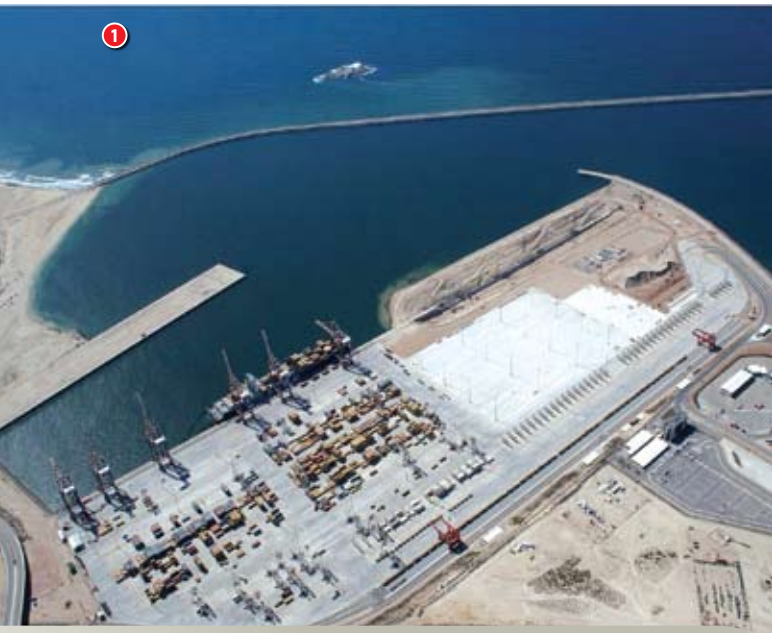
Construction of the



PORT OF NGQURA

JOINT WINNER

KEY PLAYERS

Client Transnet Ltd (National Ports Authority, Port Terminals, Freight Rail)
Professional Team Transnet Capital Projects, Hatch Mott McDonald Goba Joint Venture
Main Contractor Hatch Mott McDonald Goba Joint Venture
Major Subcontractors and Suppliers GrinakerLTA/Interbeton JV, Concor Holdings (Pty) Ltd, B&W Instrumentation

Situated approximately 20 km from Port Elizabeth, the Port of Ngqura is the biggest government-sponsored infrastructure development project to be undertaken in South Africa. The port boasts deep container berths of 16 m and will be able to accommodate the new generation of larger container ships. The construction of the port was a greenfields project with the objective of providing a full service bulk/breakbulk and container terminal together with rail links to the Ngqura main line to Gauteng.

Phase 1 encompassed the provision and construction of two container quays of 780 m in length, two bulk/breakbulk berths of 632 m, one liquid bulk berth of 452 m, the main breakwater at 2,6 km in length with a massive caisson at the roundhead, secondary breakwater at 1,08 km with four caissons at the roundhead, bulk earthworks for dry excavation of the majority of the basin and other areas, dredging of a portion of the basin to 16 m and 18 m and of the entrance channel to 18 m, basic road infrastructure, road bridge and services, and a sand bypass system.

The first phase of the project has created container capacity of 800 000 TEUs (twenty-foot equivalent units) per annum, and rail capacity of 100 000 TEUs, and is able to accommodate 1 600 reefer containers.

The construction of the port required massive quantities of sand, rock, concrete and dolosse, and major excavation – 14 million cubic metres of land-based excavation was undertaken, 13 million cubic metres of dredging works were carried out to level the cargo areas and create deepwater berths, and 808 000 cubic metres of concrete poured.

To construct the port's breakwaters, 5 million tons of rock and 380 000 cubic metres of concrete were used. Three large

1 Aerial view of the Port of Ngqura
2 Development of the port takes shape in 2003
3 Construction of the breakwaters and construction of the port in the dry

Port of Ngqura

cranes were needed to lift and position the rock and dolosse along the breakwaters, while thirty 25-ton trucks worked 24 hours a day to transport rock and aggregate from the quarry to site. The gigantic caisson at the end of the main breakwater, which is impressive at 70 m wide, 25 m long and 20 m deep, was constructed in the dry and then floated out to sea.

The 26 500 new-generation dolosse used at the Port of Ngqura are 4 m high and weigh in at 30 tons each. Every dolos took 28 days to cure and was constructed using a steel shutter. These massive concrete structures were custom-built, fabricated on site and moved into pre-determined positions using massive cranes capable of lifting up to 400 tons.

Earth-moving work usually stalls if soil and rock conditions are too tough for the equipment at hand – a challenge that faced the construction team installing a slurry wall nearly 2 km long for the container terminal at the port. Transnet Capital Projects and Dura Soletanche Bachy mobilised the hydrofraise, a French-built specialised drilling machine capable of cutting through the toughest rock and soil conditions. It was the only piece of equipment capable of the precision cutting required for the construction of the Ngqura slurry wall. A special feature of the hydrofraise is that it can penetrate the concrete of a panel that has already set to a thickness of several centimetres.

The construction of the port was aligned to the State President's Proclamation to create employment for the region. At the peak of the project there were approximately 2 600 people on site of which 2 250 were employed from the Eastern Cape Region, constituting about 86% of local labour.

