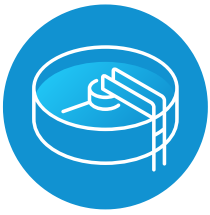
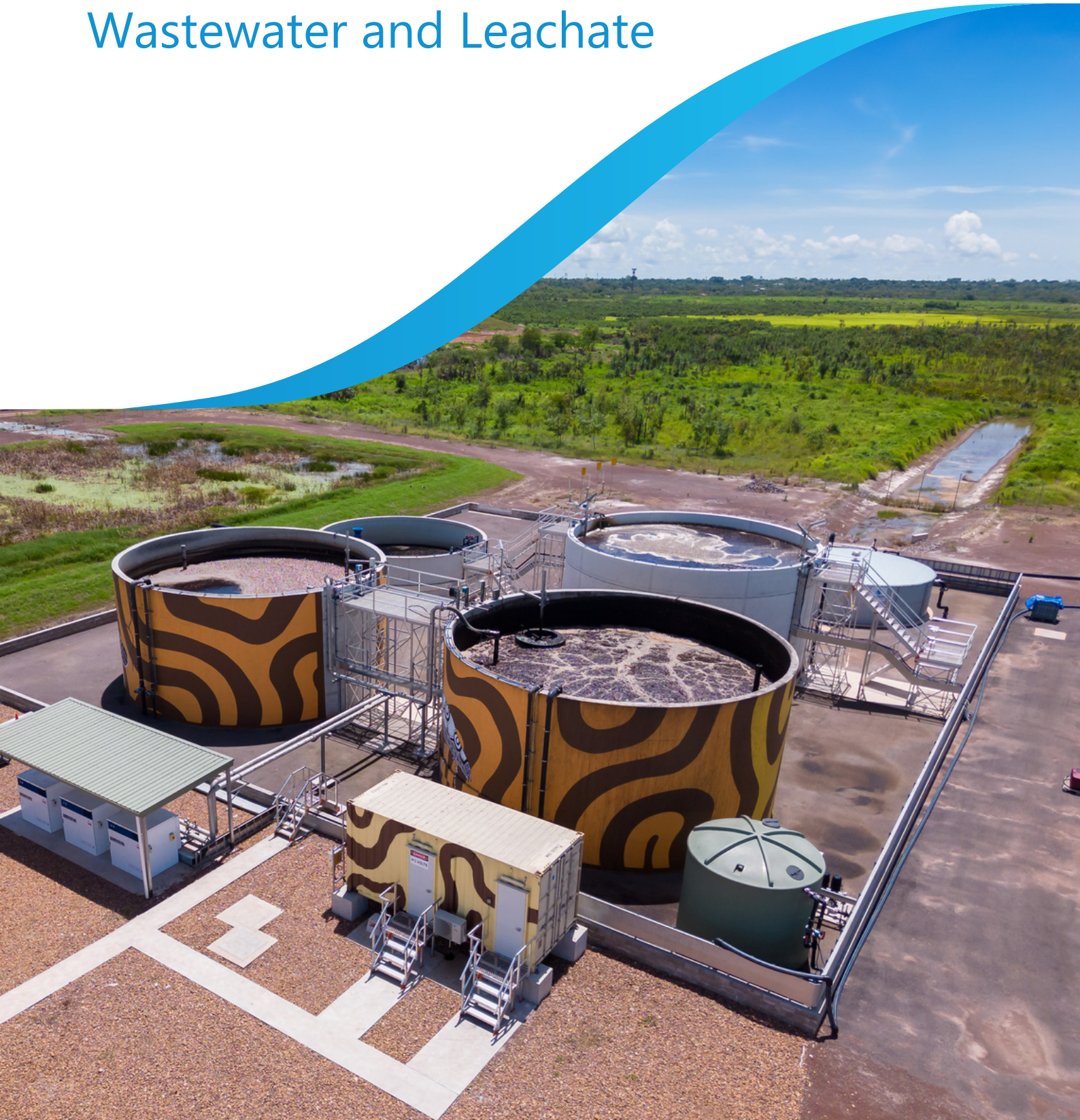





the WATER & CARBON  
group



# Statement of Capability: Wastewater and Leachate



We pay respect to the Traditional  
Owners of this land and acknowledge  
all Elders past and present.



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Our vision is to create leading environmental solutions to complex problems that deliver lasting, positive outcomes for people and the environment.



