

New Rapid Bay Jetty

Reference Geotechnical Investigation / Trial Piling

1. INTRODUCTION

It is proposed to construct a new jetty immediately to the east of the existing Rapid Bay Jetty. The new structure will provide pedestrian access to deep water for recreational divers, anglers and tourists.

The existing Rapid Bay Jetty is located at the township of Rapid Bay, approximately 100 kilometers south of Adelaide on the Fleurieu Peninsula. The current jetty was constructed in 1941 by BHP Pty Ltd for the purpose of shipping limestone from the adjacent quarry to Whyalla. Adelaide Brighton Cement later used the jetty for the same purpose, with the last shipment occurring in 1991.

The proposed structure will consist of evenly spaced twin pile bents (approximately 25), supporting a typically 3.6m wide precast concrete deck. Piles are to be raked transversely at 1 to 5. In addition, a number of longitudinally raked piles will be required, the exact number of which is subject to final design. The nominated piles are 610 diameter x 12.7 mm steel tubes. Reference is made to the attached drawing No. 2-6763 Sheet 20.

Connell Wagner is currently undertaking the design of the jetty for the Department for Transport, Energy and Infrastructure.

2. GEOTECHNICAL SUMMARY

The geotechnical investigation undertaken has been in the form of interpreting and plotting boreholes that were conducted in 1938 for the existing Rapid Bay Jetty. These records indicate that rock is likely to be present at shallow depths. Rock is expected at approximately 150mm depth for the first 200m from shore (approximately from bent 1 to 15). Beyond this point (bents 15 to 25) rock is expected to be encountered at approximately 1 to 2m depth. The material overlaying the rock generally consists of gravel with clayey sand or silty sand. The proposed new jetty is likely to sit in the Forktree Limestone sequence unit which belongs to the Normanville Group.

Further historical information regarding piling of the existing jetty revealed that "*The presence of bedrock close to the surface of the seabed slowed progress for the first 183m as drilling and blasting was required before timber piles could be driven into the seabed*".

3. SCOPE OF TEST PILING WORKS

STAGE 1

It is proposed that four raked test piles be installed in order to assess the practicality of achieving the raked alignment, embedment, and load capacity required for the design. The piles to be used are 610 diameter x 12.7mm steel tubes Grade 350 installed at a rake of 1 to 5. The jetty piles in the preliminary design arrangement require an ultimate vertical, lateral and uplift load capacity of 750 kN, 210 kN and 150 kN respectively. The approximate calculated minimum embedment is to be 4 meters founded into rock. The piles are to be driven using a hammer weight up to and including 8 tonnes.

The tests piles are to be placed on the alignment of the proposed new jetty and will be incorporated into the new structure if successful. The test pile locations are summarized in Table 1 below and on Drawing No. 2-6763 Sheet 20.

Test Pile Number	Bent Number	Approx Pile Length
1R	5	10.5
2R	10	12.9
3R	15	15.7
4R	25	18.2

Table 1 – Test Pile Location (Trial 1)

Note: Approx pile length based upon top of pile RL 4.26m CD, water depth at relevant pile bent and a pile embedment of 4 metres for bents 5 and 10, and an embedment of 5.5 metres (4m rock, 1.5m overlying) for bents 15 and 25.

During the test piling and whilst still mobilised, the results are to be discussed with Connell Wagner and DTEI.

Following the driving of the 610 diameter steel tubes, even if a 100% success rate is achieved, it is proposed to investigate driving 400 WC 270 “H” piles raked at 1 to 5. These piles are of a size small enough to fit within a 610 diameter steel tube and such that they can be used at locations where a 610 diameter steel tube pile has failed. The locations and number of these piles is to be determined following the driving of the 610 diameter steel tubes.

STAGE 2

If the success rate of the 610 diameter test piles is less than 100%, an alternative course of action may be required. The course of action is to be determined in conjunction with the piling contractor dependent upon the nature of the site conditions found and the difficulties encountered during the Stage 1 testing of both the steel tube and “H” piles. The options are as follows:

- Investigate steepening the rake of the piles to 1 in 8 (either 610 diameter steel tubes or 400WC270 “H” piles). Piles at this reduced rake require an ultimate

vertical, lateral and uplift load capacity of 850 kN, 185 kN and 230 kN respectively.

- Investigate drilling and “grouting” of raked 610 x 12.7 steel tube piles (with rake to be advised).

If the above proves to be unsuccessful, it may be necessary to drive vertical piles. Due to the inefficient nature of vertical piles, larger 813 diameter x 16.0 mm steel tubes are required. As such, the vertical piles are required to have an ultimate vertical, lateral and uplift capacity of 1050 kN, 150 kN and 450 kN respectively. The required embedment into rock is required to be 4 metres. The use of vertical piles will require design changes to the jetty superstructure.

4. ENVIRONMENTAL SUMMARY

It is noted that the site is of considerable environmental significance and is home to numerous threatened species of marine flora and fauna. Approvals from relevant authorities will be required prior to any site works.