NOOSA OYSTER ECOSYSTEM RESTORATION PROJECT

Project Update

July 2021

The Nature Conservancy Australia

Detailed designs for proposed oyster ecosystem restoration sites in the Noosa estuary

Background

For the last 18 months, The Nature Conservancy (TNC) has been working alongside community members, local indigenous elders, hydrographic surveyors, marine ecologists, coastal engineers and government agencies to select the most appropriate sites and reef designs for the restoration of oyster ecosystems in the Noosa River estuary.

The location, shape and size of oyster reef patches, displayed in the figures below, were designed to give the best environmental outcome. The locations were specifically selected to ensure public access, public safety and to provide education, fishing, recreation and water-based tourism opportunities.

The reef patch designs meet strict regulatory government requirements relating to stability, erosion minimisation, maintenance of fish passage, restoration of a degraded ecosystems and fish habitats, protection of marine plants and benefits to fisheries.

Proposed locations

- Four locations have been selected as oyster ecosystem restoration sites after extensive community feedback, scientific analysis and government input. These sites are Tewantin, Goat Island, Noosa Sound East and Noosa Sound West.
- We anticipate that up to half of the restoration work will be completed this summer (2021-2022) at two sites, likely at Tewantin and Goat Island, with the remaining work to be completed the following spring/summer (2022-2023) at the Noosa Sound sites.
- The four restoration sites were selected as those that optimise ecological, engineering, public safety and river access requirements.
- The oyster ecosystem recovery process will take about five years, that is, from when the oyster reef patches are laid in the river, until these patches are encrusted with oysters, other marine invertebrates and plant life.

Process undertaken for site selection and reef patch design

The process of site selection and design included:

1. Development of a restoration suitability model by scientists at TNC that identified areas of the estuary where oysters were likely to thrive (information listed in the table *Restoration Criteria* at the end of this brief).
2. The maps produced from this model were then further refined through community and Indigenous consultation and extensive scientific and state agency input to ensure current river values and public access were maintained.
3. After the restoration sites were selected, and consulted on publicly, engineers from ICM Engineering worked alongside restoration practitioners and expert ecologists to consider a range of designs that would support oyster survival and growth, fish habitats and biodiversity whilst also minimising disturbance to natural processes in the Noosa River. The final designs are provided in Figures 2-5 below.
4. The location and designs of the oyster reef patches were presented to an independent Scientific Committee made up of Queensland Government representatives, Noosa Shire Council staff and local marine biologists prior to their formal submission to Government to seek restoration permits.

A huge thank you to the many fishers, residents, Traditional Owners, shop and restaurant owners, local scientists and engineers who helped provide local knowledge and support throughout the site selection and design process. Thank you!

What next?

Construction of the oyster reef patches is anticipated to commence this summer.

Why oyster beds and reefs?

Scientific evidence and historical knowledge from Indigenous Australians, fishers and community members has provided unequivocal evidence that oyster-dominated ecosystems were once very common throughout Noosa and many other Australian estuaries.

These ecosystems collapsed over a hundred years ago, changing the way the estuary behaves and how fish and marine life use the estuary. We know from other restoration projects in Australia and around the world that restoring oyster ecosystems helps improve the variety of marine habitats available for marine life to use, especially fish that use the oyster reefs and beds for shelter and as nurseries and feeding grounds.

The cracks and crevices found within oyster reefs and beds provide shelter and homes for a huge range of invertebrates, like those depicted in the images below. Oyster ecosystems have also been shown to protect shorelines from erosion by acting as physical barriers to waves, which means they help keep the shoreline intact for longer and can help prevent land from washing away.

For a copy of the project brochure, view Frequently Asked Questions or to get an overview of TNC's national shellfish restoration project, visit: **https://www.natureaustralia.org.au/Noosa**

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Reef patch designs and site placement

In phase 1 (2021 – 2023) of the project, oyster ecosystem restoration is proposed at four sites: Tewantin, Goat Island, Noosa Sound East and Noosa Sound West as shown in Figure 1. Initially, the project plans to restore two sites over the summer of 2021-2022. Those sites are anticipated to be Tewantin and Goat Island, subject to final approval.