# About the Water & Carbon Group

The Water and Carbon Group (WCG) is a unique engineering contractor leading the industry in the design, build, operation, and financing of sustainable infrastructure and nature-based solutions.

Since 2007, WCG has been at the forefront of sustainable engineering solutions, specialising in water, carbon and environmental services.

We offer a comprehensive suite of services spanning advisory, design, delivery, operation, and research and development.

Our clients include government entities, utilities, private sector companies, as well as those engaged in waste/landfill management, and mining.

## Our Vision and Approach

Our vision is to create leading environmental solutions to complex problems that deliver lasting, positive outcomes for people and the environment.

This stems from the need to address important environmental issues in ways that provide the best opportunities to create positive change and deliver exceptional value to stakeholders.

We approach all projects collaboratively, leveraging the knowledge and experience of our multi-disciplinary team to create cutting-edge solutions packed with co-benefits.

This begins by asking the right questions. We develop a broader understanding of a project to identify opportunities that add social, economic, and environmental value to our clients and stakeholders.

## Legacy:

To ensure actions positively impact the world of future generations.

## Tenacity:

To be uncompromising in our quest to make a positive difference.

## Vision:

To have freedom of imagination. Be open-minded to new methods of achieving goals.

## Respect:

To embrace diversity and change. Promote individual contribution.

# Our Wastewater and Leachate Team

Our knowledgeable team has experience right across Australia with all types of wastewater.





## David Leinster

### Wastewater & Solutions Development Manager

Responsible for the development of bespoke wastewater treatment solutions that lead the industry in performance and sustainability. Two decades of experience in design and construction of wastewater treatment, bioenergy, biosolids management, and resource recovery projects.



## Mark Mullett

### Technical Manager: PFAS, Mining, Research

Throughout his 25+ year career, Mark has worked across several projects resolving hydrometallurgical and wastewater challenges within the industrial and mining sector. He is responsible for the development of PFAS and mining solutions.



## Simon Toomey

### Construction & Commissioning Manager

An industry leader, amassing over 35+ years of experience working within construction management, field services, and environmental management. Simon has project managed, commissioned, and supervised hundreds of infrastructure projects throughout Australia.



## Jean-Marc Laurillard

### Wastewater & Leachate Project Manager

Almost 2 decades of experience in mechanical engineering, design management and project management in the water and wastewater industry. Works collaboratively to develop efficient systems and cost-effective solutions.



## Sean Karimi

### Wastewater & Leachate Process Engineer

Sean's background is in Chemical Engineering and he has strong working experience in water and wastewater projects. He has almost a decade in the industry preparing concept designs, managing projects in water treatment and engineering.



## Atalana Hague

### Graduate Process Engineer

Responsible for assisting in the design and implementation of wastewater treatment solutions. Through her work experience and tertiary studies, Atalana has built solid skills in wastewater projects.



## Jonathan Quintanar Velasco

### Process Engineer

Responsible for developing and designing process systems and equipment and assisting with project commissioning and startup. Throughout his engineering career, he has designed industrial water and wastewater infrastructure and has worked on several water treatment projects in the industrial, municipal and resource sectors.

# Our Wastewater Capabilities

New-age engineering can transform wastewater into a resource with boundless opportunities.

## What we offer

At WCG, we develop modern innovative wastewater treatment solutions across multiple engineering disciplines that create value far beyond their core purpose.

Since inception, our goal has been to change how the industry approaches wastewater treatment. We apply a holistic approach to our solutions, focusing on integrating ecological (nature-based) infrastructure with innovative and conventional processes to increase treatment efficiency, deliver co-benefits and reduce energy usage.

Our experienced team of engineers and scientists are driven to create progressive, high performance, low-energy, high efficiency solutions that make a positive impact on people and the environment. We have been delivering wastewater treatment solutions since 2007 and are a prequalified supplier under several pre-approved panels for engineering, environmental and construction services, such as Local Buy.

## Where we work

We have the capabilities and personnel to deliver projects throughout Australia and across all wastewater types, including:

- PFAS treatment in wastewater
- Municipal sewage
- Industrial wastewater
- Sludge
- Mining and resources wastewater
- Landfill leachate
- Construction wastewater





Our services extend beyond wastewater treatment. We strive to create comprehensive solutions that contribute to a healthier environment while aligning with your specific goals and values.

