

The Regional Renewable Organics Network at Black Rock

About a third of the waste that we throw out at home is organic material – mainly food scraps - that create greenhouse gases when sent to landfill.

Barwon Water is planning to build a world leading Regional Renewable Organics Network (RRON) facility at its Black Rock site in Connewarre, Victoria (just outside of Barwon Heads).

The facility will take household food and garden waste from the Borough of Queenscliffe, Surf Coast Shire, City of Greater Geelong and Golden Plains Shire and safely convert it into biochar, a product that captures carbon for high value use in agribusiness, sustainable manufacturing and construction materials, and at the same time produce renewable energy.

The facility will also process local commercial and industrial organic waste and organic materials from the Black Rock Water Reclamation Plant processes.



How does it work?

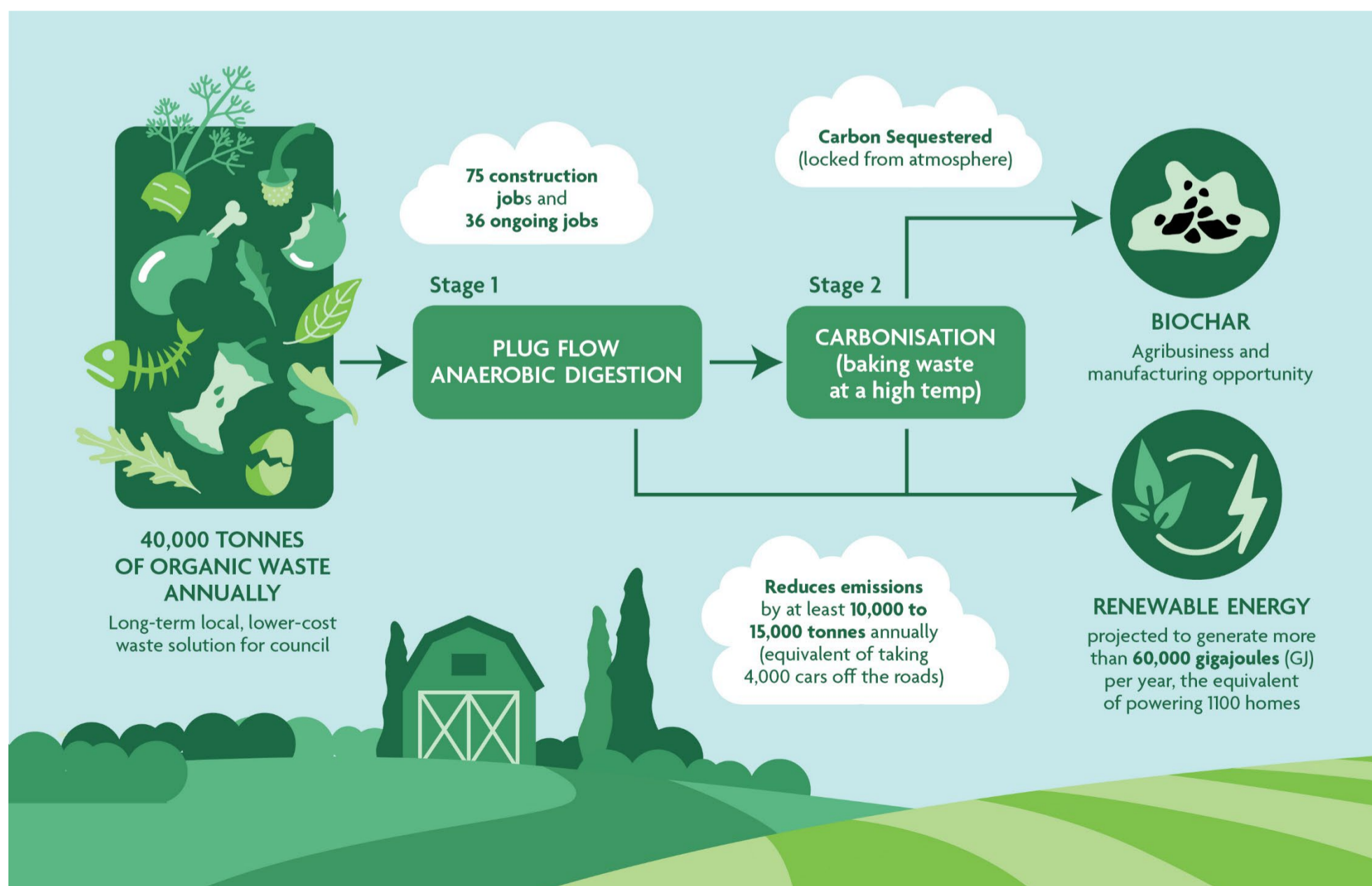
The RRON facility works in two stages.