The port is also situated in an environmentally significant geographic region. The area is home to some of the most sensitive and threatened vegetation types in South Africa, and is also close to the Jahleel Island Group, home to the country's largest colony of African Penquins, among other endemic bird life. No construction activity was permitted within 500 m of the islands.

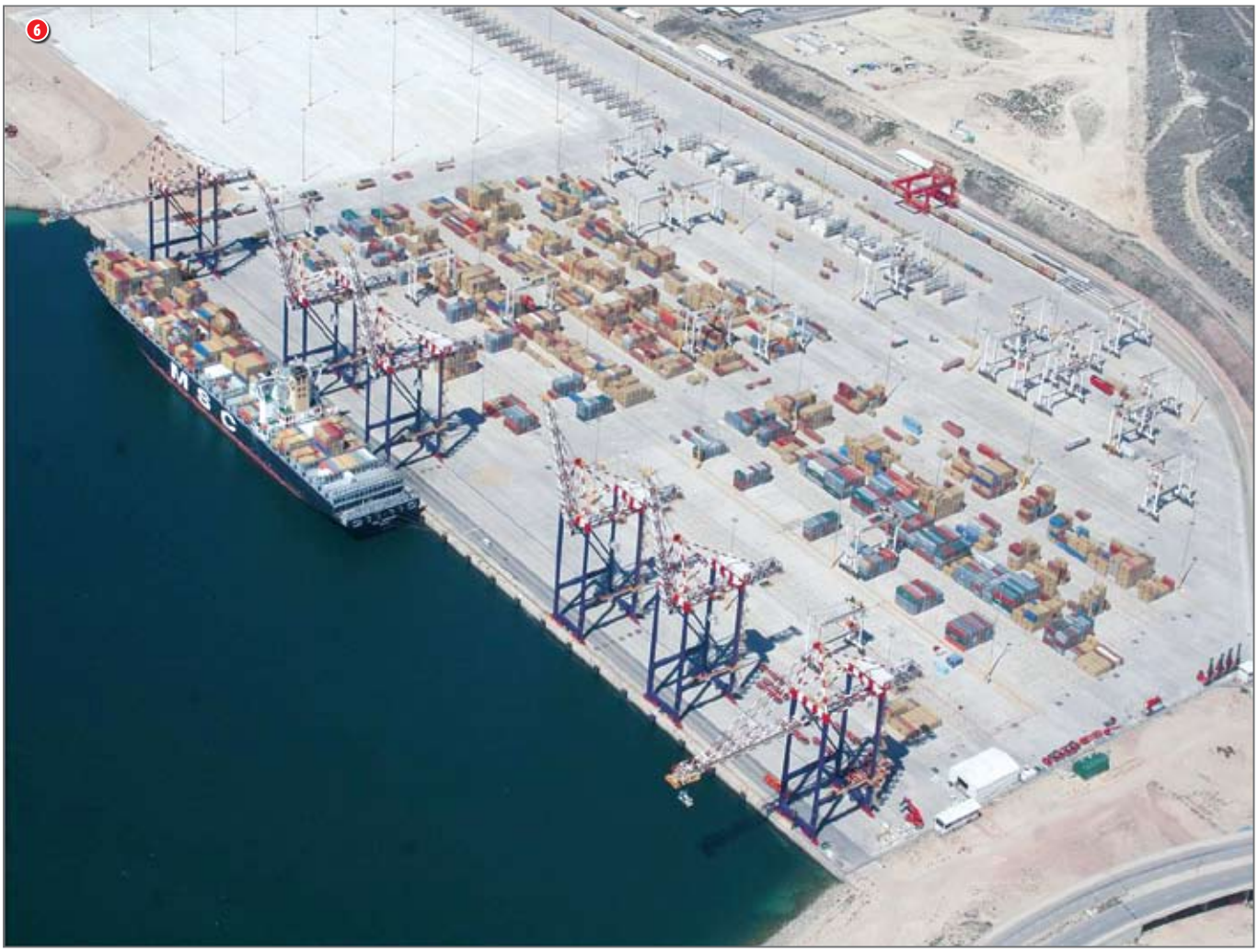
The development of a port of this nature in an environmentally sensitive area had to adhere to the strict conditions stipulated in the Record of Decision. The entire process was monitored by the Environmental Monitoring Committee, which had the power to halt the port's development in the interests of the environment. The Port of Ngqura is the only port in South Africa to have a Record of Decision for its construction and operation.

One of the requirements of the Record of Decision was the implementation of a rodent control programme. Poison-based rodent control systems can result in the secondary poisoning of birds of prey and other predators that prey on rodents. The endemic raptor species were reintroduced into the area to assist with the natural control of rodent populations. Nine spotted eagle owls, three rock kestrels and a peregrine falcon have been released inside the port and subsequent monitoring has shown the effectiveness of birds of prey in the control of rodent populations.

The port went live for commercial operations in October 2009, and six months later it had already received 84 vessel calls and handled over 70 000 TEUs.

The Port of Ngqura, a tough balancing act between commercial operations, social responsibility and environmental sustainability, is indeed a success story. □

4 Construction of caissons
5 Casting of 30-ton dolosse
6 The Port of Ngqura and the Ngqura Container Terminal Phase 1 went live for commercial operations in October 2009



Source:
http://www.saice.org.za/downloads/monthly_publications/2010/2010-Civil-Engineering-dec/#/0