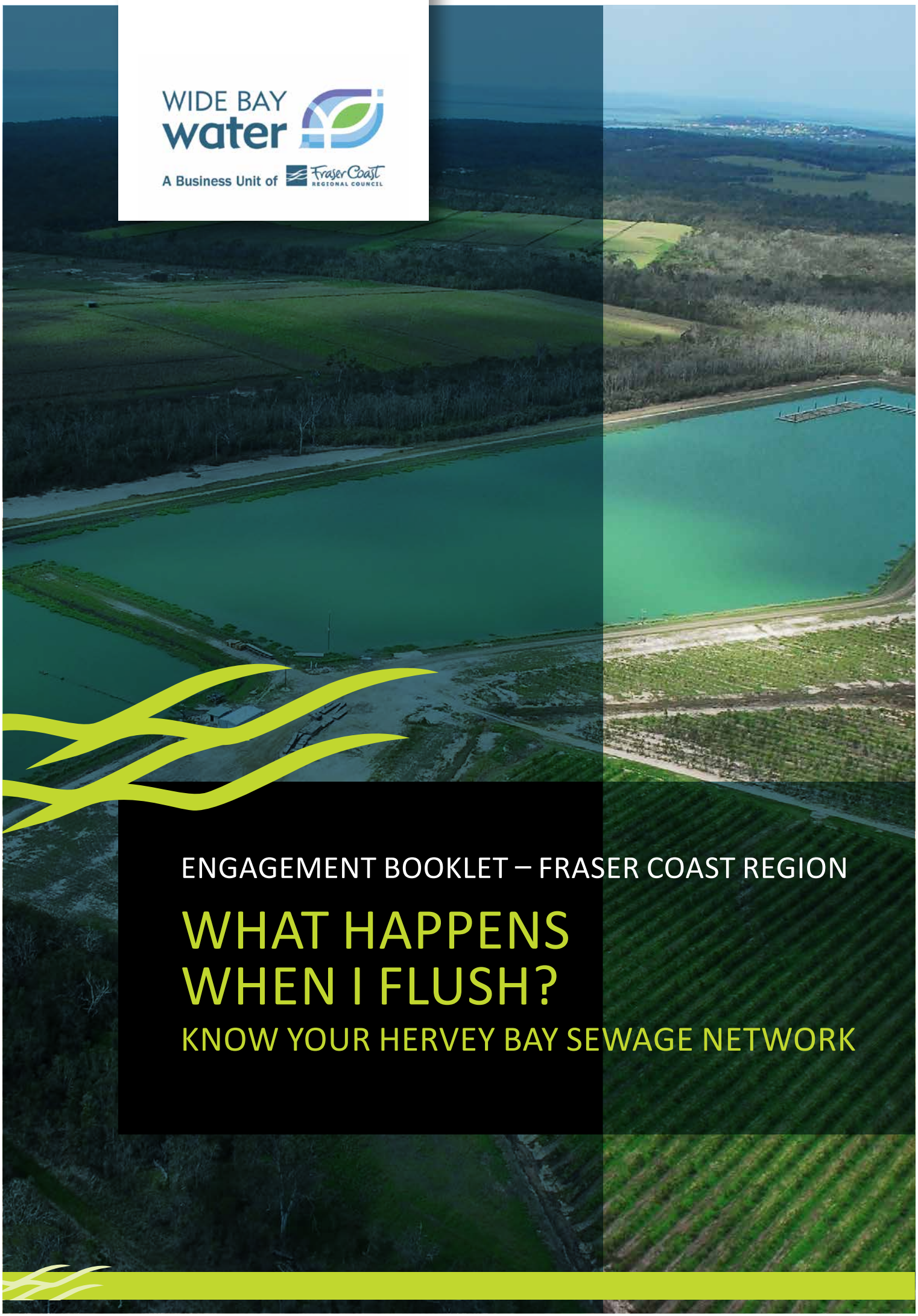


WIDE BAY water

A Business Unit of Fraser Coast Regional Council

ENGAGEMENT BOOKLET – FRASER COAST REGION

WHAT HAPPENS WHEN I FLUSH?

KNOW YOUR HERVEY BAY SEWAGE NETWORK

CONTENTS

INTRODUCTION

Hervey Bay, and the Fraser Coast, is one of Australia's fastest growing regions. With significant future population and tourism growth expected in Hervey Bay, pressure on current infrastructure, in particular sewage management, has required investigation on options to cater for future needs.

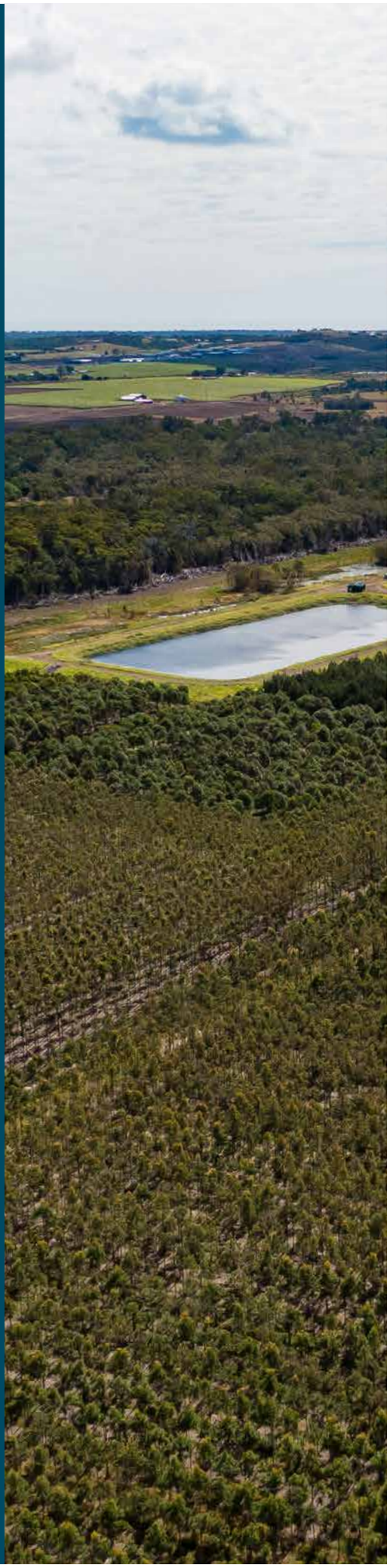
Over the next 25 years the population of Fraser Coast is expected to increase on average by 1%[1] per annum. Specifically, within the Hervey Bay Sewer Catchment area, growth over this same time period is forecast to be 1.3%, the latest estimate for the number of equivalent dwellings (ED) is around 36,500 by 2031.