In phase II of the project (2023 and beyond), future restoration sites may selected subject to resources, public consultations and support, and government approval.

Figure 1: Location of the planned phase 1 (2021-2023) oyster ecosystem restoration footprints in the Noosa River

Tewantin restoration footprint

Located 30 metres upstream of the Tewantin boat ramp on the river's southern shoreline, near the council chambers

Reef patch footprint = 1,326m2
Maximum length = 110m
Max. distance from shore = 32m

Location selected for educational purposes - celebrating western and indigenous connections to the Noosa River along with the benefits of oyster ecosystems to river health, fishing, tourism and recreation

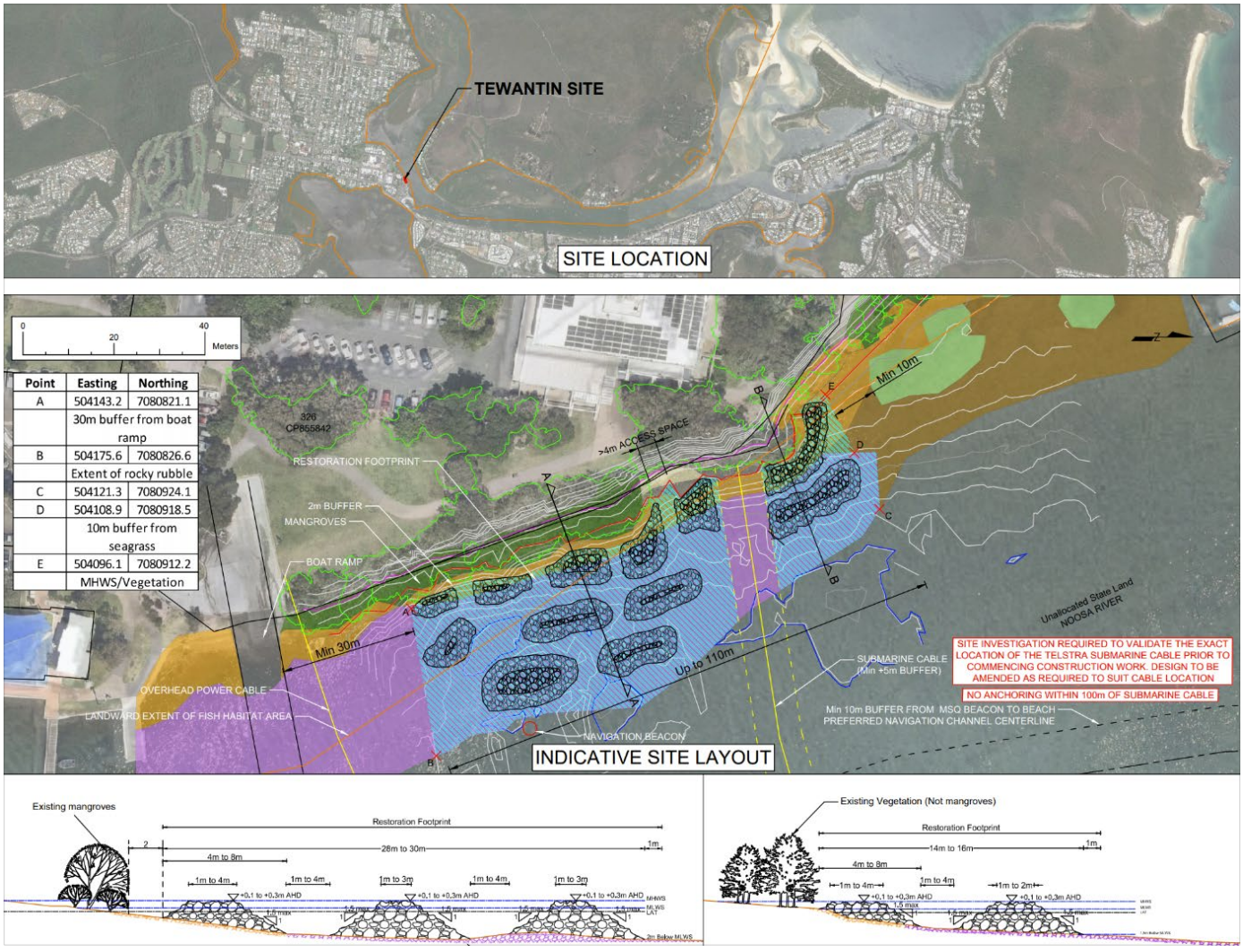

Figure 2: Tewantin restoration footprint (Courtesy of ICM engineering)