The first stage will see food and organic waste transported to the facility in trucks via Black Rock Road; approximately 40,000 tonnes of organic waste will be delivered and processed at the facility each year.

The material will be pre-treated and fed into a digester tank creating biogas, that will be used for renewable energy.

The second stage will see the digestate baked at a high temperature (a process called carbonisation), creating biochar and syngas, a further source of renewable energy.

Our projections indicate that more than 60,000 gigajoules (GJ) per annum of biogas will be generated, enough to power more than 1,100 Victorian households per year. We will use the biogas to help power operations at the Black Rock site, helping to keep energy costs low for Barwon Water and in turn keep customer water bills affordable.



More than just wastewater

The Black Rock Water Reclamation Plant and surrounding site is a special place. It is, and will continue to be, a place of cultural significance, regeneration, resources, trade, learning and connection, driving regional prosperity.

What is the Black Rock Water Reclamation Plant?

The Black Rock Water Reclamation Plant is a world class sewage treatment facility which treats the wastewater of a population of 265,000 people. The plant treats wastewater using a combination of mechanical and biological processes.



Aerial view of the Black Rock site

Generating resources

The site produces both Class A and C recycled water. Higher quality (Class A) recycled water is available for residential use through a dedicated 'purple pipe' network to Armstrong Creek, Mt Duned and northern Torquay, for a range of uses including garden watering. The Class C water is used for agriculture and nearby golf courses. Excess Class C water is released to the ocean via a submerged pipeline.