Following significant population and tourism growth in the late 1980s the Pulgul Sewage Treatment Plant (STP) was expanded in the 1990s. The total sewage treatment capacity was further expanded in 2011 with the construction of the Nikenbah STP. The current sewage and recycled water management system is reaching its limit to support the increased population and the associated sewage loading.

Wide Bay Water (WBW), a business unit of the Fraser Coast Regional Council, is responsible for the operations, maintenance and construction of water supply and sewage infrastructure for Hervey Bay and is investigating solutions to service the projected increase in load on the sewage system.

Fraser Coast Regional Council is one of Australia's leading Water Service Providers in maximising their recycled water use and as a result, minimising the outflow of nutrients into the Great Sandy Strait.

The Fraser Coast Regional Council is engaging with the community to seek feedback on a range of options for sewage treatment plant (STP) upgrades in order to meet the needs of our growing population.



[1] This is based on Office of Government Statistician's projections in 2018.

HOW CAN YOU BE INVOLVED IN THE STP UPGRADE PROJECT?

Council is seeking your community feedback on each of the three STP upgrade options so they can make a considered decision in balancing the technical assessments made and the views of the community.

To help you to understand this complex and technical network, we have provided:

- 'Expanding the Hervey Bay Sewage Network: Options for STP upgrade' booklet which details the three possible options to address our future needs;
- This document which details our Hervey Bay Sewage Network;
- Feedback form for you to share your views on these three proposed options.

As you read through these documents, please use the definitions in Appendix A to explain some of the terms used.

Copies of these documents are available online, at Council's Customer Service Centres or branch libraries at Maryborough or Hervey Bay.

There are a number of engagement activities planned in September where you can participate and seek more detailed information. To be a part of this important decision for Hervey Bay:

- Join us for the community information stalls, site visits and community workshops
- Fill out the Feedback Form or our online survey
- Find the Council's Community Hub website at frasercoast.engagementhub.com.au and click on the link for the 'Major Sewage Treatment Plant Capacity Increase for Hervey Bay Site Selection project'.

Feedback on the proposed upgrade options closes at 5pm on Tuesday 8 October 2019.

THE CURRENT HERVEY BAY SEWERAGE SYSTEM

The Hervey Bay sewerage system collects and treats all residential, commercial and industrial sewage from within the Eli Creek, Nikenbah and Pulgul STP catchments.

Sewage treatment and water recycling management can be considered as two separate systems which are closely related to one another.

> The collection and treatment of sewage.

> Methods used in the reuse or release of treated recycled water.

Find out more about the possible upgrade options in the 'Expanding the Hervey Bay Sewage Network: Options for STP upgrade' booklet.

426km of gravity sewer mains | **74** sewage pump stations | **70km** of rising mains

NIKENBAH, PULGUL AND ELI CREEK SEWAGE TREATMENT PLANTS

Three STPs at Pulgul Creek, Eli Creek and Nikenbah treat sewage in accordance with their sewage treatment plant licences so that it can be reused at irrigation sites or released to nearby water bodies.

Each sewage treatment plant is designed with two primary criteria:

> treatment design capacity; and

> hydraulic design capacity.

TREATMENT CAPACITY

The treatment capacity is a STP's capacity to reduce the organic matter as well as nutrients, such as phosphorus and nitrogen, in sewage through biological activity (aerobic, anaerobic or facultative) to levels that are acceptable for the reuse or release of the recycled water. Time is required for the organics in the sewage to be consumed by biological activity. Each STP must be constructed to allow this process to occur, taking into account the incoming load and the resulting targets desired.

HYDRAULIC DESIGN CAPACITY

Similarly, the STP capacity needs to be sufficient to be able to pass the volume of water coming into the plant (commonly referred to 'hydraulic loading').

Typically, a STP will be designed to fully treat three times average dry weather flow (ADWF). Flows above this typically undergo primary screening, chlorination and bypasses the sewage treatment process. Flows above three times ADWF aren't common and records for Pulgul STP indicate this has only happened during 13 wet weather events since 2010.

Nikenbah

Pulgul

Eli Creek

Benefits of the reuse network

THE CURRENT WATER RECYCLING SCHEME FAST FACTS

500,000
hardwood trees planted

UP TO 100%
of effluent can be reused

40% increase
in cane field yield

80% INCREASE
in dollar return on cane harvests

100ML OF WATER SAVED
by golf courses (equal to water supply for 450 homes)

35 TONNES OF NITROGEN
prevented entering the waterways in the 2017/18 financial year

20 TONNES OF PHOSPHOROUS
prevented from entering the waterways in the 2017/18 financial year

*these 'facts' are averages and estimations, not exact figures

STP	Nikenbah 100% Reuse	Pulgul Outfall present	Eli Creek Outfall present
YEAR BUILT	2009	1984 and a major upgrade in 1991	1969 (first treatment plant in Hervey Bay)
LOCATION	Piggford Lane 6.3km south of Pialba	Cicada Lane approximately 1.2km north of the Hervey Bay airport	Located in Pialba
PROCESS	> Uses Biological Nutrient Removal and Membrane Reactor technologies > Located inland and as such does not currently have access to a water outfall outlet	> Uses oxidation ditch with a bioreactor and secondary clarifiers, and an Intermittently Decanted Extended Aeration Lagoon. > Recycled water is transferred to the plantation storage lagoon or it is discharged to Pulgul Creek	> Uses traditional trickling filter technology > Recycled water is transferred to the storage lagoon or it is discharged to outfall at Eli Creek
LICENSE CONDITION	> Average dry weather flow design capacity of 4.8ML/day. > Does not allow for discharge to any receiving waters.	> License permits a discharge of 2.0ML/day during dry weather and a single day discharge limit is 6.0ML during wet weather. It also requires that 90% of the average dry weather flow (ADWF) must be reused each year.	> Daily discharge releases into Eli Creek during periods with no rainfall shall not exceed 2.75ML/day and during periods of wet weather shall not exceed 6ML/day. It also requires that 90% of the average dry weather flow must be reused each year.
CAPACITY	> Services a catchment of approximately 7,000 equivalent dwellings (ED) (3.2ML/day) > Has a treatment capacity of approximately 10,000 ED (~4.5 ML/day)	> Services a catchment of approximately 10,000 ED (4.4ML/day) > Has an estimated treatment capacity of 12,000 ED (~5.4 ML/day)	> Capacity is estimated to be 7,500 ED (3.4ML/day) > Given the proximity to existing residential properties and residential land, and the use of older infrastructure, a capacity ceiling of 10,000 ED has been applied to this plant

