



**CONSTRUCTION  
INDUSTRY COUNCIL**  
建造業議會



**CIC SUSTAINABLE  
CONSTRUCTION AWARD**  
建造業議會可持續建築大獎

# Organisations Category

## Contractor in New Works

### Bronze Award

**Gammon Engineering & Construction  
Company Limited**



### Intermodal Transfer Terminal - Bonded Vehicular Bridge and Associated Roads (Contract C19W10)

The Project site is situated between the Hong Kong-Zhuhai-Macao Bridge Boundary Crossing Facilities (HKBCF) Island and the Hong Kong International Airport (HKIA).

The project has designed Hong Kong's first marine-friendly hanging cofferdam for pile cap construction to avoid disturbance to the seabed. Alternative designs and methods for bridge deck construction have contributed to a significant carbon reduction, while total reuse of sediment avoided marine dumping and direct contamination to the marine environment.



#### Sustainable Best Practice 1

The project team initiated a discussion with the diving specialist, Gammon's in-house temporary works designer, and operation team to brainstorm an enhanced design to eliminate underwater works and minimise environmental impact during the initial design stage of cofferdam for marine pile cap construction.

The First marine-friendly hanging cofferdam in Hong Kong was designed for pile cap construction.

Compared with the typical design of a temporary cofferdam structure that requires insertion of steel shell to the seabed which causes unavoidable sediment displacement of the seabed, this design not only reduced material usage which can eliminate embodied carbon emissions to achieve decarbonisation, but also minimised the disturbance to 264m<sup>2</sup> seabed and marine habitats, providing a sustainable and innovative nature-based solution to our marine construction.

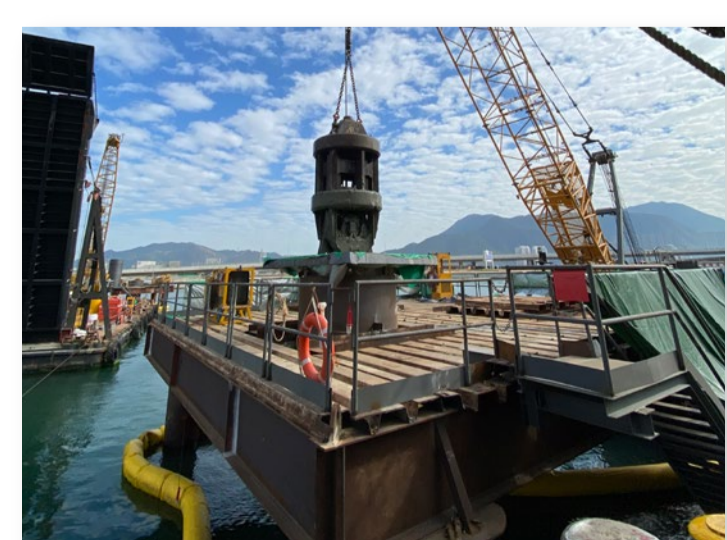
#### Sustainable Best Practice 2

Low-carbon construction method for bridge deck was initiated by project team since tender stage. Gammon engaged EPD and client AAHK proactively and proposed an Environmental Review on the proposed change of construction method.



Changing the construction method for the bridge deck from pre-cast segment erection to cast-in-situ method by Form Traveller. Compared to the conforming design, 120 tonnes of re-bar and 330m<sup>3</sup> of concrete (equivalent to reduction of 747 tonnes carbon emission) can be saved due to the slimmer structure of cast-in-situ bridge deck, 1,253 tCO<sub>2</sub>e embodied carbon has also been avoided by use of green concrete.

Avoided 45 trips of cross-border travelling trips to minimise impact to marine ecology and marine park in the vicinity, including Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP) and The Brothers Marine Park (BMP).



#### Sustainable Best Practice 3

Avoiding marine dumping operation to prevent direct contamination of the marine environment. Zero Waste to Sea was achieved by reusing additional 1,510 m<sup>3</sup> marine based sediment that beyond EIA and the contractual recommendation target of 1,150 m<sup>3</sup>. Marine dumping operation was avoided to prevent direct contamination of the marine environment. Hence

marine traffic route was shortened significantly from 42.5km to 5km, for transporting marine sediment for further treatment before reuse which eliminated 3 tonnes of carbon emission. 1,140 tonnes of cement use in Cement Stabilisation and 1,150 tonnes of carbon emissions were eliminated by optimising treatment processes. Testing determined the optimum mixing ratio with a minimum use of carbon-intensive Portland cement - 0.5%, a huge improvement compared with the 5-20% typically used in Hong Kong.