Goat Island restoration footprint

Located in the middle section of Goat Island's southern shore

Reef patch footprint = 464m2
Maximum length = 58m
Max. distance from shore = 14m

Location selected to improve fish habitats

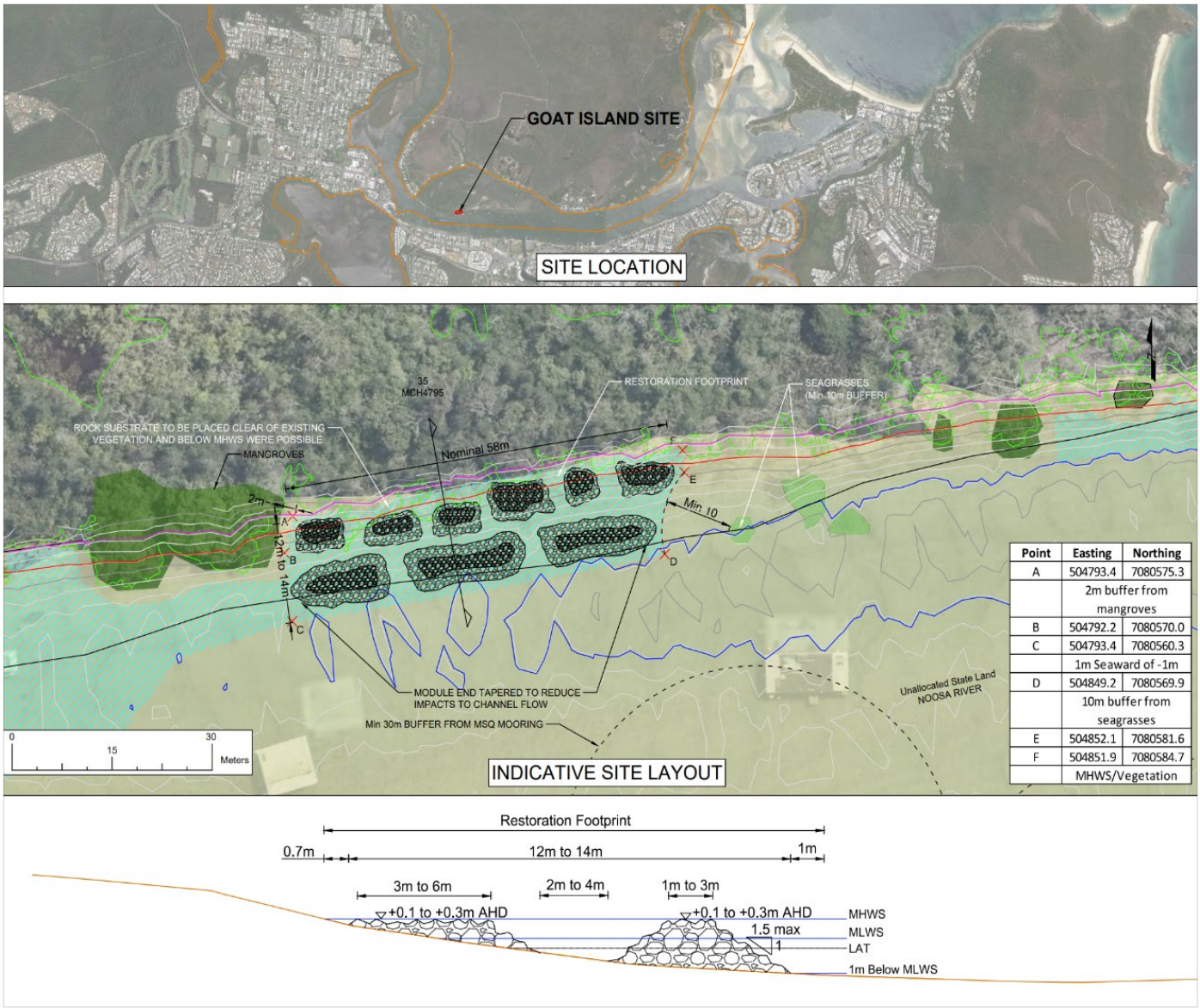

Figure 3: Goat Island restoration footprint (Courtesy of ICM engineering)

Noosa Sound East restoration footprint

Located in the eastern embayment on the south eastern shoreline of Noosa Sound

Reef patch footprint = 1,209m2
Maximum length = 240m
Max. distance from shore = 14m

Location selected to improve fish habitats and enhance recreational opportunities and tourism e.g. kayaking and snorkelling