WHAT COMES OUT OF OUR SEWAGE TREATMENT PLANTS?

From the processing in our sewerage treatment plants comes:

> Biosolids; and

> Recycled water.

WHAT ARE BIOSOLIDS AND HOW THEY ARE INCORPORATED INTO THE HERVEY BAY SCHEME?

Biosolids are the residual treated solids from the sewage treatment process.

Biosolids are collected from the sewage treatment process as slurry. This slurry is dewatered at the sewage treatment plant to produce a drier biosolids cake. The cake is stockpiled for a minimum of six months to further dry the biosolids and meet stability and contamination grades. These grades are set to ensure the biosolids quality meets reuse requirements for health and safety.

Biosolids contain nutrients and carbon which encourage plant growth. By reusing biosolids, these nutrients and carbon are returned to local soils, reducing the need for additional fertilisation. We reuse biosolids on our hardwood plantations to improve and condition the soil. Biosolids are also used on some privately managed cane farms. WBW has reused biosolids in this way for more than 10 years and, in doing so, complies with strict environmental requirements.

WHAT IS RECYCLED WATER?

Recycled water is water that has previously been used and collected in the sewerage system. Sewage is treated to a suitable quality (set by State Government) at sewage treatment plants and made ready for reuse for beneficial applications such as irrigation. Also known as effluent, it is then sent to storage lagoons where it is stored for 30-40 days before it is used for irrigation. The stored water is exposed to sunlight for the duration which acts as a disinfectant killing off any pathogens or viruses that may be present.

The quality of recycled water produced on the Fraser Coast is 'Class B' – as specified in the Queensland Public Health Regulation 2018.

HERVEY BAY CURRENT IRRIGATION AREAS

HERVEY BAY SEWAGE TREATMENT NETWORK

LEGEND

1. Pulgul Sewage Treatment Plant
2. Pulgul storage basins
3. Pulgul farm
4. Hardwood plantations
5. Turf farms
6. Flower farm
7. 850mL storage
8. Cane farms
9. Golf courses
10. Eli Creek Sewage Treatment Plant
11. Sports Precinct
12. Nikenbah Sewage Treatment Plant

GENERAL LANDSCAPING

The city's airport, Wide Bay Water offices and a local cricket ground are just some of the landscaped areas that stay green and lush through irrigation from the wastewater reuse scheme.

9. GOLF COURSES

An average 18-hole golf course uses 100 megalitres of water a year. The wastewater recycling scheme supplies two golf courses in Hervey Bay. This source substitution conserves enough town water resources to supply the needs of about 600 homes.

4. HARDWOOD PLANTATIONS

Wide Bay Water is establishing hardwood plantations around each scheme's major storage dam to ensure the 100% reuse target can be achieved - particularly when demand from the cane industry diminishes during the non-growing season.

8. CANE FARMS

The success of Pulgul Farm led to the establishment of the Eli Creek irrigation scheme - developed with cane farmers in mind. An 850mL storage facility was created to ensure consistent supply, and eight farms connected. A ninth farm has connected via the pipeline linking the two irrigation schemes. Irrigation has seen cane yields increase by more than 40% and dollar return increase by 80% compared with previous dryland practices. Cane farmers have effectively drought proofed their operations and improved their competitiveness at a time when the state's sugar industry is in crisis.

5. TURF FARM

The wastewater irrigation scheme has provided opportunities for farming operations that traditionally struggled to exist in the Hervey Bay region, because of its lack of rivers and groundwater supplies. A turf farm near the Eli Creek treatment plant has been able to use the treated water to irrigate for some time, while the construction of the pipeline connecting Eli Creek and Pulgul has enabled another turf farm to establish - the farmer specifically buying land alongside the pipeline to connect to the scheme.

3. PULGUL FARM

With no major rivers or groundwater supplies in the area, sugar cane was farmed using dryland methods. Wide Bay Water entered into a share farm arrangement with a local farmer on 70ha of land at Pulgul to investigate the opportunities for irrigation using wastewater. The farm had been one of the worst performers in the district. In 1992 the wastewater was connected to the property. Within five years, the farm went from being the least productive to winning the Maryborough Cane Productivity Award for the highest sugar cane yield per hectare. The success of Pulgul Farm led other cane farmers to connect to the scheme.

WHAT DO WE DO WITH RECYCLED WATER?

The Hervey Bay Recycled Water Scheme (Scheme) provides recycled water that can be reused at irrigation sites with any excess released to the environment.

The recycled water from all three STPs services an interconnecting recycled water network, where recycled water can be transferred around the scheme to the many storage lagoons on WBW plantation sites and on to irrigate privately owned sugar cane farms, pastures, golf courses, turf farms and WBW owned hardwood plantations.

The design of the recycled water scheme is based on a water balance between sufficient irrigation area (with seasonal crop demands and varying rainfall) and the daily production of recycled water from the STPs. To achieve this, recycled water storages are required to meet the fluctuations between supply and demand.

Currently there are a number of recycled water management components located in the Hervey Bay area including:

- several recycled water storage dams;
- recycled water distribution pipe network and pump stations; and
- four hardwood tree plantations (and pasture) managed by WBW.
- reuse by private entities includes irrigation for agricultural and other uses:
  - Sugar cane;
  - Crops;
  - Golf courses;
  - Turf farms;
  - Sports fields;
  - Open space irrigation; and
  - Supply fill points for dust suppression.