### Research and Development

- Benchtop treatability testing
- Pilot plants



### Advisory

- Process Consulting
- Concept development & optioneering
- Detailed design
- Process Optimisation
- Feasibility studies
- Project management
- Medli modelling



### Delivery

- Greenfield and brownfield infrastructure
- Design, build, operate and maintain
- Flexible finance options



### Operations

- Operation, maintenance, and repair
- Volume based fee-for-service
- Operational support services
- Commissioning



# PFAS Remediation

The LEEF System® (Low Energy Evaporative Fractionation) is a patented, multi-staged treatment system centred around harnessing air, gravity, and solar inputs to deliver a unique and proven PFAS extraction outcome.

The system has been engineered to efficiently and cost-effectively extract regulated PFAS contaminants from wastewater and leachate without high energy consumption, chemical /consumable additives, or excessive waste transport and disposal costs.

This method of PFAS extraction delivers strong cost savings by producing a waste stream of <1% of the original volume. Using a modular design, the system can be easily scaled to meet any volume requirements.

The LEEF System® was initially developed to address PFAS contamination in landfill leachate which exhibited high concentrations of a range of contaminants that rendered conventional methods, such as GAC, resins, RO, and EC ineffective or cost-prohibitive. Subsequently, the technology has been further developed and is effective on a wide range of PFAS waste streams across the globe. It is ideal for targeting PFAS-impacted wastewaters with high levels of co-contamination.

## Key statistics

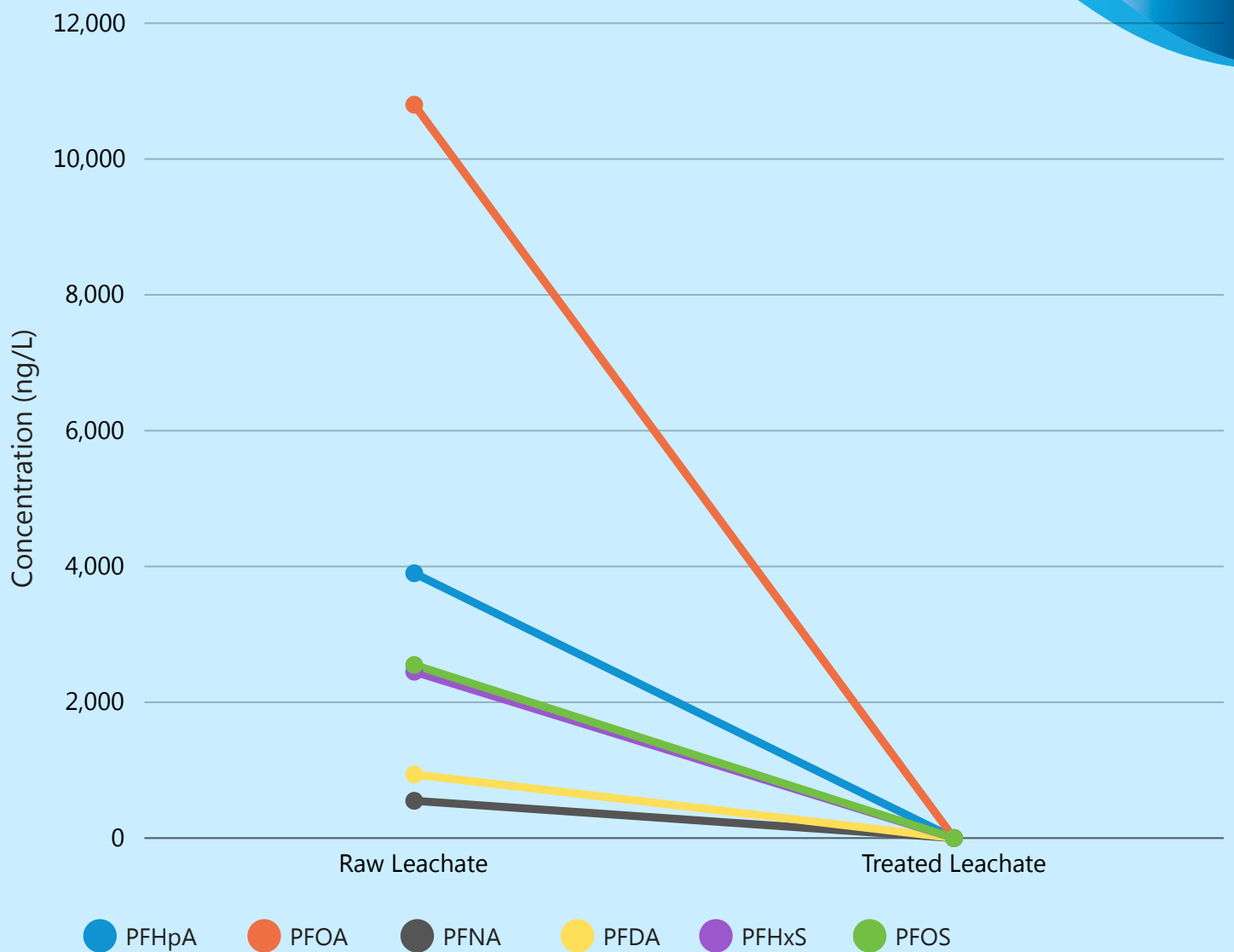
### Removal to Limit of Detection (LoR)