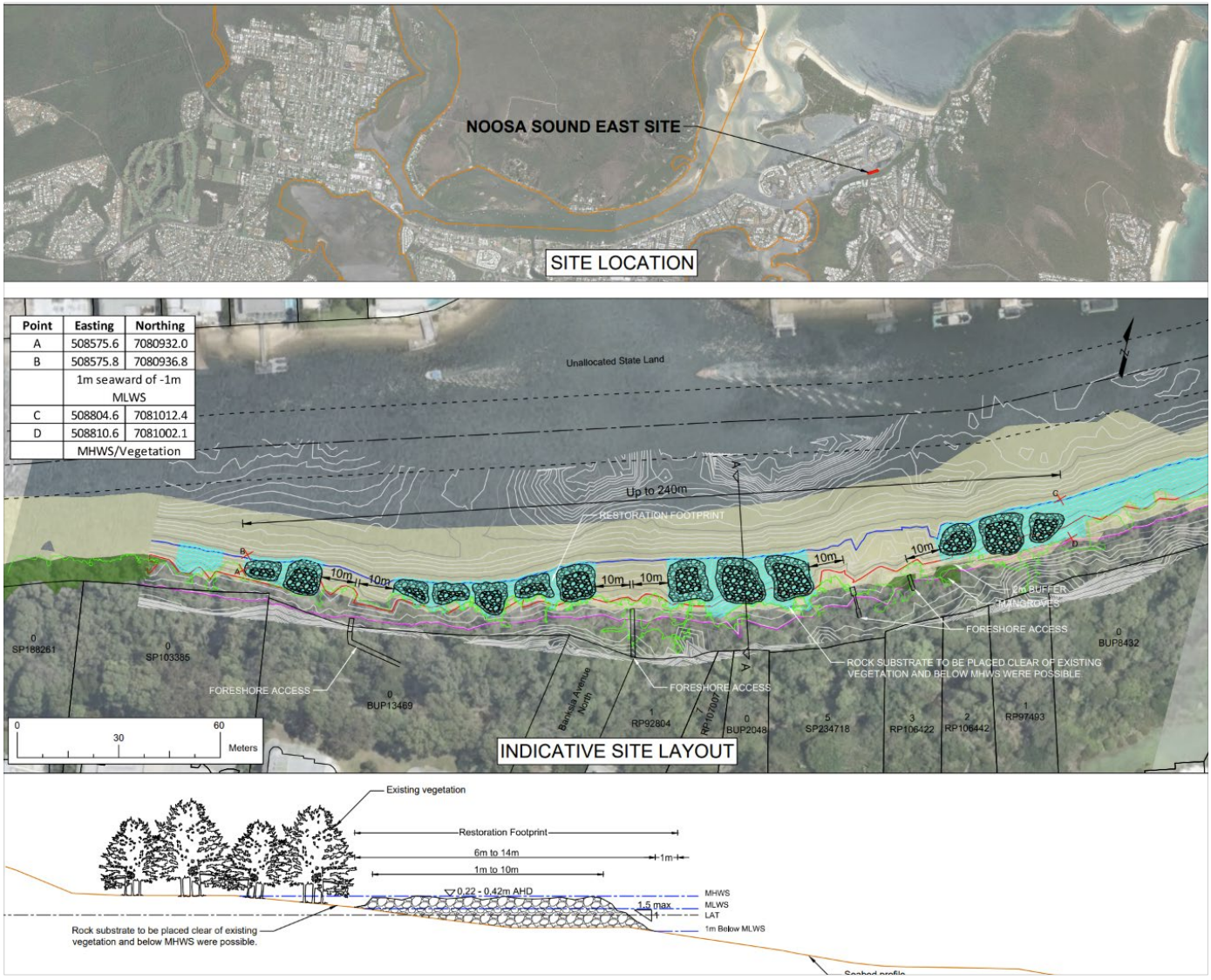

Figure 4: Noosa Sound East restoration footprint (Courtesy of ICM engineering)

Noosa Sound West restoration footprint

Located in the upriver section of the western embayment along the south eastern shoreline of Noosa Sound

Reef patch footprint = 615m2
Maximum length = 90 m
Max. distance from shore = 17m

Location selected to improve fish habitats and enhance recreational opportunities and tourism e.g. kayaking and snorkelling