The scheme is the largest local government owned plantation scheme for recycled water reuse scheme in Australia with approximately 526 hectares under drip irrigation.

These uses are subject to having approved Effluent Irrigation Management Plans.

BENEFITS OF THE RECYCLED WATER REUSE SCHEME

The Scheme enables up to 100 per cent of Hervey Bay's treated sewage effluent, also known as recycled water, to be re-used. It is estimated that in the 2017/18 financial year alone the reuse scheme protected the surrounding ocean from approximately 50 tonnes of nutrients and 15 tonnes of suspended solids being released.

Many of Queensland's Water Service Providers (WSPs) of a size similar to Fraser Coast Regional Council recycle less than 50 per cent of their effluent treated, with the larger WSPs in the south east corner of Queensland having reuse rates under 15 per cent of the total effluent treated.[2]

As well as preventing nutrients from being discharged into the Great Sandy Strait, the plantations (over 500,000 trees planted since 2005) remove greenhouse gas (carbon dioxide) from the atmosphere. It is difficult to calculate how much carbon dioxide is removed from the atmosphere, however preliminary estimates indicate that up to 500 tonnes of carbon dioxide per hectare is removed by the time the plantation is harvested after 26 years.

Trees from the Hervey Bay Water plantations irrigated with recycled water from the reuse scheme are growing at an accelerated rate and at least 10,000 of the plantations' eucalyptus trees will be used by Ergon Energy for power poles.

[2] Based on 2018 SWIMData and a mix of Queensland Government and other indicators; assumptions in calculations mean comparisons between WSPs are indicative of reuse rates only.

HOW IS RECYCLED WATER REGULATED?

Recycled water is regulated under the *Queensland Public Health Regulation 2018* and the *Water Supply (Safety and Reliability) Act 2008*.

AIM	> To protect public health and, for certain schemes known as critical recycled water schemes (those approved to place water back into the drinking water supply), to ensure continuity of operation of the scheme to meet the essential water supply needs of the community or industry. > Non-critical recycled water schemes in Queensland are required to be registered with Water Planning and Regulation (the Regulator).
RECYCLED WATER QUALITY CRITERIA	> The quality criteria for recycled water is set out in the Queensland Public Health Regulation 2018. > These criteria prescribes the minimum water quality that must be met by recycled water providers to ensure that the quality of recycled water is protective of public health. Recycled water quality is classified as A+ to D in Queensland. > Recycled water on the Fraser Coast is Class B quality.
RECYCLED WATER REGULATOR	> The Queensland Department of Environment and Science (DES) is responsible for the regulation of applying recycled water to land, discharges to waterways and protecting the environment. > Certain STP license conditions relating to each reuse scheme are monitored for compliance by the DES.
RECYCLED WATER USAGE AND MANAGEMENT ON THE FRASER COAST	> Recycled water on the Fraser Coast has been in operation for the past 23 years. > In addition to meeting legislation requirements for protecting public health and the environment, WBW has adopted a risk management and a multi barrier approach to ensure the reuse schemes on the Fraser Coast are robust and safe for approved end uses. The multi barrier approach incorporates the following elements: - Monitoring of recycled water - Soil and land assessment - Monitoring quality of biosolids - Training users - Development of reuse agreements with conditions around how recycled water is to be used - Monitoring soil moisture - Remote operation and monitoring of irrigation to prevent over irrigation of soils

LICENSE CONDITIONS FOR RECYCLED WATER

The license conditions for STPs in Hervey Bay were developed to reduce the volume of nutrients discharged from WBW STPs into the waterways surrounding Hervey Bay.

> Each STP has a set of discharge targets that are agreed through a thorough negotiation process between WBW and the relevant state environmental authority at the time (currently DES). This is known as a license agreement.

> The license agreements for Pulgul and Eli Creek STPs include daily maximum flows, maximum nutrient discharge levels per year and a minimum amount of recycled water that must be irrigated.

> Nikenbah STP is different as it is not able to release recycled water into a water body and has a 100% reuse condition.

> The negotiations for the environmental license agreement consider historical data, modelled future simulations and environmental impact assessments.

STP	LICENSE AGREEMENT CONDITIONS FOR DRY WEATHER	LICENSE AGREEMENT CONDITIONS FOR WET WEATHER	REUSE RECYCLED WATER (IRRIGATE TO LAND)
Pulgul	2ML per day	6ML per day	at least 90% of average dry weather flow
Eli Creek	2.75ML per day	6ML per day	at least 90% of average dry weather flow
Nikenbah	not able to release recycled water into a water body	not able to release recycled water into a water body	100% reuse

AVERAGE DRY WEATHER FLOW TARGETS FOR REUSING RECYCLED WATER

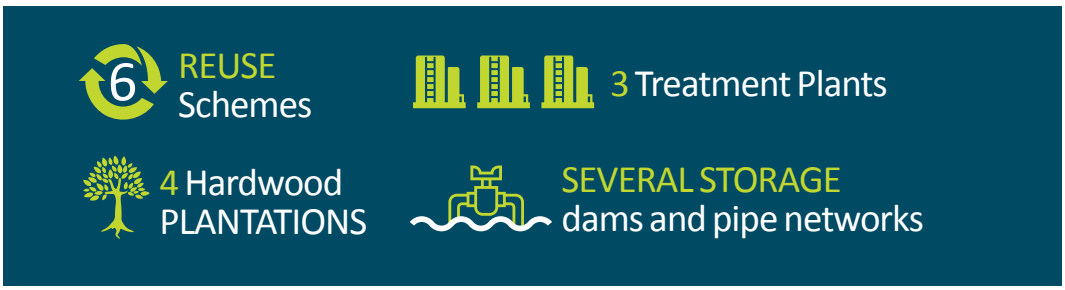
> Average Dry Weather Flow (ADWF) is calculated on an annual basis.

> All additional flows above 90% may be released as long as releases are within daily limits.

