

Albany Artificial Surf Reef

Creating a consistent, surfable wave, which maximises available swell conditions and is central to Albany, driving benefits in tourism, economic development and the retention of the region's younger age demographic.

Business Case

August 2020

Acknowledgments

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Project concept development, steering committee coordination, community consultations and stakeholder engagement, project management



Detailed Design Report, cost and production estimates, Preliminary Design Report, Numerical and Physical Modelling Reports, Computational Fluid Dynamic Modelling (University of Auckland)



Business case development



BMT Oceania has completed several tasks to meet the environmental impact requirements of the Albany Artificial Surf Reef



Feasibility study development (2015) and preliminary modelling



Preliminary cost estimates

Glossary and Abbreviations

Acronym	Extension	Description
ASR	Artificial Surf Reef	An artificially constructed surf reef created by laying a material (e.g. geo tube, rock, concrete, etc.) beneath the surface of the water to generate swell. The Albany Artificial Surf Reef will predominantly be constructed from locally sourced rock.
BCR	Benefit Cost Ratio	A cost benefit analysis measure of the present value of the benefits of a proposal divided by the present value of the capital or non-recurrent costs.
CBA	Cost Benefit Analysis	A useful economic tool to evaluate the case for a project or proposal against the status quo. It allows for an assessment in economic terms of intangible values.
NPV	Net Present Value	The sum of the discounted net benefits in a cost benefit analysis. The net benefits are the expected total costs of a project in one year, subtracted from the expected total benefits in that same year.
TRA	Tourism Research Australia	A branch within Austrade and Australia's leading provider of quality tourism intelligence across both international and domestic markets.
UWA	University of Western Australia	A Western Australian university internationally recognised for its excellence in teaching and research. An Albany campus has offered undergraduate programs since 1999.
WERC	Wave Energy Research Centre	Established in 2018 and based at UWA Albany, the WERC is a knowledge hub for the wave energy industry, undertaking the critical multidisciplinary research needed to commercialise renewable energy from the oceans. Research conducted within WERC focuses on improving wave observations and wave predictions for the greater Albany region.

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Executive Summary

This business case details a \$9.5m project to create a significant recreational and tourism asset through the **development of an Artificial Surf Reef (ASR) at Middleton Beach in Albany**, within close proximity to the Albany CBD - the **Albany Artificial Surf Reef**. The surf reef will improve the seabed conditions and the resulting wave breaking character, and consequently surfability, for a range of target surfer groups from beginner to intermediate abilities.

The coast of the Great Southern region of Western Australia (WA) is renowned for quality surfing spots due to its exposure to large Southern Ocean swells, generally suitable for advanced to expert-level boardriders. However, around the region's highest population centre (the city of Albany), although the swell exists, there is no shoreline for the swell to break into a consistent, quality surfable wave. The monitoring program that has been undertaken during the development of this project demonstrates that Middleton Beach is an ideal location for an ASR. The measurements show a very unidirectional wave climate with the standard deviation of the wave direction varying only 6° throughout the measurement period as well as average wave periods being in excess of 12 seconds with an average wave height of around 0.65 m. These factors combine to make **the proposed site an ideal location for an ASR** as the predictable wave conditions, low tidal range and predominant offshore winds means that a lot of the variability encountered with previous ASR locations is eliminated. Concurrent beach monitoring over a 13 month period show that, currently, only 6 surfing days were rated better than 'Average'. With the Albany Artificial Surf Reef, it is expected that this will be **increased at least 30 times**, with wave breaking at 41% of the year at a -1.0m crest level, maximising wave breaking whilst also ensuring adequate user safety.

Currently, the **closest suitable surfing locations from the CBD are around 40 minutes' drive away and are generally disregarded by beginner and junior surfers** (except for weekends and on transit). With a lack of public transport available to reach appropriate locations (e.g. Mutton Bird Beach or Nanarup), the opportunities to surf on a regular basis are limited, particularly for young people. Aside from the safety aspects associated with the current need to drive distances to find surfable waves, the current locations are isolated and unmonitored. Enabling these activities to be undertaken at Middleton Beach will **improve safety through increased monitoring and proximity to the Albany Surf Lifesaving Club and medical and emergency facilities** in the city.

Through this enhancement of recreational amenities, the City of Albany is aiming to attract and retain a younger generation, who currently tend to be drawn away to metropolitan areas where a wider variety of recreational facilities exist. The Albany Artificial Surf Reef will provide a significant attractor for retaining this demographic, as well as expanding the recreational amenity for older residents who currently need to travel to surf, either to isolated beaches some way from the city or to other locations such as Margaret River. Furthermore, the Albany Artificial Surf Reef will create a consistent, quality wave appropriate for holding events at state, national and international levels. Indeed, **Surfing WA has stated that they would foresee holding 3-4 events per year in Albany that are not currently possible due to the poor quality of surf on Albany's central beaches**. Surfing competitions are heavily promoted and publicised; a single international level surfing event (short board or longboard or bodyboard etc.) can bring hundreds of thousands of dollars into the local economy.

