



Australian Government
Great Barrier Reef
Marine Park Authority



reefHQ
GREAT BARRIER REEF
AQUARIUM

Reef HQ Renewal Annual Report

December 2019 – June 2021



Summary

Since December 2019, the Australian Government has invested \$40.1 million in the refurbishment of Reef HQ Aquarium.

- The original funding of \$26.9 million was for capital works that relate to demolition, replacement and upgrade to ageing infrastructure at our 34-year-old facility. The aggressive tropical environment and stress that has resulted from holding in excess of 4 million litres of salt water, have impacted the facility since its build.
- As part of the Government's COVID-19 Relief and Recovery Fund to assist Great Barrier Reef tourism and the North Queensland regional economy, we received \$2.6 million for the upgrade and maintenance to the animal life support systems. These systems control the environments within the live exhibits and are crucial to the health and care of our animals.
- In October, a funding boost of \$5 million from the COVID-19 Relief and Recovery Fund will see a modern new facade, and a new admissions and foyer area to enhance visitor accessibility at the Aquarium.
- Lastly, \$5.6 million for upgrades to exhibits to refresh the visitor experience.

The redevelopment of Reef HQ Aquarium is a keystone project within Townsville's Waterfront Priority Development Area and supports the Townsville 2020 vision to create world-class experiences to drive economic growth through new investment and greater tourism spending.



Achievements to date

Early Works Program delivered and completed. Early Works Program delivered **\$7.4 million** in works relating to critical safety and life support systems.

25 ancillary tanks have been destocked with animals rehomed.

Met with 45 domestic and **65 international** tourism buyers at the 2021 Australian Tourism Exchange.

Media since December 2019:

Potential audience reach through traditional media **1,236,079**.

Equivalent advertising value in traditional media public relations **\$2,186,638**.

216 media mentions across traditional media, newsletters and digital media.



Social media since December 2019:

Total impressions across the Authority and Reef HQ channels **328,504**.

Average engagement rate per impression **5.47%**.

Best performing post for engagement rate per impression:

- Facebook: concept images at 17.1%
- Instagram: "Thank you and sea you soon video" at 10.3%
- LinkedIn: small animal holding area at 30.9%
- Twitter: concept images at 8%

Best performing video with **39%** of all views on videos featuring the Capital Works project is "Thank you and sea you soon" with **12,481 views**.



Website since December 2019:

10 webpages have been created to highlight the Capital Works project.



Timeline



Early works

Key messages

The early works encompass a number of projects with the primary focus on resolving critical safety issues. Other projects were included within the scope due to the requirement to relocate and upgrade integrated systems at the same time. Planning of the early works began more than 18 months ago.

Plant room

New plant rooms were built on level one over the substation to house electrical and mechanical services. This included the thermal energy storage unit, primary life support systems, electrical battery storage and main switchboard.

The relocation of systems into secure areas improves access and safety for staff, while also eliminating issues from pigeon excrement.



New main switchboard

The majority of the electrical infrastructure was nearly 30 years old and required maintenance and upgrades to meet current standards. These upgrades improve safety, eliminate flood risk and enabled a new egress pathway from Reef HQ Aquarium.



Other major projects within this area include:

Thermal Energy Storage System –

- While this project was funded by Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program, the thermal energy storage unit is a key component in stabilising and sustaining electricity supply.



Electrical battery storage –

- Added to Reef HQ's energy system through the installation of an electrical storage system to store renewable energy and operate the transfer of energy when there is a power failure.

Pico-hydro generators –

- When completing upgrades to the Coral Reef Exhibit protein skimmers, energy recovery was incorporated via pico-hydro generators, which now generates electricity 24/7.

Substation demolition and restoration –

- The previous Ergon substation located outside the theatre entrance in Kelleher Place was demolished with Ergon installing a new padmount transformer in a different location. This new transformer takes up a smaller footprint and allows Reef HQ to regain the area previously taken by the substation, which improves in turn the management of fire and emergency services and allows alternative egress pathways.



Fire systems

Both wet and dry fire systems were upgraded to meet current standards. This was triggered by works associated with the relocation of the main switchboard. Works included the installation of dry fire systems in the new plant rooms to detect electrical fires and the installation of a booster pump in Kelleher Place.



Life support system upgrades

Upgrades to the life support systems will ensure the stability of systems that are crucial in maintaining optimal conditions for the animals.