> While 90% ADWF is the minimum amount that must be irrigated, WBW often reuses far more than this, especially during dryer years when farmers make maximum use of the recycled water.

> Achieving 90% ADWF reuse can be challenging during wetter years when continuous rainfall means farmers do not need the recycled water and there is little opportunity to irrigate on WBW plantations.

> WBW was unable to achieve the 90% ADWF requirements in 2010/2011 and 2011/2012 during high rainfall years.

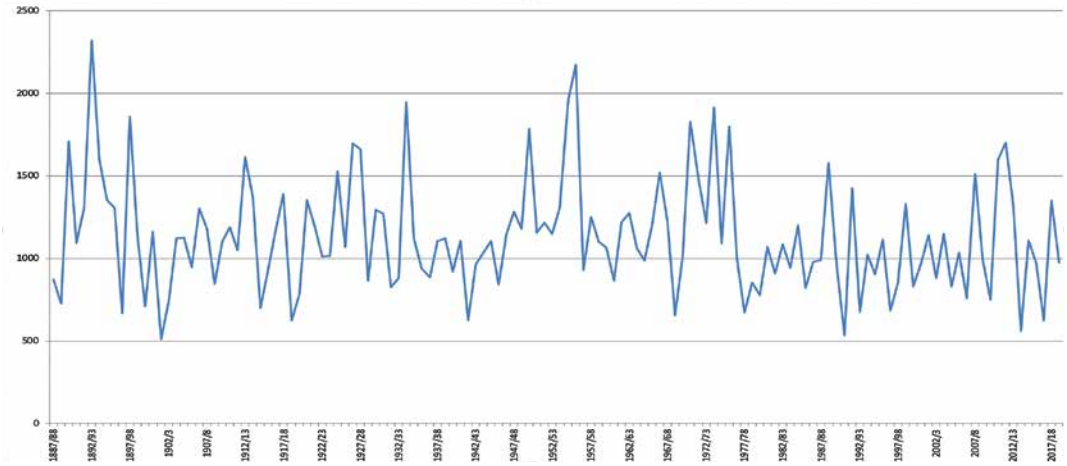


RAINFALL AND ITS IMPACTS ON INFLOW AND REUSE IN THE HERVEY BAY SEWERAGE TREATMENT SYSTEM

Not only does rain have a direct impact on how much recycled water is irrigated it also impacts the amount of sewage that flows into STPs.

The following graph shows annual rainfall totals recorded over the last 127 years in Maryborough (by financial year). Maryborough rainfall has been used instead of Hervey Bay as the Hervey Bay rainfall records do not extend as far back historically.

HISTORICAL YEARLY TOTAL RAINFALL (MM)



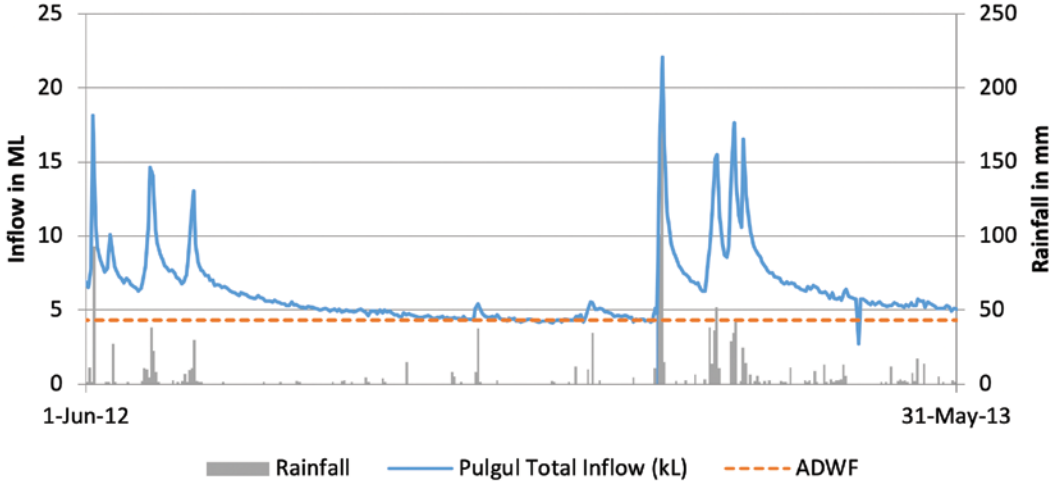
Rain can increase flow into STPs in two way: inflow and infiltration.

- Inflow is direct flow into the sewerage reticulation network, this can enter through manhole covers, illegal stormwater connections and various other means.
- Infiltration is water that has seeped into the sewerage network through minute cracks in pipes and manholes, and generally comes from water in the ground.

While inflow is almost instantaneous and only an issue while it is raining, infiltration is caused by raised water tables and can continue for weeks after heavy rainfall periods.

The following graph plots rainfall against sewage inflow into the Hervey Bay STPs.

