DM COMPOSITES

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EDITHBURGH DIVE STAIRS

PROJECT CONTEXT

Edithburgh Jetty is one of South Australia's most iconic and heavily used shore-diving locations, attracting snorkellers and scuba divers from across the state and interstate. Recognising the need to improve safety, accessibility, and the overall user experience, Yorke Peninsula Council committed to delivering a purpose-built dive access staircase designed specifically for marine recreation.

The new staircase was designed with multiple intermediate platforms at varying heights, allowing safe water entry and exit across a wide range of tide conditions. This significantly improves accessibility for swimmers, snorkellers, and divers, while reducing risks associated with climbing directly onto the jetty structure.

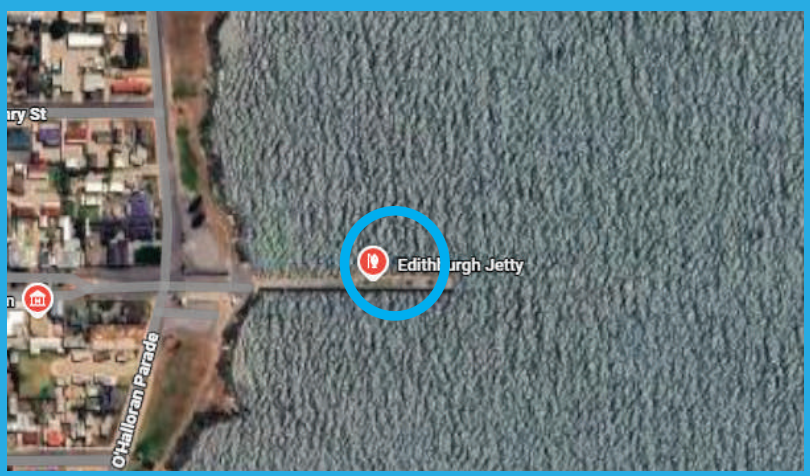
The project also formed part of a broader upgrade to the jetty precinct. In addition to the new dive stairs, the scope included replacement of the ageing jetty shelters and installation of a new underwater camera system, enabling live streaming of marine life via YouTube in partnership with Australian Ocean Laboratory (AusOcean). These upgrades further enhance the visitor experience and promote Edithburgh as a leading marine tourism destination.

The dive stairs project was developed in close collaboration with the local community and key stakeholders. Extensive consultation was undertaken, including a public co-design workshop held in Edithburgh, ensuring the final outcome reflected local needs, priorities, and long-term community value. The new stairs were installed on the north side of the jetty, replacing the former northern access steps that were removed after sustaining damage in 2018.

As noted by Mayor Kylie Gray, the project represents a significant investment in community infrastructure and regional tourism, reinforcing Edithburgh's reputation as one of South Australia's premier dive destinations and delivering a long-lasting asset for both locals and visitors.

LOCATION:
Edithburgh (SA)

CONSTRUCTION COMPLETION:
December 2025



DM COMPOSITES' ROLE

The Edithburgh Jetty Dive Stairs project delivered a new dive access stair system connected to the existing Edithburgh Jetty. The works included demolition of the existing stair, fabrication and installation of a new steel stair frame with FRP treads/landings and handrailing, installation of driven steel piles through grouted sleeves, and placement of a rock cage ballast/protection system at the toe of the stair in the tidal zone. The design is a combined system interfacing with the existing jetty structure and subject to marine/wave exposure, with construction loads, lifting arrangements, and temporary works remaining the contractor's responsibility.

KEY CONSTRAINT THAT DICTATED METHODOLOGY: NO PLANT ON THE JETTY

A defining site constraint was that heavy equipment could not be mobilised onto the jetty, and there was no practical way to run conventional piling plant along the deck. As a result, all piles were installed from the shore, and the pile hammer was operated from a 130T crane (hammer hung on the crane) to reach the pile positions and drive to refusal. This constraint drove the whole strategy: preassemble as much as possible onshore, lift in one major operation, then drive piles through the sleeves using the sleeves as a guide.

TECHNICAL SOLUTION DELIVERED

Structural arrangement

The dive stair structure is supported on driven piles with sleeves that are later grouted, and it includes a rock cage at the lower end. The drawing set identifies typical member types including:

Piles: 219 x 12.7 CHS (P1)

Pile sleeves: 323 x 12.7 CHS (PS1)

Stair stringers / beams: RHS members (e.g., 250 x 150 x 9 RHS noted in the schedule)

