## 19.6 RABY BAY REVETMENT WALL TRIAL AND REPORT

**Objective Reference:**

**Authorising Officer:** **Peter Best, General Manager Infrastructure & Operations**

**Responsible Officer:** **Rodney Powell, Senior Engineer Marine & Water Assets**

**Report Author:** **Toby Ehrsam, Coastal Infrastructure Adviser**

**Attachments:** **1. Raby Bay Repair Trial Assessment Report**

The Council is satisfied that, pursuant to Section 275(1) of the *Local Government Regulation 2012*, the information to be received, discussed or considered in relation to this agenda item is:

*(c) the local government's budget*

*(h) other business for which a public discussion would be likely to prejudice the interests of the local government or someone else, or enable a person to gain a financial advantage.*

**PURPOSE**

The purpose of this report is to request Redland City Council (Council) notes:

1. the recommendations of the Raby Bay Repair Trial Assessment Report (the Report); and
2. the implementation of Raby Bay Revetment Wall Stabilisation Program (Stabilisation Program)

**BACKGROUND**

Council engaged the consultant Arup to oversee a project to trial various new stabilisation methods to address the history of ongoing revetment wall movement, occurring in the Raby Bay Canal Estate.

Existing methods for canal stabilisation and full revetment wall reconstruction are implemented reactively (i.e. post-failure), and are considered robust and effective. However, due to ongoing rising construction costs, these methods are not financially sustainable into the future. This reactive approach also has other disadvantages, principally, significant stress on the revetment walls of adjoining properties which are not repaired, significant negative social impacts experienced by affected residents (eg: damage to private property, impacts on road and canal traffic, site access considerations and noise) and reputational damage to Council.

As such, Council requires a method that can be implemented proactively prior to failure and at a lower cost and lower social impact, than existing repair methods.

The Raby Bay Repair Trial Project (the Trial) consisted of three trial remediation areas. These trial areas are located at Masthead Drive, Sternlight Court, and at the south-western area of Foreshore Park. The trial areas underwent geotechnical investigations and monitoring to inform the potential failure mechanisms and rates of movement prior to construction works. Following construction, a 12-month monitoring phase commenced to gather data on post construction rates of movement.

The Trial comprised multiple stages as detailed below:

Stage 1: Geotechnical assessment of the Trial areas inclusive of surveying and monitoring of instrumentation.

Stage 2: Analysis of the results of Stage 1 and determination of Trial specification requirements for Stage 3.

Stage 3: Implementation of revetment wall remediation methods at a number of Trial sites.

Stage 4: A 12-month monitoring phase and a final assessment of the Trial remediation methods. Data from Stage 1 and Stage 2 are intended to be used to establish baseline measurements against which the Stage 4 monitoring is compared for effectiveness of the Trial methodologies.

**ISSUES**

The Stabilisation Program is a revetment wall renewal method that can be implemented proactively prior to the point where a full revetment wall reconstruction is required, and at a lower cost than the existing repair methods. The implementation of the Stabilisation Program is intended to reduce the requirements for full revetment wall reconstruction and associated high repair costs. The Stabilisation Program is not considered suitable for revetment walls that require full replacement.

As part of the Trial, trigger levels have been developed as thresholds for action as revetment walls deteriorate.

Thresholds for action are listed below:

| Measured movement at wall | Proposed treatment |
|---|---|
| < 50mm | Monitoring |
| ≥ 50mm and < 100mm | Monitoring and implementation of new repair methodology |
| ≥ 100mm | Full reconstruction utilising previously employed methods, e.g. two rows of screw piles |

Significant cost savings and stabilisation efficiencies are expected over time with the implementation of the Stabilisation Program. As outlined in the Report, a cost comparison between current revetment wall reconstruction costs and the most suitable Trial stabilisation method are outlined below:

| Cost of work | Proposed treatment |
|---|---|
| $ lineal metre (Approx.) | Current revetment wall reconstruction (two rows of screw piles) |
| $ lineal metre (Approx.) | Most suitable trial stabilisation method (Mainmark Resin Injection) |

Assessment of the Trial has been completed by Arup and the highest scoring repair solution is the resin injection method undertaken by Mainmark Pty Ltd with a score of 92% out of 100%.

The implementation of the Stabilisation Program is expected to result in a 195% increase in the number of revetment walls stabilised over the next 10 years without the need to increase annual capital budgets. The implementation of the stabilisation program over the next 10 years is projected to result in estimated savings of In addition, significant social benefits to the community will be achieved by minimising disruption to residents from impacts on road and canal traffic, site access considerations and noise.

If the Stabilisation Program is not implemented, this will result in no change to the increasing costs of fully replacing revetment walls in the Raby Bay Canal Estate. In addition, not implementing the Stabilisation Program will result in ongoing social risks due to construction impacts on road and canal traffic, site access considerations and noise.