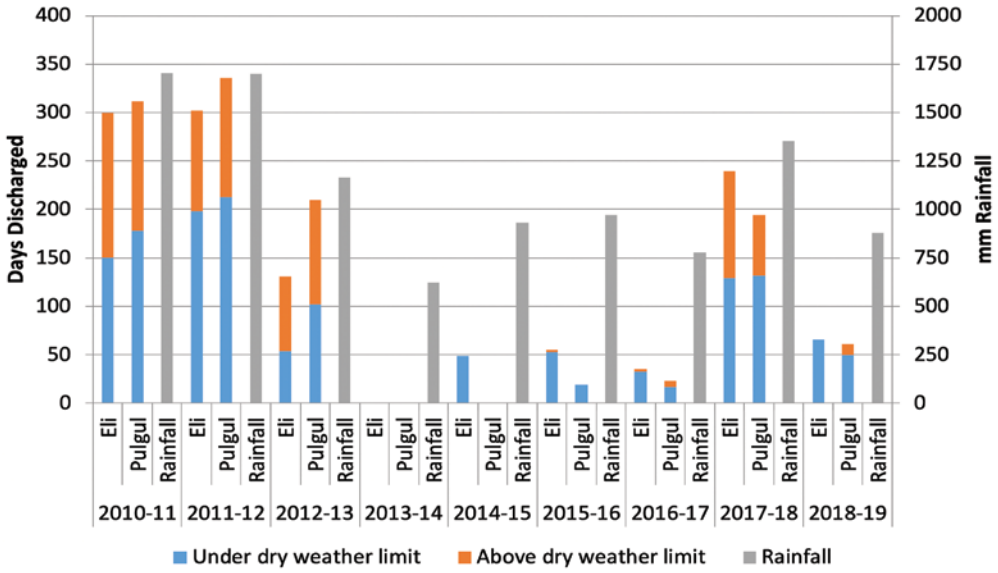
SEWAGE INFLOW VS RAINFALL



The graph below shows the general relationship between rainfall and frequency of discharges. The "above dry weather limit" counts the amount of discharges above the 2 ML and 2.75 ML dry weather discharge limits for Pulgul and Eli Creek STPs respectively. This does not mean that any licence conditions were broken as the vast majority of these discharges would have occurred during wet weather periods and been below the 6 ML limit for other discharges.

High rainfall years result in more discharges, with Pulgul discharging for 336 days in the 2011-12 financial year. Low rainfall results in little to no discharge.

DAYS DISCHARGED PER FINANCIAL YEAR



MANAGING THE RECYCLED WATER REUSE SCHEME

The benefits of the recycled water reuse scheme are numerous but not without challenges. The table below illustrates some of the key strengths, challenges and possible solutions of the recycled water reuse scheme.

STRENGTHS	CHALLENGES	STRATEGIES
> Provides a sustainable and effective use of a precious resource. > Prevent nutrients from being released into water bodies. > Absorbs carbon dioxide from the atmosphere. > Helps to improve and provide a service to the community. > Reduced cost for WBW when private users irrigate with recycled water. > WBW can continue to irrigate the hardwood plantations even during high rainfall years.	> Private users cannot be relied upon to use the recycled water during wet weather periods. There can be entire years when it is raining so much that demand for recycled water from private users becomes very low. > WBW must be careful to avoid overloading the soil with nutrients or saturating the irrigation areas and causing overland flows of the recycled water.	> The plantations use specific tree types that can survive extended dry periods and also survive extended periods of highly waterlogged soils. > Construction of recycled water storage dams. The dams allow for storage of the recycled water for when private users aren't using it. > Release of recycled water at outfalls. The volume of recycled water released is limited to ensure safe and sustainable release to the environment with minimal risk of ecological harm.

WHAT IS AN OUTFALL?

An outfall is where recycled water exits a recycled water management network into a water way or body e.g. creek, river or ocean, also commonly called a 'discharge' or 'release' location.

> Consideration in choosing an outfall location includes that the site should be able to disperse the recycled water effectively so that it does not have a negative impact on the environment. Commonly, hydrodynamic modelling is used to demonstrate the impact of an outfall on the receiving waters.

> In Hervey Bay, the Eli Creek and Pulgul STPs both have licenced outfalls for the release of recycled water to waterways.

PULGUL STP OUTFALL

The current release point (outfall) for Pulgul STP is located in the lower tidal section of Pulgul Creek, which is limited in terms of its hydrodynamic ability to effectively disperse the recycled water. This area is surrounded by dense mangrove forest, saltmarsh and claypan, and provides valuable habitat and food sources for a variety of vertebrate and invertebrate species.

An independent Environmental Impact Assessment of the current release conditions at Pulgul Creek was commissioned in 2014 by WBW. The findings indicated that there were impacts upstream and downstream of the outfall. A range of effects of the current releases on water quality, flora and fauna were observed throughout the freshwater, estuarine and intertidal areas with localised hot spots near the shallow outfall.

Concentrations of nutrients were found above naturally expected values as well as relevant water quality objectives set by the Queensland Government. While nutrients are also likely to accumulate from other sources in the upstream creek catchment, it was observed that the releases of recycled water from the Pulgul STP were contributing to the accumulation of nutrients – particularly when there was a low natural flow in the creek.

WHAT ARE THE KEY OUTFALL RISKS?

HUMAN HEALTH RISKS

The key risk to human health from recycled water releases is generally through contact with water containing elevated levels of faecal contamination such as bacteria and viruses. Such contact can be classified as either primary or secondary in nature. Primary contact usually being defined as activities that have a high probability of water being swallowed e.g. swimming, windsurfing, diving and water-skiing, while secondary contact activities involve a lower probability of water being swallowed e.g. boating, rowing and fishing.

ENVIRONMENTAL RISKS

Key environmental risks associated with marine outfalls are a product of the elevated concentrations of contaminants being released from the treatment plant process.

Some of key risks commonly associated with such releases include the following:

> Oxygen depletion in the surrounding waters that may prove harmful to marine flora and fauna

> Nutrient enrichment that may trigger algal blooms

> Generation of toxic zones due to the presence of toxicants in the releases

> Settlement of particulate matter and sediment on flora and fauna

WHAT IS HYDRODYNAMIC MODELLING?

In order to help assess these risks hydrodynamic models of the at-risk and surrounding areas are often created that can help estimate and visualise accumulation and dispersion of nutrient in the recycled water.

Hydrodynamic models are used as an efficient approach to simulate water movement in many types of waterways including creeks, rivers, lakes, estuaries and coastal areas. While physical scaled models are still built and used for some purposes, these models are now typically computer based software programs. These programs solve a multitude of complex equations to calculate the behaviour of a water body including information such as current speeds, current directions, water levels and wave heights. Hydrodynamic models then provide the base on which dispersion, plume tracking and ecological models can also be applied.

These models can typically be used to simulate what might happen in our waterways over periods of days, months or even years. They can therefore significantly help decision making on how best to deal with different types of pollution and what might be the best management strategy to mitigate the impacts.

CURRENT OUTFALL AT PULGUL CREEK

Following is an image showing modelled nutrient accumulation in coastal waters for maximum dry weather discharge flows of 2ML per day at the existing release location at Pulgul Creek.

The release of recycled water in this scenario is optimally timed with tidal flows to maximise dispersion.