Major projects within this area include:

Coral Reef Exhibit and Predator Tank sand filter systems

- Sand filters are a mechanical filtration system that traps suspended particulates and removes them from the water, ensuring water clarity.
- The previous sand filters were located in a gated area in Kelleher Place. These sand filters were at the end of their life and needed to be relocated to allow space for the new Ergon padmount transformer and fire hydrant booster pump.



Coral Reef Exhibit protein skimmers

- Protein skimmers remove organic waste, such as fish poo, dead algae and food from the systems.
- Parts of the old protein skimmer system were at the end of their life or had broken. The system also needed to be moved, so that repairs could be undertaken on the wave machine deck.
- Ozone degassing was not possible in the old system. Ozone is a naturally occurring, highly reactive form of oxygen gas that attaches to dissolved organic compounds to remove them from the system. In the old system residual ozone would re-enter the Coral Reef Exhibit before it had a chance to dissipate. To enable degassing of ozone in the new skimmer system setup, a reservoir was incorporated to provide the gas a longer dwell-time, preventing any residual ozone from entering the exhibit.



Reverse osmosis machines

- These systems concentrate salinity in the tanks and displace freshwater received through rain during the wet season.
- Two machines were installed, which can displace up to 44,000 litres per day. This has increased the previous capacity almost five-fold.

Heat installation

- Heating is a byproduct of the chiller. Reef HQ is utilising this removed heat in a heat exchanger, so that as water passes through it is heated. This will be utilised in the Coral Reef Exhibit in winter.

Structural works

Modifications, upgrades and repairs, including waterproofing, were required for a number of external and internal areas, sometimes due to concrete erosion or poor design. This included repairs to external walls and the generator room, as well as mezzanines.

Major projects within this area included:

Discovery Lagoon filtration system

- The filtration system was removed from the ground floor and relocated to a new compliant mezzanine underneath the first floor, to facilitate the repair of the nib wall.



Mechanical services

A number of mechanical services required replacing as they had come to the end of their life.

Replacements included:

- Mechanical switchboard for creek-water pump, Predator Tank sand filter system and the wave machine.
- The wave machine included other upgrades to the air delivery system, motors and pneumatic equipment, and new blower motors.

Hydraulic services

Some hydraulic services were modified, replaced or repaired as part of the retrofit actions in other works.

Other projects

Building management system

- Upgrades to the building management system are being planned. Critical modifications have been adjusted as part of the main switchboard and power management upgrades.

Reef HQ IT server

- A new IT server was installed and upgrades to NBN, fibre network connections, secure cabinets and uninterrupted power supplies were implemented to upgrade system securities and efficiencies.

Monitoring water quality

- New equipment has been purchased for monitoring water quality and to determine a baseline, so that during the remaining renewal works we can monitor the impact to our Coral Reef Exhibit.

Capital works

The request for tender (RFT) for a single Principal Contractor for design and construction of the Aquarium closed on 28 May 2021. Conversations have commenced with the preferred Principal Contractor, with the appointment expected to be formalised early in the 2021-22 financial year. In the 2020-21 financial year, total project expenditure was \$4.98 million.

Sustainability initiatives

Sustainability initiatives and innovations have been at the forefront in decision making and procurement. These initiatives include:

Thermal energy storage system

- The unit is a revolutionary renewable energy system. The technology uses an onsite thermal battery that stores excess solar power generated through the existing solar array at Reef HQ. The energy is stored as ice and can be used at night to power life support systems and temperature controls for the Coral Reef Exhibit.

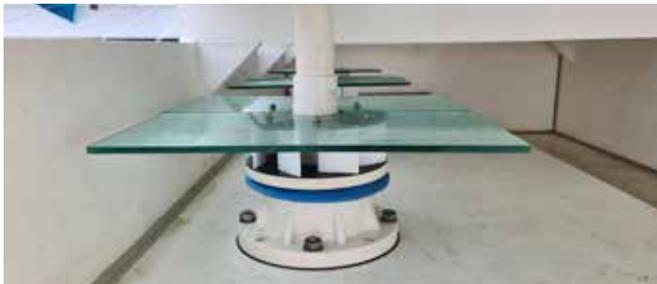
Electrical battery storage

- While not a big system, it will buy precious time if there are issues with other emergency power systems. It can also provide important peak load shedding when the solar power is low, but building loads are still high and it offers a storage system when excess solar power is generated in the middle of the day.