**STRATEGIC IMPLICATIONS**

**Legislative Requirements**

The recommendations presented in the Report have been developed to ensure conformance with "section 167 (5)(b) of the *Coastal Protection and Management Act 1995" (the Act)*.

For the Raby Bay canal estate, the Act specifies that works considered "accepted development" within the estate do not require specific permits or approvals and only require pre/post works notification to the Department of Environment and Science (DES) as outlined in the Code.

The budget for the implementation of the Stabilisation Program will be funded by a differential rate applied to specific properties in the Raby Bay Canal Estate. The ability to adopt a differential rate is dictated by the "Section 81 of the *Local Government Regulation 2012"* (Regulation). The adoption of an ongoing differential rate was approved by Council as part of FY2018/19 budget deliberations.

**Risk Management**

Non acceptance of the recommendations in the Report, will result in the deferral of the Stabilisation Program. This will result in a continuation of the reactive renewal of revetment walls with current full revetment wall reconstruction methods and associated costs.

Social risk to Council exists due to current renewal work typically being more disruptive to residents because of impacts on road and canal traffic, site access considerations and noise.

A financial opportunity has been identified, with an estimated saving/metre of revetment wall stabilised.

Implementation of the Stabilisation Program will result in the proactive stabilisation of revetment walls before they reach total failure. Over time, this will reduce the incidence of revetment walls requiring full replacement and the associated cost and social impacts.

Contractor risk

All construction risks will be identified through the Council's risk assessment process and managed by Project Delivery Group (PDG). Proposed construction methodology, site-based management plans, traffic management plans, environmental management plans and, any other evaluation criteria identified by PDG officers, will be requested prior to conclusion of the contract procurement process.

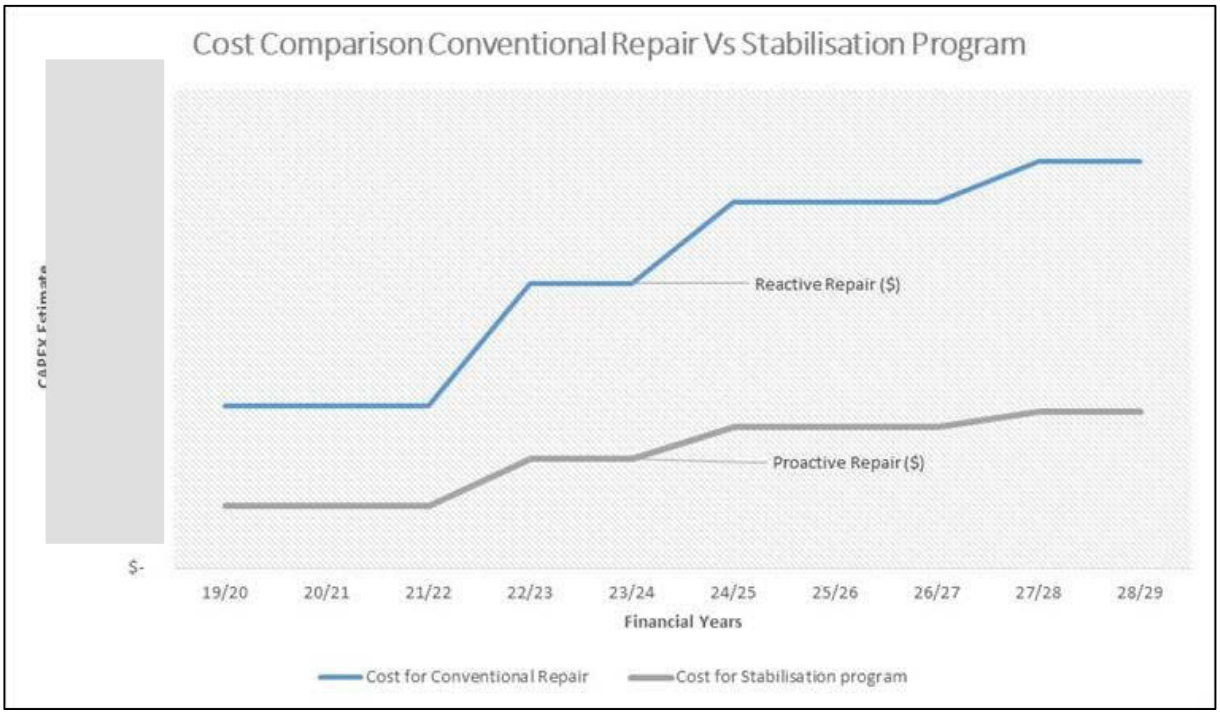
**Financial**

FY2018/19 budget implications – Nil.

Funding of CAPEX is required in FY2019/20. This program of works is funded by the revetment wall differential rate and associated reserve.