The model was run over 30 days and this image shows the maximum modelled nutrient levels that could be expected from this discharge scenario

Shading indicates the nutrient accumulation from the existing discharge location at Pulgul Creek at a rate of 2ML per day

ENVIRONMENTAL VALUES

A study was conducted by the Queensland Department of Environment and Science (DES) in 2018 that examined the environmental values for waters in Hervey Bay. The work carried out by DES included consultations with community and stakeholder groups within the Mary Basin, and was informed by the development of the draft Great Sandy Marine Park zoning plan. As a result of the community consultation the environmental values that were identified of greatest importance are:

- Aquatic ecosystem
- Maintenance or rehabilitation of seagrass habitat
- Irrigation - suitability of water supply for irrigation
- Farm Water Supply Use - suitability of domestic farm water supply
- Stock Watering - suitability of water supply for livestock
- Aquaculture - health of aquaculture species and human consumption of aquatic food
- Human consumers of aquatic foods – health of humans consuming aquatic foods
- Primary Recreation - health of humans during recreation (possible direct contact with water)
- Secondary Recreation - health of humans during recreation (indirect contact with water)
- Visual recreation (walking adjacent to waterways)
- Drinking Water Supply (suitability of raw drinking water)
- Industrial Use (suitability of water supply for industrial use)
- Cultural and Spiritual Values (Indigenous and non-indigenous cultural heritage)

The Environmental Values of a community need to be considered when examining the possibility of building an outfall in a coastal location.

CONSIDERATION OF ODOUR GENERATION AT SEWAGE TREATMENT PLANTS

Residential land development adjacent and within close vicinity to STPs can be affected by odours, which can be intensified by a combination of meteorological factors and operational issues.

WHAT IS AN ODOUR BUFFER?

To reduce odour issues around STPs and reuse sites, odour buffer zones are required. These buffers assist as a planning tool in identifying where residential development should be avoided.

WHICH TREATMENT PLANTS HAVE AN ODOUR BUFFER?

STP	ODOUR BUFFER ZONE REQUIREMENTS
NIKENBAH	> Not located near any residential areas and is located on a large property owned by Fraser Coast Regional Council that encompasses the odour buffer area.
ELI	> Odour buffer of 400m from the footprint of the STP > The 400m buffer zone is based on 1990 Victorian guidelines for STPs up to 50,000 EP (Equivalent Persons) > These buffer distances have been supported through odour modelling at the site.
PULGUL	> Odour buffer of 400m from the boundary of the STP and includes several residential and industrial properties falling within this buffer area. This was the result of residential properties existing here before the odour buffer was added to the Planning Scheme. The 400m buffer zone is based on 1990 Victorian guidelines for STPs up to 50,000 EP (Equivalent Persons). This is the same as the potential upgraded capacity of Pulgul STP.

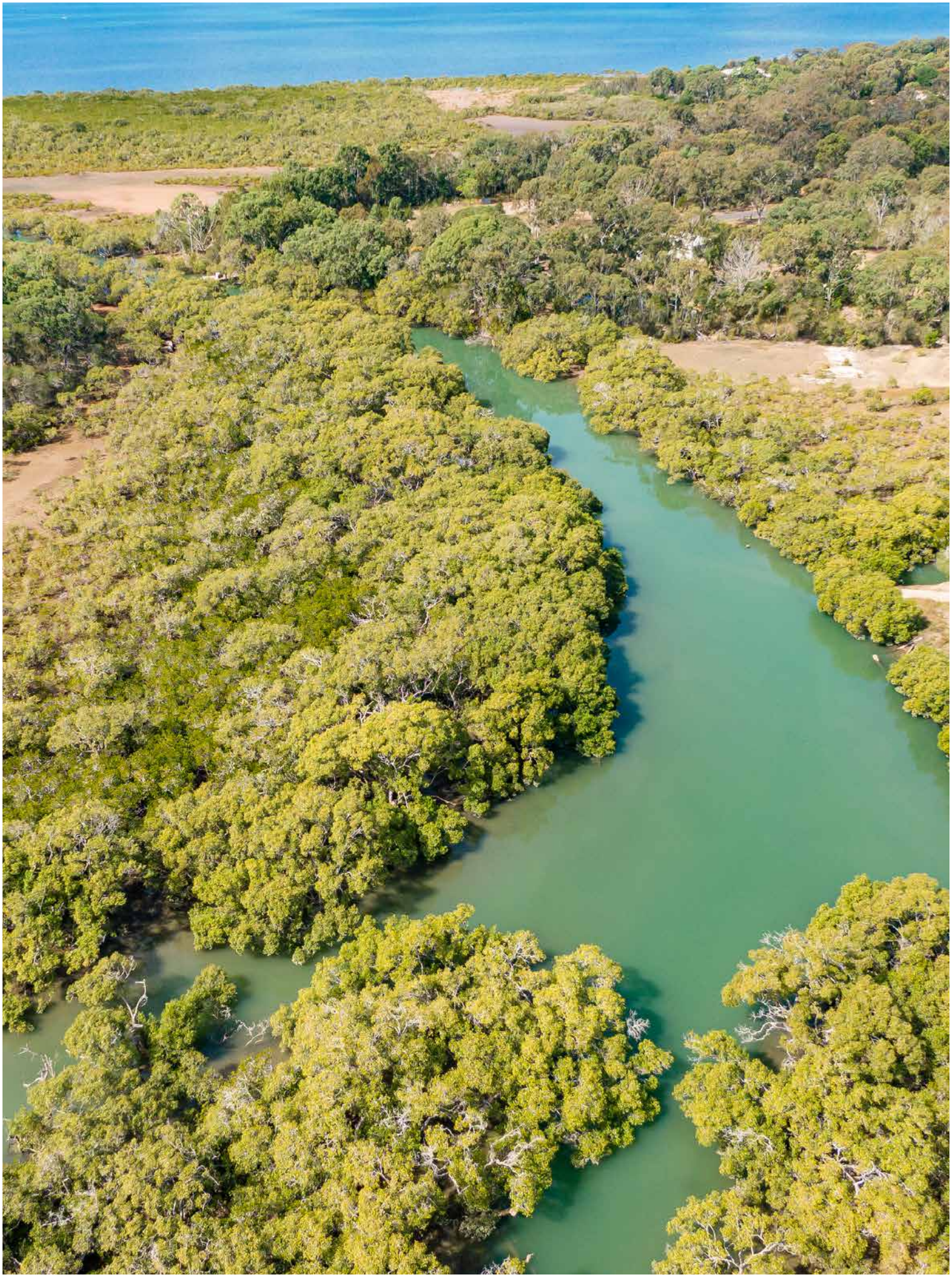
*The 1990 Victorian guidelines for STP's is what the current QLD EPA requirements refer to for odour buffers

HOW ARE ODOUR BUFFERS MANAGED?