Pico-hydro generators

- As part of the design, water already flowing through the system will turn a propeller, which generates the electricity. This electricity will be used to power the new pumps that are part of the protein skimmer upgrades.



Minimising energy use

- The relocation of systems, such as sand filters, protein skimmers and Discovery Lagoon filtration, has improved efficiencies as they are closer to the water source. This, coupled with highly durable and efficient pumps, minimises energy use compared with the previous system setup.

In materials

- The reservoir that has been incorporated to degas ozone within the Coral Reef Exhibit protein skimmers, is an experimental unit. It is made from a plastic, Paneltim. Paneltim panels are an environmentally friendly product manufactured from new and recycled polypropylene and polyethylene. The panels are fully recyclable.
- The batteries in our electrical battery storage system are sodium nickel chloride batteries (solid state salt). The battery's safe chemistry assures it has zero harmful emissions and is completely recyclable, with battery materials recycled to produce stainless steel, the nickel and iron go into alloys, and the salt and ceramic are used for road beds.
- The sand filters remove particulates from the water by forcing water under pressure through a micron media. In the case of our new sand filters, the micron media used is recycled glass. Between the three sand filters, there is 8550 kilograms of recycled glass media.



Animal movements

Key messages

Reef HQ intends to continue to operate some exhibits during the closure, including the Coral Reef Exhibit and some temporary housing arrangements. Some animals have been, or will be, permanently rehomed in other facilities, and other animals will be temporarily housed off site and returned to Reef HQ once the works are complete.

Due to permitting requirements no animals can be traded, sold, consumed or released into the wild. We have made a commitment that healthy animals will not be euthanased.

Staff from the curatorial team are onsite every day to care for the animals. This includes feeding, tank maintenance and assessing the health and behaviour of the marine life.

Ancillary tanks: destocking, decommissioning and rehoming

Since closing on 1 February 2021, the curatorial team has focused on rehoming or relocating animals from those tanks that are being renovated or refreshed. To date, 25 tanks have been destocked, with only one ancillary tank remaining.

Where possible, fish were rehomed onsite in exhibits that will remain active throughout the works.



The reptiles were returned to facilities from where they were initially acquired.

The last ancillary tank to be destocked is the dangerous creatures tank.

When required, those components that make up the life support system within these exhibits, such as pumps, lights and calcium reactors, will be salvaged and stored for the exhibits when reactivating.



Predator Tank: destocking, decommissioning and rehoming

The Predator Tank is home to a number of iconic and protected animals. The curatorial team has been assessing the best options for the rehoming of our animals. This includes working collaboratively with other facilities designed to house larger animals.



In preparation for the destocking of the Predator Tank, the team is working on a number of plans, including:

- A small-scale experimental sea cage that will be sunk into the Predator Tank and be used to hold the black tip reef sharks, while the team removes the smaller animals.



- On the observation deck additional tanks and systems have been built to house animals once they have been removed from the Predator Tank, and prior to them being relocated or transported, as required by the final plans.

Exhibit revitalisation

Key messages

The visitor experience and educational content will be enriched, through the reinvigoration of exhibits to include hands-on experiences, scientific demonstrations and modernisation of interactive technology.

As part of the exhibit revitalisation, the Authority is undertaking a consultation process with Reef Traditional Owners to co-design Connection of Sea Country exhibitions to improve understanding of cultural knowledge and the protection and promotion of Indigenous heritage values of the Great Barrier Reef.

The next phase of the exhibits project is awaiting the onboarding of the Principal Contractor, where it is expected a design phase will begin and include consultation with the relevant teams.

Master Plan

Works on the Master Plan began in the 2019-20 financial year.

Workshops with internal stakeholders were delivered by external companies; Cox, Counterpoint and UAP.

To date, the Master Plan has been for internal use only. It has been used to guide discussions in the exhibits working group. The Reef HQ Business Operations team is now adapting the Master Plan for a public release.

Exhibits working groups

A working group facilitated by the Reef Education team and with representatives from other Reef HQ teams was established. The group met weekly from August to December 2020, to brainstorm ideas and functionality of spaces.

To expand upon the exhibits working group, a Functional Requirements and Design Group (FRADG) was established to discuss their ideas and further functional requirements. These discussions took place from late 2020 through to early 2021, and were captured by the Capital Works team to guide future planning necessities. The Director of Reef Education and Engagement chairs this group.

Co-design

Relative Creative, an Indigenous owned strategic design agency, has been contracted to facilitate workshops for internal staff to introduce the principles of co-design and identify tools and implementation tips.