More than just wastewater

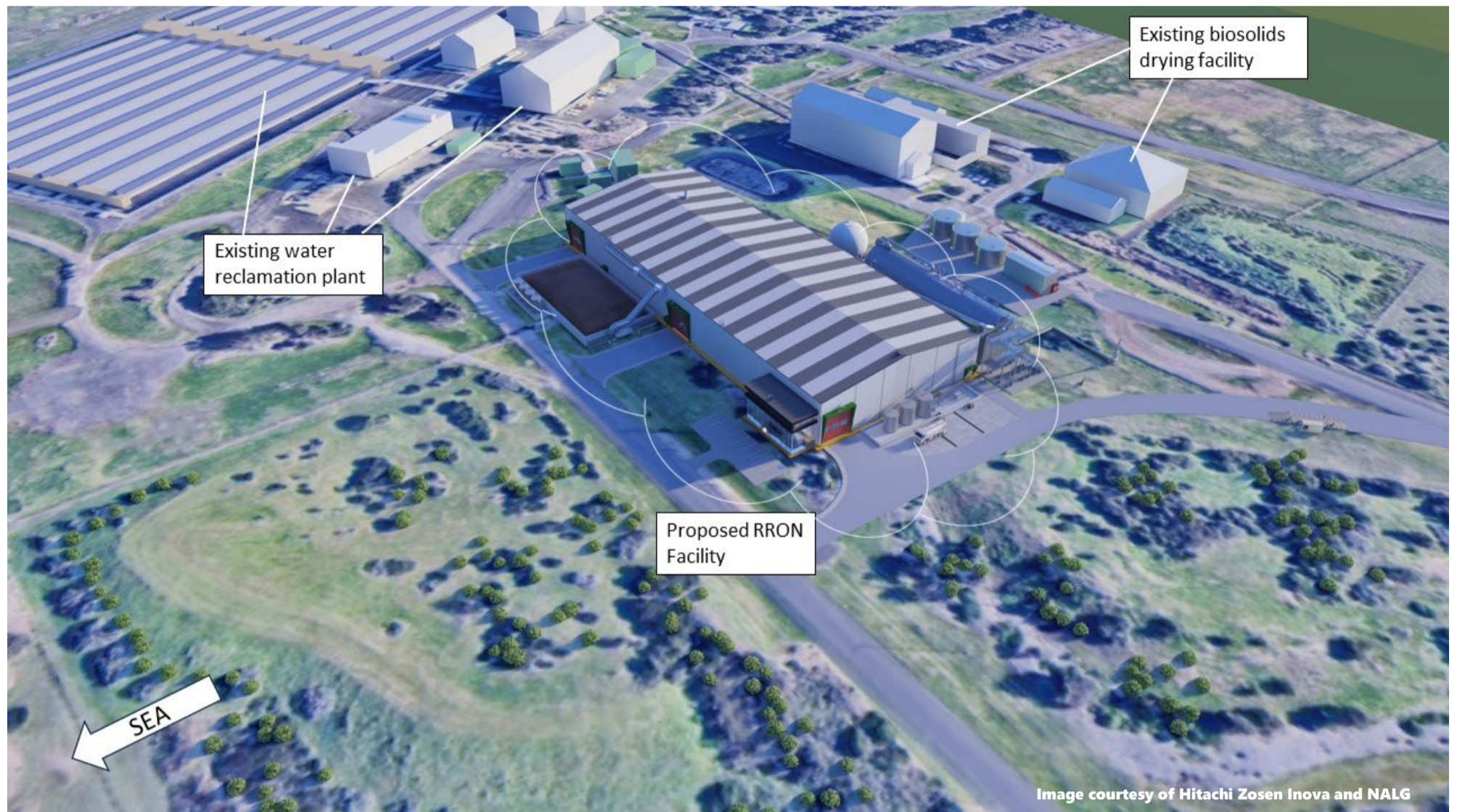
A 3 megawatt (mW) solar farm is also located at the Black Rock site (see below). The farm was the first megawatt-scale solar installation in the Australian water industry and supplies up to 35% of the energy use at the Water Reclamation Plant.



What will the RRON look like?

The RRON facility will be built on a vacant area of land near Barwon Water's existing Black Rock Water Reclamation Plant, which treats greater Geelong's wastewater and produces Class A and C recycled water.

The RRON facility will be compact with most equipment located within the main building. The facility will stand at 14 metres high (its tallest point, which is ~ 3 metres lower than the existing buildings at the site), will be ~ 100 metres long and ~ 45 metres wide – taking up a total of ~ 4,500 square metres or roughly 0.5% of the total Black Rock site.



The height of the building is designed to provide enough clearance for operations, including trucks to safely drop off organic waste within the building.

Most of the equipment is housed within the building. The digester tank, liquid waste receival area and the biofilter (which filters air from the building) will be located outside the main building.

The facility's exterior walls and roof will be made from coated steel that combines long term durability and excellent corrosion resistance. Translucent sheeting will be used strategically on the roof to maximise natural light filtering into the building. The facility will be built in a staged approach, allowing it to adapt to changing technology and organic waste volumes.

An expansion of the facility may be required in future years to cater for increased waste volumes. Any expansion would be undertaken in consultation with Traditional Custodians, local neighbours and communities and agencies.

What is biochar?

Biochar is a carbon-rich material created when organic waste is 'baked' at high temperatures. The RRON facility will produce up to 6,000 tonnes of biochar per year by baking the region's organic waste at a high temperature in a low oxygen process known as pyrolysis.



The process of baking the waste also produces a gas called 'syngas' which can be converted into renewable energy. The high heat involved can also destroy contaminants contained in some organic wastes.

Today, when organic waste is disposed of, the carbon is released back into the atmosphere mainly in the form of methane and carbon dioxide. This is not a good outcome as it simply adds

to climate change. Barwon Water is supporting the region to divert this waste, transform it into high value products and in the process lock the carbon in place for hundreds to thousands of years. Locking up the carbon in this manner helps reduce the impact of climate change.



The benefits of using biochar are diverse. It is a versatile product which is rising in popularity as consumers and businesses seek to reduce their carbon footprints and produce sustainable products.

