important: Applicants should be aware that it is an offence under the Act to intentionally or negligently provide incorrect or misleading information to EPA, or to conceal information.

Before you sign the declaration, ensure that:

- you have answered every question
- you have attached any required supporting documentation
- all the information you have given is true and correct to the best of your knowledge
- you have the necessary authority or permission to submit the application.

I declare to the best of my knowledge that the information provided in this form and any attachments is true and correct.			
Full Name	Christine McNeill		
Company Position	Project Manager		
Signature		Declared at:	9.50 am
		Date	07/10/2021



## Permission pathway form

*Environment Protection Act 2017*

The personal information on this form and any correspondence, notice or other document issued after processing of this information will be stored and used by EPA for the purpose of administering the *Environment Protection Act 2017* and the Environment Protection Regulations 2020. You may access this information by contacting the EPA Privacy Information Officer. This information may be disclosed to another Government organisation, tribunal or court, where required for administering or enforcing the above Act and Regulations or any other relevant laws.

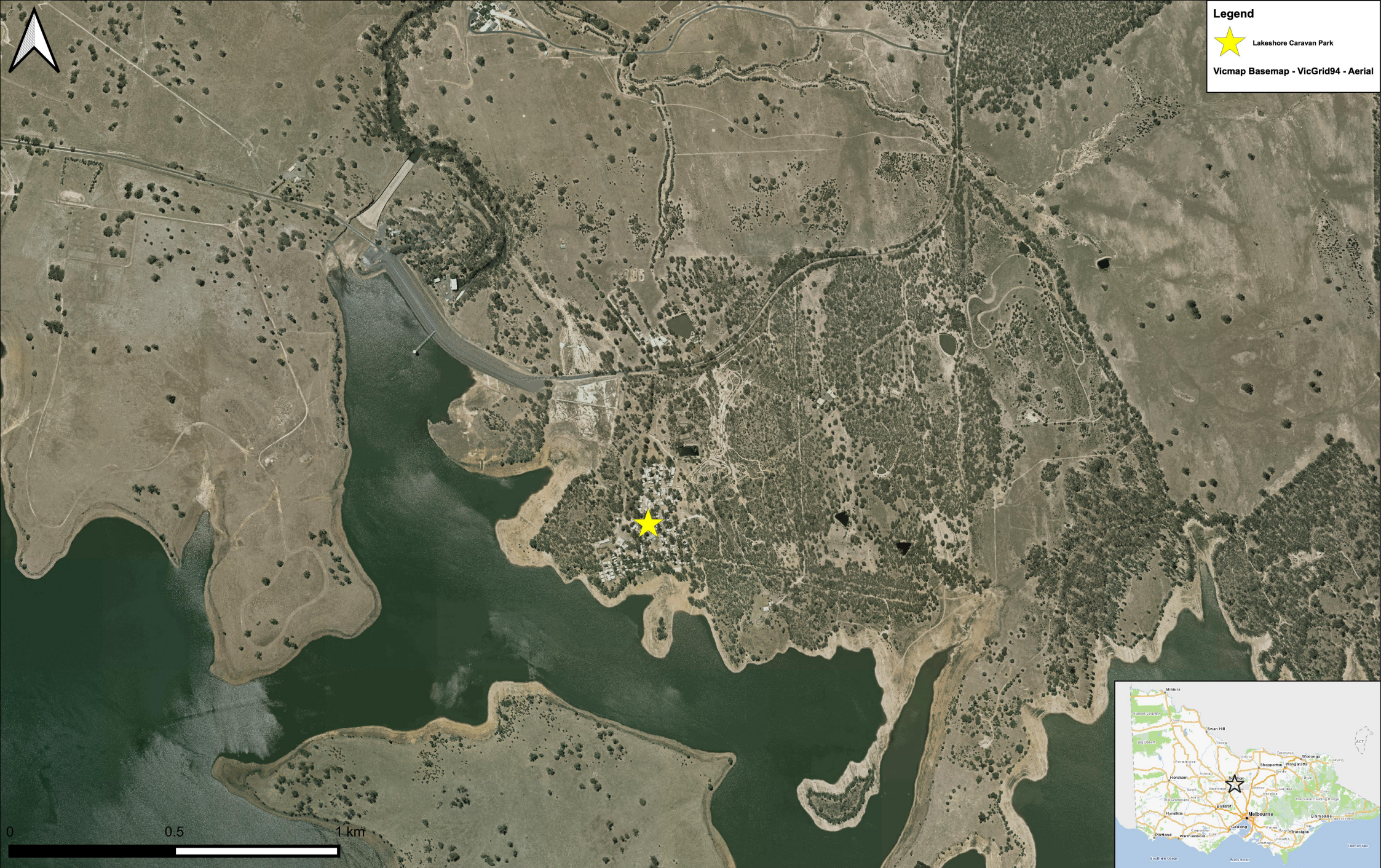
You have the right to access this information by contacting the Environment Protection Authority at 200 Victoria Street, Carlton VIC 3053, or by email [contact@epa.vic.gov.au](mailto:contact@epa.vic.gov.au) or telephone 1300 372 842 (1300 EPA VIC).