The project therefore also responds to the need to **diversify and grow the regional economy**. The potential tourism benefits from hosting surfing events are clear, but a more general uplift in visitation and length of stay would also be expected. The project will complement other initiatives to further develop adventure tourism assets, such as for the 'Snake Run' skate park, mountain biking and bush walking. In fact, a real opportunity exists for Albany to be recognised as a **Surfing Town**, there is no such hub currently on the south coast of WA, despite there being multiple recognised surfing spots in the region (albeit some drive from the CBD). With existing infrastructure in retail and hospitality, the facilitation of a recognised hub in Albany would provide substantial benefit both economically and socially, which is identified as of critical importance to overcoming economic and social challenges faced by the current and ongoing Covid-19 pandemic.

Environmental benefits are also significant. The reef's substrate will provide for significantly improved marine ecology at and around the site leading to additional amenity in regards to fishing and diving at the site of the Albany Artificial Surf Reef. Reduction in emissions through the ability to surf close to the CBD are also clear. It is not intended that the Albany Artificial Surf Reef will be a multi-purpose reef and its utility will be focused on surfing. **Analysis and modelling of the Albany Artificial Surf Reef by Royal Haskoning DHV and Bluecoast Consulting Engineers, both numerical and physical, demonstrate that it will not have a significant impact on coastal processes. This work has**

been reviewed by the Department of Transport Coastal Infrastructure Branch and the documentation has been finalised to address all environmental requirements.

The City of Albany recognises the importance of **strong community and stakeholder engagement** for a project of this nature. Extensive community engagement has been undertaken in the development of this project through meetings and an online survey. The City received a total of 728 survey responses, representing a very high representative sample of the community. Notably, **the majority of respondents supported, in principle, the proposal to create an ASR at Middleton Beach with 90% voting in support of the idea**. Furthermore, of the respondents who stated they lived outside of Albany, the majority indicated that they would visit Albany more often (97% of the respondents from outside Albany) if the surf/wave conditions were improved.

A number of key socio-economic needs and benefits have been identified with the development of the Albany Artificial Surf Reef:

Economic	<p>The project will have economic development outcomes, through:</p> <ul style="list-style-type: none"> • Retained spending - Every wave rider travelling out of Albany represents leakage from the local economy. Providing a local break would retain some of this expenditure. • New spending - A surf reef will be a new attraction, enhancing destination appeal and serving to draw visitors. More visitors will be attracted than participate (e.g. family / spectators). <p>The project will facilitate the development of Albany as a Surfing Town on the south coast of WA that will further help to diversify and grow the regional economy. Further economic benefits will accrue through increased land values at Middleton Beach, improved sustainability of accommodation and hospitality providers, the attraction of investment in new facilities, and by offsetting economic impacts of the recent and ongoing global Covid-19 pandemic.</p> <p>International studies have shown that such reefs can return at least \$20, due to increased tourism and beach protection, for every dollar spent on the reef. In some locations that have revenue based around beach activity, the benefit can be very large, like the 500:1 benefit to cost ratio gained by creating wider beaches in Miami¹.</p>
Social	<p>There is a critical need to retain young populations in the regions in order to continue to service and develop prosperous towns into the future. The most notable methods to retain and attract younger populations are through initiatives that aim to revitalise regional cities and towns to cater for young interests, needs and desires. The Albany Artificial Surf Reef will deliver a recreational outlet beyond those currently available in the region, providing for diversified interests in the community and helping to create a more liveable regional city.</p> <p>The project complements other initiatives in the city, such as the development of student accommodation to attract younger people to the region to take advantage of tertiary educational opportunities (such as at the UWA Albany campus). The overlap with marine science and ecological courses held at UWA in Albany are evident.</p>
Health	<p>Prevention, including access to sport, recreation and open spaces, is identified as the most impactful and beneficial approach to the obesity epidemic. Considered particularly popular amongst youth, surfing offers a significant recreational outlet that will engage young people, get them outdoors and active. Surfing provides many health benefits including mental wellbeing, cardiovascular fitness, shoulder and back strength and leg and core strength.</p>
Ecological	<p>The surf reef will provide habitat for colonisation and occupation by many marine fauna that would otherwise be unlikely to persist at that location due to the high energy hydrodynamic conditions and the sand-dominated substrate to the extent that it has the potential to increase local biodiversity.</p>
Environmental	<p>The Albany Artificial Surf Reef substrate will provide for significantly improved marine ecology at and around the site leading to additional amenity in regards to fishing and diving at the site of the Albany Artificial Surf Reef. The literature review of constructed artificial reef projects for both rock and geotextile materials revealed that all structures resulted in an improvement to habitat growth of marine flora and fauna. Hence, as long as construction techniques are administered that minimise environmental impacts, the construction of the Albany Artificial Surf Reef is believed to have a positive impact on the marine ecology.</p>
Safety	<p>The current surf locations (e.g. Mutton Bird beach or Nanarup beach) are isolated and unmonitored. Enabling surfing to be undertaken at Middleton Beach will improve safety through increased monitoring and proximity to the Albany Surf Lifesaving Club and medical and emergency facilities in the city.</p>