In terms of what it looks like, biochar is black and granular, also lightweight and highly porous.

Where will biochar be used?

Biochar can be used for so many things!

Industries from agriculture and horticulture to construction, manufacturing, energy storage can all use biochar.

While the opportunities are broad and diverse, Barwon Water’s approach is to primarily seek local end uses for the biochar with a focus on agriculture and the production of advanced sustainable materials. When applied to the soil, biochar can:

Increase water efficacy	Improve fertiliser efficiency	Attract nutrients to plants
Increase plant yields	Increase microbial activity in soil	Increase and retains carbon in the soil

Recent studies show that biochar, if used correctly, can help build organic carbon in soil by up to 20% and can reduce nitrous oxide emissions (greenhouse gases) from soil by 12 to 50%. Some examples include sports fields, golf courses, home gardens, agriculture and horticulture.

When used in manufacturing and construction, biochar can increase strength, durability and substitute fossil fuel intensive products with more sustainable alternatives. Some examples include roads, sustainable batteries, paints / dyes and construction materials.

Barwon Water is currently investigating a range of opportunities for the sale of biochar with a focus on regional use. One of these opportunities include the potential partnership with a local social enterprise to bag and sell the biochar to the local community. Barwon Water will keep the local community informed of these opportunities as they develop.

Biochar research and development

Barwon Water is leading several research and development projects to better inform its understanding of biochar, how it can be applied and future commercial market opportunities.

Biochar to Batteries Research Project

Barwon Water are leading a consortium of research institutes (RMIT and Deakin's Battery Research and Innovation Hub) undertaking techno-economic feasibility of using biochar in energy storage devices (sodium ion batteries through to super-capacitors).

This is a nationally leading concept geared to developing diversified high-value end use options. Other collaborators involved include Intelligent Water Networks (IWN), DEECA, South East Water, and the City of Greater Geelong.

Deakin University 'On-Farm' Biochar Trials

Barwon Water have partnered with Deakin University Centre for Regional and Rural Futures (CeRFF) soil scientists and a local Barrabool farmer to undertake a series of biochar 'on farm' trials at the back of Deakin University, Waurin Ponds.

Supporting Deakin University PhD Students

Barwon Water are supporting two Deakin University PhD students who are researching the application of biochar / activated carbon in water treatment and to improve water holding and co-benefits for soils to improve drought resilience and nutrients for crop productivity.

GenU Nursery Biochar and Alum trials

Barwon Water has initiated a series of ongoing research trials with Deakin and Melbourne University students at the GenU nursery (in South Geelong) that explore the potential of using biochar and Alum (a chemical compound) to grow native plants. A key focus at present is determining leachability / mobilisation of heavy metals in soils.



What is important to our community

Over the past three years we have been engaging with the community to inform the design and future operation of the RRON facility. To date we have received feedback through the following key activities:



**41 interactions
via interactive
map, survey +
QA tool**



**9 community
group briefings**



**10 “Meet the
Project”
meetings**



**11,000 project
website visits**



**More than 2500
letters/emails to
the local
community**



**Engaged with
more than 250
during community
events in 2022**

We have been listening and learning to what the community are interested to learn more about, respond to questions, share information on how the facility will operate and also share more information about biochar and how this can be used in the future.

We know through our community conversations to date that noise, traffic, odour, what the facility will look like, Caring for Country and the environment are top priorities.

How will noise be managed?

The RRON facility will meet strict Environment Protection Authority guidelines to ensure any noise is not disruptive.

Any noise generated by the facility or by trucks entering and leaving the facility, needs to comply with the Environment Protection Authority's (EPA) conditions and frameworks to minimise disturbance to neighbours or the surrounding environment.

Our design includes measures to limit noise, with equipment appropriately enclosed and the use of noise dampening protection where required.

Noisy equipment, such as fans, will be housed within noise dampening enclosures to prevent any noise emissions.

A noise assessment is being undertaken, considering future and existing noise (from our current Black Rock operations) into account. We will share the outcomes of the assessment with our community for further feedback once completed.



How will odour be managed?

The RRON facility will not smell or produce any odour.