Conversations have begun and are ongoing with the Wulgurukaba people via the North Queensland Land Council and following the advice of the Indigenous Reef Advisory Committee.

The Reef Education team is navigating challenges to establish which specific people this project should be working with.

Education

The Reef Virtual Connections program continued to be delivered after the Reef HQ closure and up until June 2021.



The Virtual Connections program has been adapted to a dry program, therefore no diver, and will be delivered from Northtown during the closure, along with other Reef Education programs and activities.

Looking forward

Principal Contractor

The Request for Tender closed on 28 May 2021. It is expected a contract will be awarded and an announcement made in July 2021.

After the contract has been awarded, those Tenderers who were unsuccessful will receive a notice of outcome.

Master Plan

The Plan is expected to be released publically through media channels in the first quarter of the 2021-22 financial year — this will help inform the public and stakeholders of our vision to transform Reef HQ as an educational and cultural landmark for visitors to North Queensland, well into the future.

Small animal holding facility

A back-of-house area has recently been built and includes the food preparation space with a cold room and freezer. This is where stocks of fish food and food culturing takes place.



This area will be fitted out to accommodate a holding area for small animals. This provides:

- An adequate space to acclimate animals, either prior to rehoming or prior to display in new exhibits ready for reopening
- A space to treat sick or injured fish
- An opportunity to develop culturing and propagation projects, as determined of value to the visitor experience in the exhibit plan redesign.

The fit out of this area is expected to be completed prior to site handover to a Principal Contractor.

Additional funding

In July 2021, Reef HQ Aquarium secured additional funding of \$40 million as part of the Townsville City Deal. This will enable us to transform Reef HQ into a global destination of excellence in tropical coral reef education as part of Stage 2 envisioned in our 20 year Master Plan.

Contractors engaged / local companies

Contractor	Contractor location	Early works program
AECOM	Fortitude Valley, QLD	Engineering – Predator Tank and Coral Reef Exhibit
Citibuild	Townsville, QLD	Structural works – external wall
DevCert	Townsville, QLD	Development certification
Jackson Semler	Townsville, QLD	New plant room & Kelleher Place egress site
JMAC Constructions	Townsville, QLD	Substation relocation
Kassulke	Townsville, QLD	Structural works – plant room waterproofing
McClintock Engineering Group	Townsville, QLD	Mechanical engineering
Northern Water	Cairns, QLD	Life support systems – reverse osmosis machine
Peak ARE	Townsville, QLD	Life support systems – sand filters Coral Reef Exhibit air handling unit and chilling system
Stowe Australia Pty Ltd	Eight Mile Plains, QLD	Electrical - main switchboard, field switchboards, cabling, supply to padmount transformer, mechanical switchboards, dry fire system
Tacoma	Townsville, QLD	Life support systems – sand filters Predator Tank, protein skimmers Coral Reef Exhibit Wet fire hydrant system
WIZ Consulting Engineers	Townsville, QLD	Structural engineering

Sub-Contractor / Supplier	Contractor location	Early works program
A Instrument Choice	South Australia	Data loggers
A Mans Toyshop	Townsville, QLD	Supplier – bolts
Ajay Fibreglass	New South Wales	Coral Reef Exhibit protein skimmers
Allclear Print and Signs	Townsville, QLD	Printing – marketing collateral
Aquatic Rock & Theming Pty Ltd	Sunshine Coast, QLD	Rainforest exhibit restoration
Australian Institute of Marine Science	Townsville, QLD	Animal rehoming
Bakers Crane Trucks Pty Ltd	Townsville, QLD	Tank pickup
Bayset Pty Ltd	Townsville, QLD	Coral Reef Exhibit protein skimmers
Berserker Pythons	Townsville, QLD	Animal rehoming
Billabong Sanctuary	Townsville, QLD	Animal rehoming
Boltmasters	Townsville, QLD	Supplier – bolts
Braeco Sales	Western Australia	Coral Reef Exhibit protein skimmers
Brandsmith Studio	Townsville, QLD	Graphic design – marketing collateral
Brazier Motti Holdings	Townsville, QLD	Stormwater rearrangement
Brilliant Touch Ups Pty Ltd	Townsville, QLD	Painting services
Counterpoint Architecture	Townsville, QLD	Master Plan
COX Architecture	Brisbane, QLD	Master Plan
Duraplas	New South Wales	Water tank
Excelplas Pty Ltd	Victoria	Predator tank acrylic assessment
Expoelle Pty Ltd T/as Cooling Tower Sale	Gold Coast, QLD	Life support systems – heat exchanger
Finigate Integrated Logistics	Victoria	Life support systems – filter pumps
Global Welding Supplier	Townsville, QLD	Supplier
Gough Plastics	Townsville, QLD	Fabrication
Haymans Electrical	Townsville, QLD	Supplier – electrical
HIT FM	Townsville, QLD	Advertising
I4Architecture Pty Ltd	Townsville, QLD	Architecture design – Kelleher Place
Independent Slip Testing Services	Lota, QLD	Wet slip assessment
James Cook University	Townsville, QLD	Animal rehoming
JP Piping Systems Pty Ltd	Mackay, QLD	Supplier – plumbing and PVC fittings
KB Pipelines	Townsville, QLD	Stormwater realignment
Kennards Hire	Townsville, QLD	Gantry / scaffolding hire
L.Birch & AA Tuala	Townsville, QLD	Electrical services