For languages other than English, please call 131 450.

Visit [epa.vic.gov.au/language-help](http://epa.vic.gov.au/language-help) for next steps.

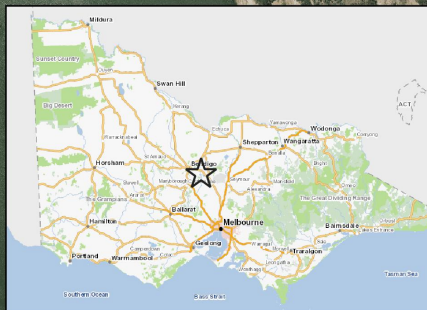
If you need assistance because of a hearing or speech impairment, please visit [relayservice.gov.au](http://relayservice.gov.au)



**Legend**

-  Lakeshore Caravan Park

Vicmap Basemap - VicGrid94 - Aerial



Prepared by: D Wallis  
 Checked by: H Hall  
 Thursday 07/10/2021, 01:47pm  
 Job number: 1354

# Lakeshore Carvan Park Locality Map



Projection: MGA94 Zone 55  
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Disclaimer: This map has been prepared in accordance with the scope of services described in the contract or agreement between RMCG and the Client. Any findings only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and RMCG accepts no responsibility for its use by other parties.

# Appendix 2: Wastewater production estimates

**Lakeshore Caravan Park Wastewater Production Estimate**

Hilary Hall

Updated 1 November 2021, with capacity info supplied by CRC

Reference: EPA Code of Practice for Onsite Wastewater Management, Publication 891.4, 2016, Table 4

Type	Notes	Units	No. people or seats (100%)	Design flow rate		Organic load	
				L/person.day	L/day	g BOD/person.day	kg BOD/day
Cabins	Per guest and staff w outsourced laundry	185	4	100	74000	60	44
Caravan/camping sites	Per guest and staff w outsourced laundry	144	4	100	57600	60	35
Restaurant	70 seats inside, 70 seats outside, commercial kitchen	1	140	30	4200	40	6
Caretaker residence	Household with full water-reduction fixtures	1	2	150	300	60	0.1
Office	Per employee	1	2	20	40	15	0.0
Kiosk	Shop, per employee	1	2	15	30	10	0.0
Camp kitchen	Based on meeting hall with kitchenette	1	50	10	500	5	0.3
<b>Phase 1 total</b>				<b>136670</b>		<b>85</b>	

Wastewater production: 137 kL/day 85 kg/day  
 At 100% occupancy 4,157 kL/month 2585 kg/month  
 49,885 kL/year 31018 kg/year  
 49.88 ML/year

**Notes**

Occupancy rate equals for above table is 100%

The ensuite bathrooms for the camping/caravan sites have been included in the fully services site numbers

No internal recycling of treated wastewater has been included in these calculations

No backwash from pools has been included in these calculations - cartridge pool filters to be used

**BOD loading 622 mg/L**

**Comparison with Nagambie Lakes Leisure Park Water Bill**

**Lakeshore estimate**

Water use (4 months)	Apr, May, Jun, Jul	2700 kL	7203 kL
Monthly average		675 kL/month	1801 kL/month
Daily average		22 kL/day	59 kL/day
Water use (4 months)	Aug, Sep, Oct, Nov	7200 kL	11227 kL
Monthly average		1800 kL/month	2807 kL/month
Daily average		59 kL/day	92 kL/day
Water use (4 months)	Dec, Jan, Feb, Mar	13200 kL	12498 kL
Monthly average		3300 kL/month	3125 kL/month
Daily average		108 kL/day	103 kL/day
<b>Annual total</b>		<b>23100 kL</b>	<b>30928 kL</b>
<b>Average annual</b>		<b>63 kL/day</b>	<b>85 kL/day</b>

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% occupancy	80%	70%	65%	65%	35%	35%	35%	50%	70%	70%	75%	80%
Daily wastewater kL/day	109	96	89	89	48	48	48	68	96	96	103	109
Monthly wastewater kL/month	3,389	2,966	2,754	2,754	1,483	1,483	1,483	2,118	2,966	2,966	3,178	3,389
<b>Annual production ML/year</b>												<b>30.93</b>



# Appendix 3: WWTP vendor quotations

Quotations removed due to commercial sensitivity.

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**Document review and authorisation**

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1.0	Draft	1/12/2021	H. Hall	A. Kelliher	M. McIntosh	A. Kelliher	C. McNeill CMC Constructions
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