- Below 1% Waste Stream
- Low Energy Usage
- Zero Consumables
- Low Operational Requirements
- Easily Scalable & Modular
- Treatment volumes 1ML+ per day





## LEEF System® Performance



# Technology Integration

Complex waste streams have multiple factors that mean no one product is an off-the-shelf solution. Our approach to project planning is a technology-agnostic view where the best-fit solution provides the best value long-term outcome.

Conventional solutions focus narrowly on a central factor without addressing the surrounding issues and they fail to identify or leverage broader opportunities to create value.

We have our patented technologies such as LEEF System®, but these are used when they form the best design solution for the project.

With our wide range of experience across multiple projects over the past 20 years, we can provide a custom-made solution that is effective and adaptable.

Our experience extends into integrated ecological treatment where effluent can be treated and polished to meet irrigation or discharge water compliance levels.

## Technologies we integrate:

### **Biological Treatment:**

Efficient microbe treatment option with low chemical use.

### **Reverse Osmosis (RO):**

High level of contaminate removal and a well established technology.

### **Carbon Filtration (CF):**

Can be engineered for specific contaminants high levels of integration capability.

### **Membrane BioReactor (MBR):**

A strong biological treatment system for highly contaminated water.

### **Nano Filtration (NF):**

Provides very low particle size filtration and highly energy-efficient.