All organic waste that is delivered to the RRON facility, will be dropped off and processed within an enclosed building or enclosed equipment.

The trucks delivering the organic waste will be sealed to reduce odours when transporting the organic waste to the RRON facility. When trucks arrive at the facility, they will drive into the main building and the door will be closed prior to them emptying the organic waste for pre-treatment. Trucks will be cleaned before leaving the facility to reduce any potential odour from the trucks.

The main building will be under negative pressure, with air sucked through ducts at regular intervals and passed through a biofilter, rather than emitting to atmosphere. A biofilter is a layered filter bed (please see image below), which air will pass through and be treated by bacteria and treat any odorous air, before exhausting the treated air to the environment.



The organic waste will be pre-treated within 48 hours after it is delivered to site. Regular odour inspections will be undertaken at the RRON facility around the site.

A detailed odour management plan will be prepared, and we will need to meet Environment Protection Authority (EPA) requirements throughout the commissioning and operation of the facility. With more than 110 years' experience in managing and treating millions of litres of wastewater every day, we are experienced in managing odour and being compliant with all environmental regulations and conditions.

How will traffic be managed?

It is estimated that there will be around 16 waste trucks moving to and from the site a day (Monday to Friday), increasing to 20 to 25 trucks a day by 2033 as waste volumes increase. It is estimated 2 to 3 trucks a day (Monday to Friday) will move to and from the site for biochar collection.

When will trucks operate?

Trucks will operate on weekdays during normal working hours. Times may vary depending on when residential waste is collected from the kerbside and how far trucks need to travel from the collection area.

This represents an increase of traffic by 0.1% on Barwon Heads Road which currently has an estimated 11,000 vehicles per day.



Example of a typical waste truck

Truck movements will commence from 2025 when the facility is being commissioned and increase to approximately 10 trucks per day once the facility is operational. There will be also truck activity during construction, from 2024.

A more detailed traffic assessment is being developed and we will share the outcomes with our community when complete.

How will traffic be managed?

Which direction will the trucks come from?

Trucks are expected to enter and exit the facility from the middle driveway on Black Rock Road.

Trucks will travel along the Barwon Heads Road, mostly from the west (approximately 92%) and less frequently from the east (approximately 8%).

Thirteenth Beach Road and Bluestone School Roads will not be used as they are subject to three tonne load limits.



How will we Care for Country?

Barwon Water applies a Caring for Country approach to the land and waterways in partnership with Traditional Owners, other agencies and community members.

We acknowledge that the proposed site and the broader Black Rock precinct is on Wadawurrung Country. We have engaged Wadawurrung Traditional Owners Aboriginal Corporation to review and provide feedback on the Cultural Heritage Management Plan that was prepared for the proposed facility.

We intend to plant additional plants and trees to help screen the facility and blend it with the surrounding environment.



The facility will be designed to manage stormwater and integrate with existing stormwater management at the overall Black Rock site to prevent any runoff into the natural environment.

The RRON will be required to the EPA's guidelines and regulations to ensure there is no impact on the environment.

An environmental management plan will also be prepared for the RRON facility.

How will we manage safety?

Managing staff, contractor and community safety is a high priority for Barwon Water.

Fire prevention measures will be put in place to ensure there is a low risk of fire. Fire infrastructure will be located throughout the site to prevent and manage the risk of fire. This will be reviewed by the Environment Protection Authority and Country Fire Authority as part of the approval process.

Some of the equipment at the RRON will run 24 hours a day, seven days a week, including the digester, with biogas being produced continuously.

The biogas will be used at the neighbouring biosolids drying facility to support powering operations.

In the unlikely event that the biogas doesn't meet specifications or the biosolids facility doesn't require the biogas, we will need to manage the excess biogas produced.

As part of the facility design, a 7.5 metre high "stack" (please see image below) is included to manage excess biogas. On those rare occasions, the excess biogas will be flared within the stack, however, no flame will be visible from the outside. This "stack" provides a critical safety measure for our staff, contractors and community.



Interaction between moving vehicles and staff on site is a key safety consideration. Preventative measures such as walkways, guards, bollards, low speed limits, speed humps will be included in the facility design. A vehicle operational plan will also be developed to inform how many vehicles are allowed to be on site at once.