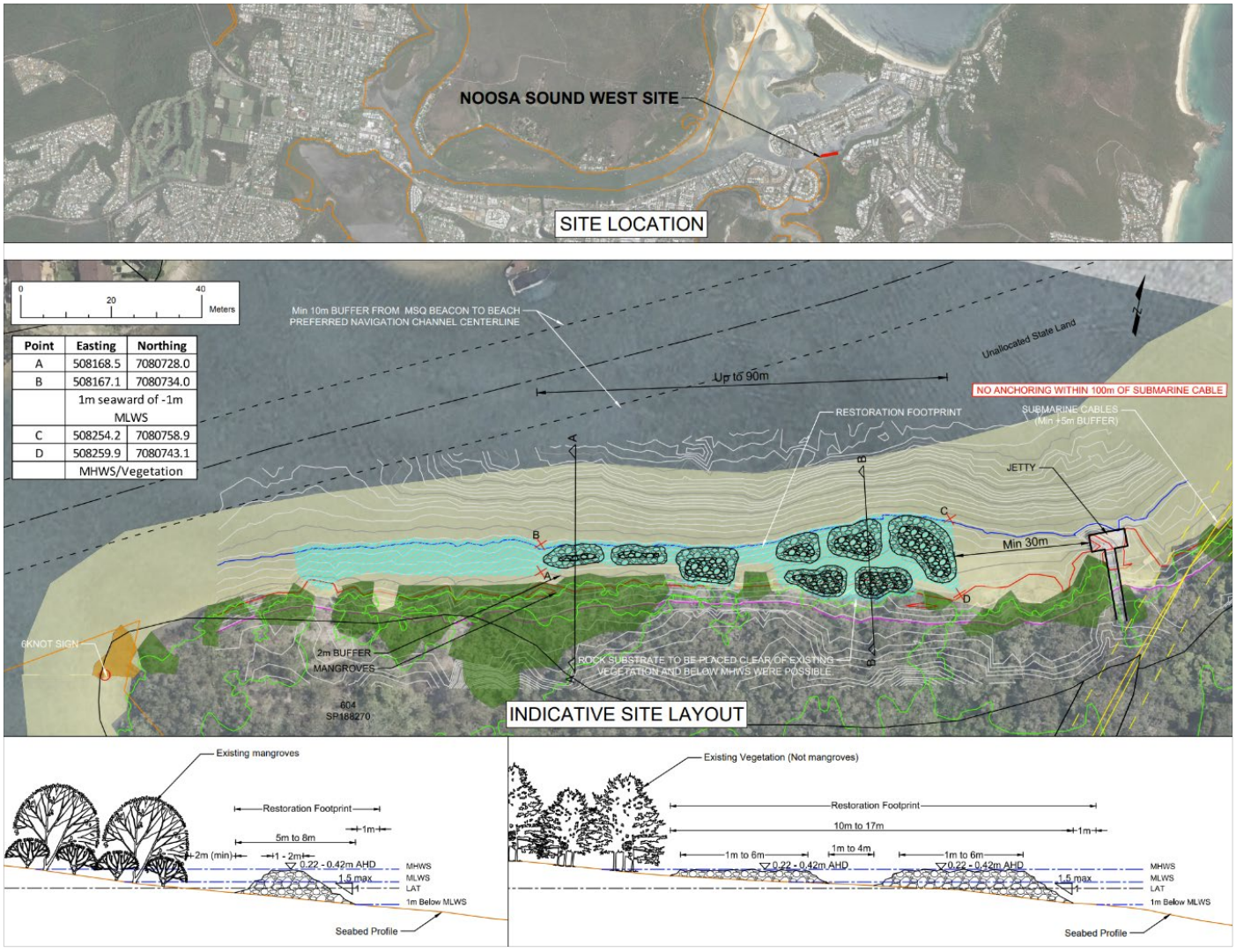

Figure 5: Noosa Sound West restoration footprint (Courtesy of ICM engineering). The area on the map shaded aqua green, upstream of the oyster reef patches (to the left, facing), is outside the restoration footprint, but has potential for future work.

Restoration criteria

Parameter	Envelope	Criteria (more suitable = 4, less = 0)	Rationale
Marine plants proximity (including seagrasses)	10m – 500m	Areas within 10-500m buffer =4 All other areas =2	Connectivity to other structured habitats such as seagrass, mangroves, increases diversity. 10m minimum distance used to mitigate damage to marine plants and 2m from mangroves, aerial mangrove roots and fallen timber, but ensuring connectivity.
Rocky reef proximity	2m – 500m	Areas within 5-500m buffer =4 All other areas =2	Connectivity to other structured habitats increases diversity. 2 metre minimum distance included to mitigate damage to rock substrates while maintaining connectivity. Direct augmentation of degraded rocky reef by permit only.
Extant oyster ecosystems proximity	2m – 250m	Within 2m – 250m = 4 All other areas = 2	Connectivity to other structured habitats increases biodiversity. Connection to other oyster reefs increases meta-population connectivity, successful reproduction and oyster recruitment. 2 metre minimum distance included to mitigate damage to extant oyster ecosystems but ensuring connectivity.
Historical oyster ecosystem proximity	Within 250m	Within 250m = 4 All other areas = 2	Sites which have historically supported oyster ecosystems are thought to be able to support future oyster ecosystems. Restoration takes place on historic oyster ecosystems, which may now be lost, where known and practical.
Mobile seabed	Exclusion area	Within exclusion area = 0 All other areas = 4	Highly mobile seabeds generally offer unsuitable substrates for shellfish restoration.
Mangroves (including pneumatophores), fallen trees and timber in waterways.	+2m minimum distance	Within exclusion area = 0 All other areas = 4	Minimum distance of 2m maintained between intertidal marine plants and oyster ecosystems to protect plants, as well as fallen trees (which are also important habitats) from works associated with oyster ecosystems. Relatively close proximity maintained to maximise ecological connectivity.
Small craft channels	+10m width channel maintained	Areas within buffer = 0 All other areas = 4	Minimum channel width of 10m maintained in constrained river channels so oyster ecosystems do not impede on safe navigation.