Furthermore, the possibility of Middleton Beach becoming a prominent surfing hub with all of the associated benefits to the community, tourism and economy should not be overlooked. The Albany Artificial Surf Reef has a strong potential to become the centrepiece of a city boasting quality surf, accommodation (new hotel), surf related shops, galleries, etc., as well as links to the world-renowned heritage listed 'Snake Run' skate park, mountain bike and cycling trails which all come together to create a complete Adventure Tourism package

An **in-depth feasibility assessment for the Albany Artificial Surf Reef was undertaken** by specialist consultants Royal HaskoningDHV. This study identified a number of options and makes recommendations which underpinned the detailed design phase. Bluecoast Consulting Engineers have since developed a Detailed Design Report for a 'left-hander' surfing wave, situated 150m north of the 'Surfers Beach' car park and approximately 140m offshore. The reef measures 165m long and varies in width up to 100m, creating an effective a crest length of over 110m. This is in line with the preferred option identified during the feasibility phase, providing far superior surfing experience than alternative options and is also the best value for money in terms of length of ride per \$. The **total development cost has been estimated by Bluecoast at \$9,500,041**. In terms of longer-term sustainability, the only costs that would be associated to the structure following construction are those related to inspection and survey. It is envisaged that these surveys will be undertaken annually for the first 3 years following construction and then subsequently either event-based (following large wave events) or every 5 to 10 years.

Conservative cost-benefit analyses have been performed in order to assess the attractiveness of the proposed project relative to the 'do nothing' option. **The calculations demonstrate a positive NPV of \$19.4m (BCR of 3.25), clearly deriving from the high level of community benefits that would accrue.** The benefits included in the analyses are focused on: (i) events - attracting participants from outside of the region to a number of modest surfing events per year (in line with guidance from Surfing WA), and (ii) an uplift in visitation and length of stay as a result of establishing Albany as a surfing hub and complementing other initiatives in the region associated with adventure tourism. A host of other benefits could also have been included, such as retaining expenditure from residents that would otherwise travel elsewhere to surf, environmental savings and increased health and safety, but these are not required to be included in order to produce an attractive return on public investment. It should also be noted that there would be many other participants coming to Albany to surf the reef who would fall outside of the contest/event purpose. These **recreational travelling surfers could potentially have a far greater benefit than the three to four events calculated in the cost-benefit analysis** but have not been included due to the difficulties in quantifying the impact and the already attractive cost benefit scenarios developed using the event impacts alone. Further, the effects of interstate and international visitation are ignored in the base case to consider ongoing Covid-19 impacts. The more likely 'best-case' scenario includes such factors and indicates that tangible project value may be much greater than identified in the base case.

With regard to job creation, there will be benefit from both the construction phase and the operational phase, with the project expected to **create 31 FTE direct jobs in the construction industry and 130 FTE jobs in the economy as a whole**, during the construction phase, and an estimated **54.5 sustainable, long-term FTE jobs in the region**, based on the additional direct tourism spend.

Following the recommendations made in the Feasibility Assessment and Detailed Design Report, the on-site (actual construction) **start date is targeted to be March/April 2021**, following securing remaining funding (pending Federal application) and construction procurement (pending funding). The project is **scheduled for completion in February 2022**.

A full Risk Management Plan has been prepared for the project and a robust governance mechanism defined. The City has **extensive experience in successfully planning, executing and operating/maintaining significant infrastructure projects**, including projects such as this. This project will comply with the City's rigorous project planning, procurement and governance methodologies.

Financial support of \$4.5 million for capital development is pledged by the Government of Western Australia and included in forward planning estimates conditional to this business case and detailed design package. Remaining funds will be sought from the Australian Government, through an appropriate funding stream (e.g. BBRF) when available, to supplement the financial contributions committed by the State Government.