Commonly asked questions

How much energy or electricity does it take to power the RRON? Will the RRON be energy self-sufficient?

The RRON will be net energy positive, with a large volume of biogas used in its most efficient form, to offset existing natural gas usage at the existing biosolids drying facility. On average, the electrical energy demand of the RRON will be ~1.3MWh. We are investigating opportunities such as solar, to further reduce this demand.

What sort of organic waste will be accepted at the RRON?

Common food waste items that will be processed at the RRON facility include (but not limited to) bones, bread, vegetables, fruits, eggs and eggshells, spoiled / out of date food, dairy products, coffee grounds and seafood. Common green waste items that can be accepted include branches, garden and grass/lawn clippings, sticks and weeds.

Your local Council will inform you what can and can't be collected in your food and green organics bin. Barwon Water encourages you to contact your local Council to discuss what your current kerbside collection service is and how this works.

Is there anything the RRON won't accept?

The RRON facility cannot accept non-organic waste items such as plastic, glass or metal or any hazardous materials (such as batteries, appliances, light bulbs) or animal feces (such as dog poo).

How will Barwon Water manage contamination at the RRON facility?

Contamination in the organic waste will be managed through pre-treatment at the facility. Before entering the digester, various stages of de-contamination, shredding and screening will be utilised to remove physical contamination.

This contamination will then be transported to a licensed facility, for further treatment or for landfill. We continue to work closely with our partner councils on behaviour change campaigns, to keep contamination to a minimum.

Can I still use my compost at home?

Yes! Home composting is one of the ways community members can help divert food waste from landfill. Barwon Water encourages all community members to contact their local Councils for more information on home composting programs.

Where does the region's food and garden organics waste currently go?

There is also a shortage of food waste processing facilities in the Barwon region, with most food and garden organics being sent outside of the region to be processed.

Will my water bills and council rates go up because of the RRON project?

The project is designed to help keep water bills affordable and Council rates down. The RRON facility provides a lower cost solution than waste going to landfill, is competitive against other processing options, and reduces the energy costs associated with treating sewerage.

The RRON has been designed to ensure it is sustainably funded in a way that doesn't require subsidies by Barwon Water customers and helps reduce costs to treat our wastewater. The Victorian Government has also contributed \$285,000 to assist with the concept development.

Will the local community be able to purchase biochar from the facility?

Barwon Water is looking to partner with a local social enterprise to take the biochar produced at the RRON, to bag it and to sell it to the local community.

If the facility is noisy or smells, what will Barwon Water do?

Barwon Water is committed to minimising its impact to the surrounding environment. In the event that noise and/or odour became an issue at the RRON, this would be measured, assessed and dealt with accordingly to meet EPA requirements.

Will traffic impact local cycling routes?

Safety of our staff, contractors and local community is a high priority. Truck movements to and from the facility are not expected to impact existing cycling routes. Once operational, truck drivers will be given a site induction including information about the nearby cyclist route.

Next steps and staying informed

We are committed to continuing to listen and learn from our community.

Over the next three months, we will finalise the various technical assessments, and the design of the facility.

It is anticipated that the RRON facility will be operational and accepting local food and garden organic waste from 2025/2026, pending final regulatory approval from key agencies and the Barwon Water Board.

The below timeline outlines the project next steps:

October to December 2023	<p>We will listen to and learn from the community as we share the proposed functional design of the facility and outputs of the technical assessments.</p> <p>We will apply to the Environment Protection Authority to seek a Development Licence approval and obtain the necessary planning approval to proceed with the project.</p>
2024	<p>Construction commences.</p> <p>Ongoing community engagement.</p>
2025	<p>Commissioning the constructed processing equipment, with Council material likely required to allow wet commissioning.</p> <p>Ongoing community engagement.</p>
2025/2026	<p>RRON facility operational, processing local household and garden organic waste and producing biochar.</p>



Stay up to date by registering for updates on our project website by scanning the QR code.

Should you have any questions, please get in contact with us at projects@barwonwater.vic.gov.au or 1300 656 007