Compared to existing methods, the reduced cost of implementing the proactive repair process is expected to allow for a 195% increase in the number of revetment walls to be stabilised without the need to increase annual capital budgets. It is estimated that an additional 965m of revetment walls will be stabilised in Raby Bay over the next 10 years.

The implementation of this program is expected to result in savings of approximately CAPEX over a 10 year period, as shown in the graph below.




Projected 10 year program of works for the Stabilisation Program and Revetment Wall Program is outlined below:

| **Stabilisation Program 1 (Proactive Repair)** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 |
| Length of Revetment wall stabilised (m) | 80 | 80 | 80 | 140 | 140 | 180 | 180 | 180 | 200 | 200 |
| | | | | | | | | | | |
| **Raby Bay Revetment Wall Program 2 (Reactive Repair)** | | | | | | | | | | |
| | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 |
| Length of Revetment wall replaced (m) | 65 | 80 | 80 | 60 | 60 | 40 | 40 | 40 | 20 | 20 |

1. This program will be increased as the number of failures reduces
2. This program will reduce as the number of failures reduces

**People**

An internal panel of pre-qualified suppliers has been established and contractors can be engaged directly off this panel, removing the need for a tender process to occur for each project (savings of per project). This procurement activity process is more efficient and delivery (construction) timeframes will be significantly reduced compared to current stabilisation projects.**Environmental**

There are no implications.

**Social**

During Stage 3 (Construction) of the Trial stabilisation methods were assessed and it was concluded that the resin injection method minimises disruption to residents, including impacts on road and canal traffic, site access considerations and noise.

**Alignment with Council's Policy and Plans**

This report is in line with Council's Marine Estates Asset Management Plan.

The outcomes of recommendations in this report align with Council's Corporate Plan 2018-2023 vision outcome areas:

3. Embracing the Bay (3.3, 3.4 and 3.5);
5. Wise Planning and Design (5.4);
8. Inclusive and Ethical Governance (8.2, 8.3, 8.4, 8.5).

## CONSULTATION

| Consulted | Consultation Date | Comments/Actions |
|---|---|---|
| Raby Bay Technical Working Group<br>Group Manager Project Delivery – PDG<br>Service Manager Project & Contractor Management – PDG<br>Project Coordinator Marine - PDG | May 2014 | Risk assessment workshop held to assess the risks and develop an action plan associated with a planned trial of new repair practices for upper level failures in fill on Raby Bay Canal Estate. |
| General Meeting Resolution | August 2014 | Item 16.2.4 of the General Meeting Minutes of 20 August 2014 - REDLAND CITY COUNCIL RABY BAY RISK ASSESSMENT WORKSHOP refers:<br>That Council resolves to:<br>1. Note the report and agree to public release of the report; and<br>2. Approve allocation of the funds necessary (up to [redacted] from the Raby Bay Special Charge Reserve to carry out the Action Plan recommended in the report. |
| Raby Bay Ratepayers Association - Technical Working Group | Quarterly from Mid 2014 – current | Regular communication and updates have been provided to the Technical Working Group during quarterly meetings and identified milestone dates |
| Arup Project Manager and project team | Feb 2015 to July 2018 | The Arup project manager and project team were tasked to design the trial, oversee the trial and assess the trial. Their involvement during this time was to oversee and manage all associated tasks to ensure the successful completion of the trial. |
| Project Coordinator Marine – PDG | January 2017<br>March 2017<br>June 2017 | Technical review of contractor's performance and onsite activities during trial |
| Project Coordinator Marine – PDG<br>Senior Tender & Contracts Officer - PDG | November 2017 | Provided with trial assessment monitoring data |
| Division 2 Councillor | May 2018 | Meeting with Councillor to provide update on Trial progress and outcomes |
| Division 2 Councillor | March 2019 | Meeting with Councillor to provide update on Marine Project progress and outcomes |

## OPTIONS

### Option One

That Council resolves to:

1. note the recommendations of the Raby Bay Repair Trial Assessment Report;
2. note the implementation of Raby Bay Revetment Wall Stabilisation Program; and
3. maintain this report and attachment as confidential until the contract is awarded, subject to maintaining the confidentiality of legally privileged, private and commercial in confidence information.

**Option Two**

That Council resolves to:

1. not note recommendations of the report; and
2. maintain this report as confidential, subject to maintaining the confidentiality of legally privileged, private and commercial in confidence information.

**OFFICER'S RECOMMENDATION**

**That Council resolves to:**

1. **note the recommendations of the Raby Bay Repair Trial Assessment Report;**
2. **note the implementation of Raby Bay Revetment Wall Stabilisation Program; and**
3. **maintain this report and attachment as confidential until the contract is awarded, subject to maintaining the confidentiality of legally privileged, private and commercial in confidence information.**