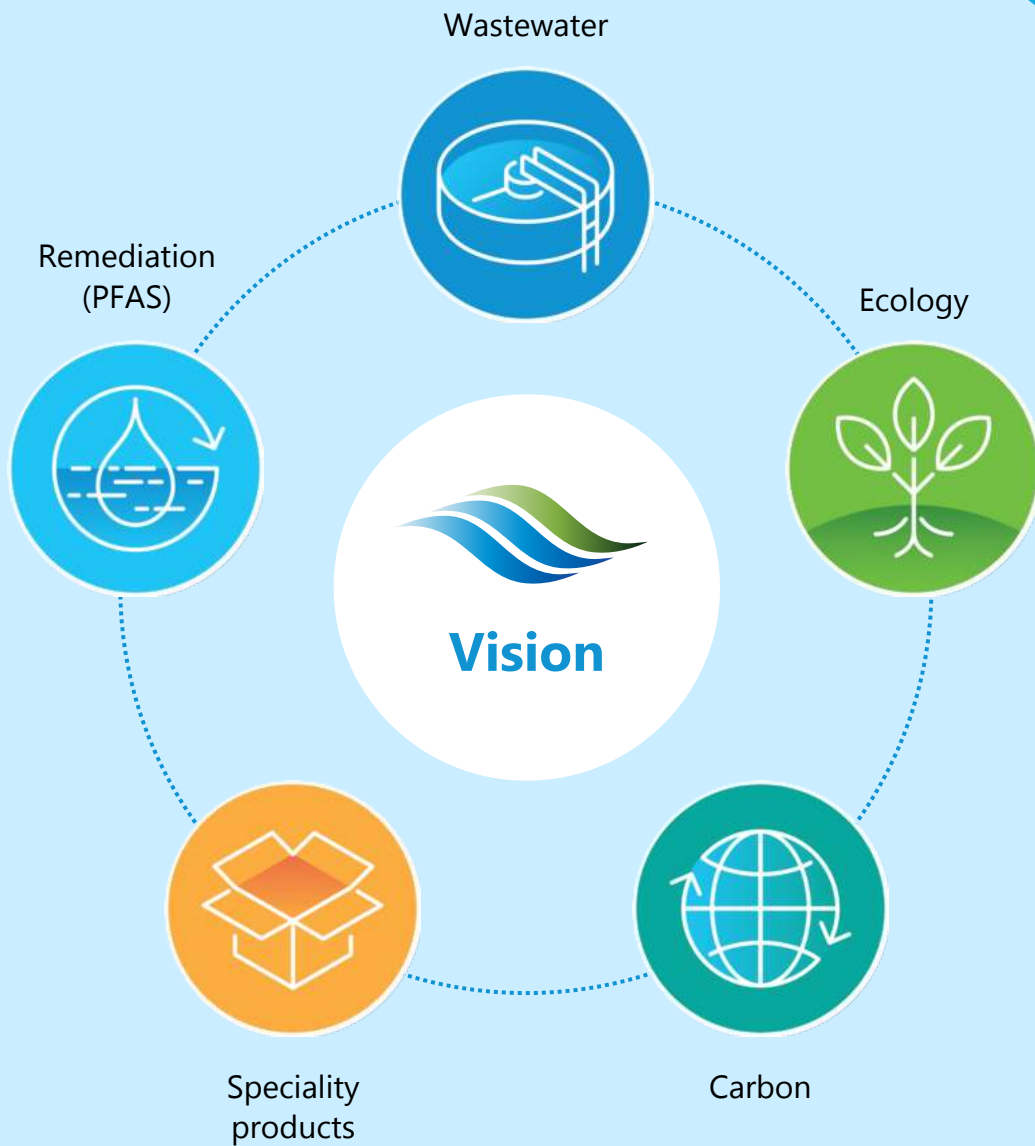
### **Ion Exchange Resins (IX):**

Trace levels of heavy metals and PFAS.





## Integrated solutions



# Case Studies



## Shoal Bay Leachate Treatment Plant & LEEF System

Darwin, Northern Territory

The \$13 million Shoal Bay Leachate Treatment Plant uses WCG's patented LEEF (Low Energy Evaporative Fractionation) System® to remove per- and poly-fluoroalkyl substances (PFAS) and is the first permanent facility treating PFAS in leachate, coupled with biological and ecological treatment.

Treated effluent from the LEEF System® is moved through various biological treatment stages, including a wetland.

From there, the leachate is used to irrigate a capped landfill planted out with Vetiver grass that is salt tolerant and can uptake residual nitrogen and metals from the water.



## PFAS contaminated stormwater treatment

Darwin, Northern Territory

Prior to commissioning, the recently constructed landfill cell at the Shoal Bay Waste Management Facility became inundated with stormwater during the wet season. This stormwater became contaminated from site runoff, with elevated levels of nutrients, metals and PFAS exceeding permissible discharge limits for stormwater.

Our engineers deployed a containerised water treatment plant involving a multi-step approach to tackle the contaminants. By successfully implementing coagulation/flocculation, breakpoint chlorination, PFAS removal via ion exchange, and pH correction, we were able to achieve ultra-low trace levels of contaminants in treated water, ensuring compliance with discharge requirements.

# Case Studies



## Maleny Effluent Disposal Forest & Treatment Wetland

Maleny, Queensland

WCG designed and implemented an effluent disposal forest and wetland, covering 14ha and 3ha respectively, as part of a \$17 million upgrade to the Maleny Sewage Treatment Plant. The project transformed a cattle grazing area into a native rainforest ecosystem irrigated by treated effluent, reducing discharge to the local Obi Obi Creek by 60%.

The treatment wetland component reduced Total Nitrogen concentrations, highlighting the efficacy of using integrated treatment and disposal solutions alongside ecological infrastructure. This initiative, working with client Unitywater, set a benchmark in sustainable effluent management, supporting both biodiversity and community environmental values.



## Low Energy Sewage Treatment Upgrade

Narrogin, Western Australia

A sewage treatment upgrade in Narrogin, incorporated an advanced plastic media trickling filter and a 20,000m<sup>2</sup> treatment wetland. This solution drastically reduced energy consumption, operating at 50% less energy than conventional plants. The upgraded plant achieved an 80% reduction in Total Nitrogen discharge and a 50% reduction in Phosphorus, without pre-treatment.

The wastewater treatment plant upgrade exemplifies how water utilities can enhance treatment plant performance using ecological and energy-efficient methods, marking a significant advancement in sustainable wastewater management.



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