Restoration criteria

Parameter	**Envelope**	**Criteria** (more suitable = 4, less = 0)	**Rationale**
Tidal Works (pontoons, jetties, boat ramps)	+30m distance maintained	Within 250m = 4 All other areas = 2	Minimum distance of 30m maintained between tidal works and oyster ecosystems. This measure reduces the chance of damage to the oyster ecosystems from human activites, and also protects vessels and ensures general public safety when using these facilities.
Moorings	+30m distance maintained	Within 30 m = 0 All other areas = 4	Minimum distance of 30m maintained between official moorings and oyster ecosystems to reduce chances of damage to moored vessels and oyster ecosystems. The distance also takes into consideration the maximum possible length of a vessel attached to a mooring in the river.
Foreshore Access (beaches and parks)	+10m distance maintained	Within exclusion area = 0, All other areas = 4	Minimum distance of 10m either side of public foreshore access points maintained for ease of vessel access to useable shorelines.
In-water urban utilities (submarine cables & pipelines)	+5m distance maintained	Within exclusion area = 0 All other areas = 4	Minimum distance of 5m maintained between submarine cables and pipelines and oyster ecosystems.
In-water transport utilities (cross-river cable barges, ferry terminals, etc.)	+30m distance maintained	Within exclusion area = 0 All other areas = 4	Minimum distance of 30m maintained between in-water transport utilities and oyster ecosystems to maintain safe operation of public transport services in the river.
Seaward extent	<30m from shorelines	Within exclusion area = 0 All other areas = 4	Sites for oyster ecosystem restoration extend from the intertidal zone to a maximum distance of 30m from the associated shoreline to minimise impacts on river users. Exceptions would be subject to careful assessment and the written approval of Maritime Safety Queensland.
Water depth	<2m below MLWS	Within exclusion area = 0 All other areas = 4	Oyster ecosystems are only established in water depths less than 2m below the Mean Low Water Spring tidal line at a restoration site. This maximised the chance of restoration success.

Who are we?

The Noosa Oyster Ecosystem Restoration Project is led by The Nature Conservancy, a global environmental non-profit organisation working to create a world where people and nature can thrive. In the last 70 years, The Nature Conservancy has grown to become one of the most effective and wide-reaching environmental organisations in the world, with over 400 scientists.

In a unique partnership, The Nature Conservancy, Noosa Shire Council and the Noosa community, together with support from The Thomas Foundation, Australian Marine Conservation Society and Australian Government, are working together to restore lost oyster ecosystems to the Noosa River estuary. This project is part of The Nature Conservancy's efforts to restore 30% of Australia's lost shellfish ecosystems, which if achieved, would make Australia the first nation to recover a critically endangered marine ecosystem. Over the last 20 years The Nature Conservancy has restored shellfish reefs in over 200 locations throughout the world including in Australia.

Acknowledgement

We acknowledge the Kabi Kabi Traditional Owners who are the custodians of cultural knowledge and their collective memories of the Noosa River and Lakes region and advise this project accordingly. The project is located on Kabi Kabi Sea Country.

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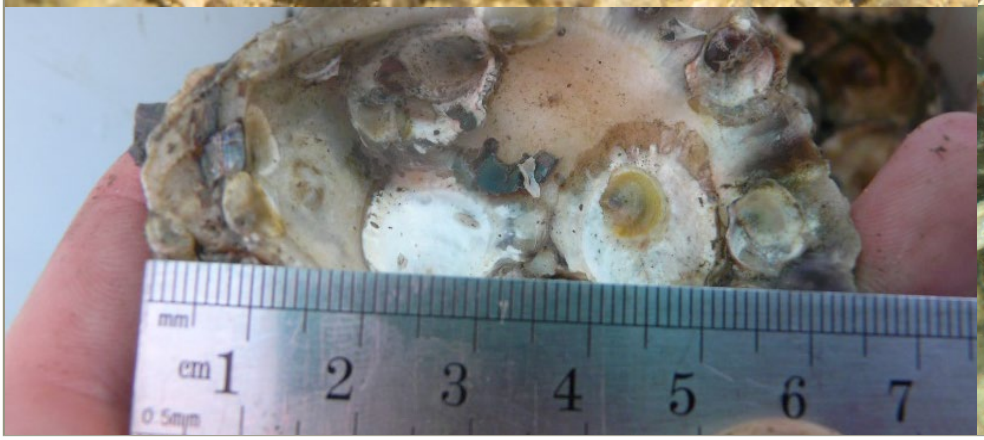

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