The component of the STP that generates the most odour is the inlet works. Improved technology in odour control means that, if the inlet works were to be upgraded, odour control would be installed to prevent any increases in odour from this facility. This mitigates the risk of increased odour for those within the odour buffer zone. There is a risk that should an operational issue occur there may be temporary increases in odour for those within the buffer zone. All reasonable efforts would be taken to ensure this does not occur.

The existing buffer zone for Pulgul STP is based on a guideline originally created in 1990 which is still current. Since then there have been significant advances in inlet works odour control. Based on that guideline the current odour buffer is big enough for the potential upgraded capacity of the STP and the risk of odour issues occurring outside the buffer zone would be negligible.

Pulgul STP and Odour Buffer boundary



APPENDIX A

DEFINITIONS:

Average Dry Weather Flow (ADWF): sewage flow in a sewerage system during periods of dry weather.

Biosolids: the residual treated solids from the sewage treatment process.

Effluent: see Recycled Water

Equivalent Dwelling (ED): This is a standard unit used in load estimation. The unit is typically equal to a three bedroom house with an average number of occupants.

Inflow: is any external source of water, stormwater or groundwater that enters the sewerage system.

Mega Litre: An Olympic size swimming pool is approximately 2.5ML.

Outfall: recycled water exit point within a recycled water management network. This is also commonly referred to as 'discharge' or 'release' location.

Overflow: is the discharge of a combination of stormwater and domestic sewage caused by a sewer's capacity being exceeded during wet weather events.

When the volume exceeds the sewerage system's capacity, storm and sewage water may overflow from pump stations or recycled water storage dams.

Peak Wet Weather Flow (PWWF): is the peak flow caused by stormwater and/or groundwater in a sewerage system during extreme wet weather events.

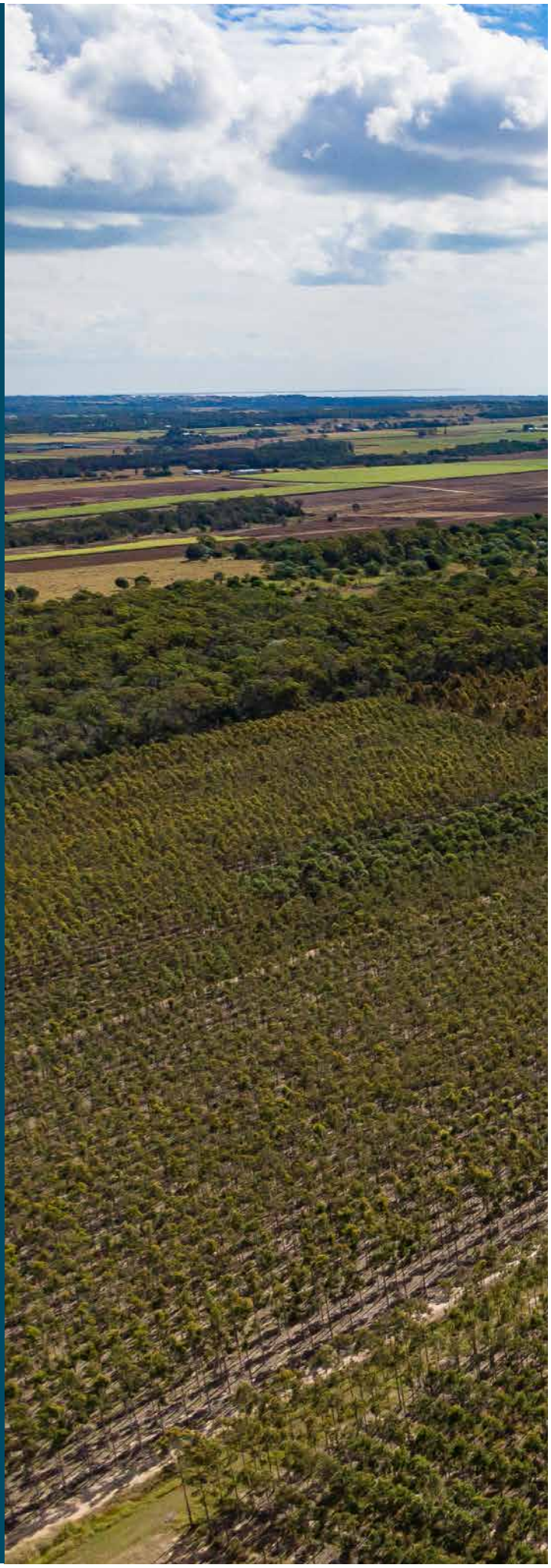
Recycled Water: is the product of a multi-stage mechanical, biological and chemical sewage treatment process.

Sewage: wastewater from a shower, bathtub, washing machine, dishwasher, kitchen sink and toilet.

Sewer: a pipe, usually underground, that is used for carrying sewage away from buildings to a place where it can be safely treated.

Sewerage: refers to the collection of physical facilities (e.g., pipes, lift stations, and treatment and disposal facilities) through which sewage flows.

Sewage Treatment Plant (STP): physical, chemical and biological processes used to remove contaminants and produce recycled water that is safe for reuse and/or release into the environment.



WIDE BAY water

A Business Unit of Fraser Coast Regional Council

HAVE ANY QUESTIONS, FEEDBACK OR NEED MORE INFORMATION?

CONTACT THE PROJECT TEAM AT WBWENGAGEMENT@FRASERCOAST.QLD.GOV.AU
OR SPEAK TO A PROJECT TEAM MEMBER BY PHONE ON 07 3217 6849