Contractors engaged / local companies cont.

Sub-Contractor / Supplier	Contractor location	Early works program
Marine and Aquaculture Research Facility	Townsville, QLD	Animal movements
NBN Co Limited	Townsville, QLD	NBN relocation
Newmans Rewinding	Townsville, QLD	Foot mount
Northern Controls & Engineering Pty Ltd	Townsville, QLD	Generator fuel lines
Northern Plastic	Townsville, QLD	Life support systems – sand filters
NQ Control Services	Townsville, QLD	BMS, VSD transducer and controls
NQ Cranes	Townsville, QLD	Freezer
Ornatas	Townsville, QLD	Animal rehoming
Pacific Rim Technical	Townsville, QLD	Life support systems – sand filters
Parker Hydraulic Consulting Group	Townsville, QLD	Fire hydrant study
Parkside Building Supply	Townsville, QLD	Coral Reef Exhibit protein skimmers
Pinky's Disco	Townsville, QLD	Closure event
Pollinate	Sydney, NSW	Market research
Professional Pump Services & Irrigation	Townsville, QLD	Supplier – tanks and hoses
Pumpspec Limited	New Zealand	Life support systems – filter pumps
Quark Photonics Pty Ltd	Interstate	Supplier – fibre optic cabling
Rapid Plumbing NQ	Townsville, QLD	Water pipe and waste line relocation
Regulator Australia Pty Ltd	Sydney, NSW	Supplier
Relative Creative	Gold Coast, QLD	Indigenous co-design consultation
Sherriff Electrical	Townsville, QLD	Supplier – powerboards
SPA Consulting Engineers (QLD) Pty Ltd	Townsville, QLD	Electrical consultation
Specialised Force Pty Ltd	Townsville, QLD	Hydraulics
Solex	Townsville, QLD	Phase rotation test
STAR FM	Townsville, QLD	Advertising
Superdream	Brisbane, QLD	Graphic design – marketing collateral
Th3rd Dimensions	Airlie Beach, QLD	Videography – marketing collateral
The Digimen	Townsville, QLD	Graphic design – marketing collateral
Treadwell Group	South Australia	Supplier – structural framing
Tri Tech Refrigeration S.A Pty Ltd	Salisbury, QLD	Supplier
Townsville Angel Faces	Townsville, QLD	Closure event
Townsville Bulletin	Townsville, QLD	Advertising
Townsville City Council	Townsville, QLD	Water reticulation services
Townsville Gymnastics	Townsville, QLD	Closure event
Townsville Pump Services and Engineering	Townsville, QLD	Fybroc pump
Townsville Scaffold Hire	Townsville, QLD	Life support systems – Coral Reef Exhibit protein skimmers
UAP (Urban Arts Projects)	Brisbane, QLD	Master Plan
Utile design	Townsville, QLD	Training
Vinidex Pty Ltd	Townsville, QLD	Supplier – PVC pipes and fittings
Waterco Limited	Meadowbrook, QLD	Life support systems – sand filters
Watertec Engineering Pty Ltd	Beenleigh, QLD	Oxycon system
Welcon Technologies	Gladstone, QLD	Engineering services
Windy Wizard	Townsville, QLD	Closure event
Wymedical Pty Ltd	South Australia	Supplier – air

Summary

To stay connected to Reef HQ Aquarium and the Great Barrier Reef follow our Facebook page and check the website for regular updates.



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