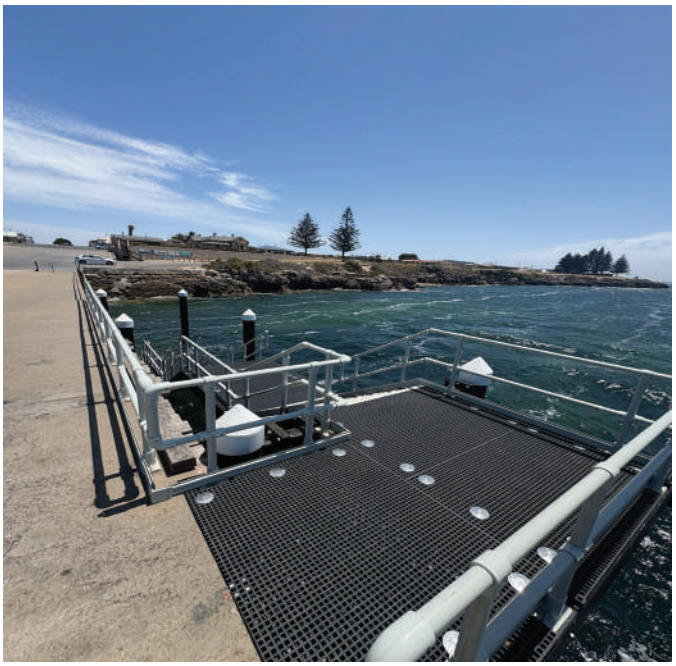
The elevation/sections show the pile sleeve at the seabed, with a levelling ring flange at the base of the sleeve, and the rock cage loaded with large rocks/rock bags near the stair toe.

Foundations and pile acceptance basis

The design notes require piles to be driven to refusal, with capacity confirmed and high-strain dynamic testing (PDA), and a minimum penetration depth referenced. DM Composites required to allow for overdrive and confirm driven capacity via a suitably qualified engineer/engineering geologist.

Grouted sleeves

The sleeves were completed with an underwater grout system. DM Composites utilised a proprietary, free-flowing, shrinkage-compensated underwater grout, with anti-washout characteristics and a minimum compressive strength requirement. The method included centralising the pile, sealing the annulus, pressure testing grout lines, injecting from the lowest point, and completing the operation continuously to displace water/air.



CONSTRUCTION METHODOLOGY AND SEQUENCING

1) Demolition and enabling works

The existing stair was demolished and removed in a controlled lift sequence (support with crane, disconnect/cut, lift to land/barge for disassembly/disposal). The jetty deck, timber decking boards, and kerb were cut back at the new landing interface ready for installation.

2) Onshore preassembly to reduce tidal-zone work

To manage safety, tide windows, and the “no plant on jetty” constraint, the main stair assembly was preassembled onshore as a single lift-ready unit, including:

- Pile sleeves assembled to the stair frame
- Rock cage assembled to the stair frame
- Ladder assembled to the stair frame

This approach reduced the amount of work performed over water and avoided piecemeal installation under changing conditions.

3) Primary lift and positioning using 130T crane

The assembled stair frame was then lifted into position using a 130T mobile crane. Once suspended/placed, the crew:

- Levelled the stair frame using levelling jacks at the base of the pile sleeves
- Stabilised the base area (sandbagging around the base of the sleeve)
- Installed temporary bracing as required by the temporary works engineer

This step is where sequencing mattered most: maintaining control of swing, tide/swell influence, and exclusion zones while the structure was partially supported and not yet pile-fixed.

4) Rock cage loading

With the frame in place and temporarily stabilised, the rock cage was then loaded with large rock/Kyowa rock bags, with explicit care taken to protect any coated steelwork from damage during loading operations.

5) Pile installation from shore using crane-suspended hammer

Because equipment could not be mobilised on the jetty, piles were driven from the shore. The piles were installed by driving through the pile sleeves, using the sleeve as a guide, and driven until refusal. Once each pile achieved refusal, the top of pile was cut flush with the top of the pile sleeve.

This “drive-through-sleeve” method is critical on this type of marine stair because it protects alignment. The sleeve/frame position is established first, then the pile is installed to match the final geometry rather than trying to “build to piles” with limited access and tolerance issues.

During pile-driving works, unexpected ground conditions were also encountered that differed from initial assumptions. As a result, additional testing was initiated to confirm pile performance and conformance with the design intent, including verification of achieved capacity and embedment behaviour. The outcome of this testing is being used to confirm compliance and, if required, identify any appropriate next steps in consultation with the project engineer and relevant stakeholders.

6) Grouting and finalisation

After pile driving and trimming:

- Underwater grout was pumped into the pile sleeve annulus
- HDPE caps were installed to the sleeves
- Jetty-edge works and finishing items were completed (including making good kerbing and installing the nominated railing system to the jetty edge).

Throughout the install, lifting design, temporary works stability, and construction procedure were DM Composites-managed responsibilities, with nominated inspection stages and notice requirements for superintendent inspections.

SAFETY, ACCESS, AND RISK CONTROLS

This project succeeded on sequencing discipline. The methodology intentionally reduced exposure hours in the splash/tidal zone and reduced manual handling by:

- Maximising onshore fabrication and preassembly before marine installation.
- Using a single controlled major lift with a 130T crane, then levelling and temporary stabilisation before progressing to piling.
- Driving piles through sleeves so alignment is controlled by the installed frame (especially important given the “line of best fit” / clearance realities around existing jetty geometry and piles).

Keeping the structure stable during partial completion required DM Composites to maintain stability and avoid overstressing elements during construction, and to design temporary works accordingly.

PROJECT OUTCOMES

The finished asset delivers a durable marine access system with corrosion-resilient components in the tidal/splash zone, a guided piled foundation system driven to refusal, and a rock cage system providing toe protection/ballast at the lower end. The shore-based installation methodology enabled the works to be completed despite severe access constraints on the jetty, and the staged approach (lift/level/stabilise → load cage → drive piles → grout) reduced rework risk and improved safety control in a high-exposure environment.

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