

Rothera Wharf Reconstruction & Coastal Stabilisation

Final Comprehensive Environmental Evaluation



BAS Environment Office

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**British
Antarctic Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Non-Technical Summary

Introduction

This final Comprehensive Environmental Evaluation (CEE) has been prepared by the British Antarctic Survey (BAS) to assess the potential environmental impacts associated with two related projects at Rothera Research Station; the reconstruction of Rothera Wharf and associated coastal stabilisation works. Over the next ten years the combined Antarctic Infrastructure Modernisation Programme (AIMP) represent the largest UK Government investment in polar science since the 1980s and will enable BAS to continue to deliver world leading science capability in the Polar Regions. Rothera Wharf reconstruction and the coastal stabilisation are the first activities at Rothera included in the AIMP projects. BAS have appointed the civil engineering company BAM as their Construction Partner to deliver this project.

This CEE has been prepared in accordance with Article 8 and Annex I to the Protocol on Environmental Protection to the Antarctic Treaty (1991).

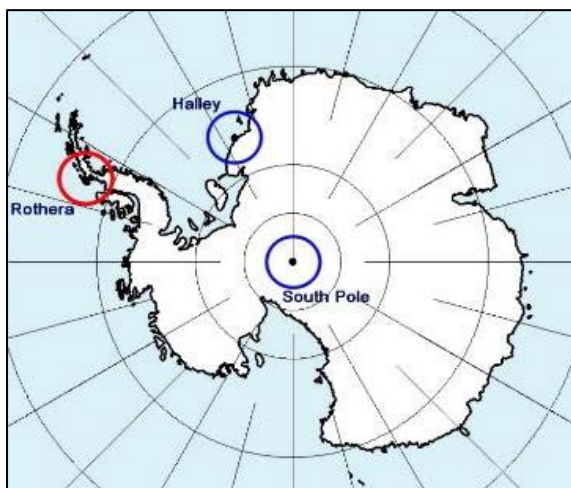


Fig 1. Map showing location of Rothera Research Station

Description of Proposed Development 1 – Rothera Wharf Reconstruction

The existing wharf at Rothera Research Station, referred to as the Biscoe Wharf is 25 years old and is now beyond economic repair. In addition the Natural Environment Research Council (NERC) have commissioned the construction of a new ship the Sir David Attenborough (SDA) which as a much larger research vessel than the current BAS ships, requires a new deeper and longer wharf, to be built at Rothera. The water depth at the existing Biscoe Wharf is too shallow for the SDA to berth alongside and it is not long enough to offload people and cargo safely. The proposed solution is to dismantle and replace the existing wharf with a new larger wharf built in the same location. The design of the new structure is similar to the existing 60m long wharf design but will have a berthing length of 76m and extend further out to provide greater water depth. The preferred option will be constructed over two Antarctic summer seasons 2018-2020. Demolition of the existing wharf and partial build of the new wharf will occur in the first season and completion of the construction will take place in the second season.



Fig 2. Aerial view of Rothera Research Station & Biscoe Wharf at Rothera Point

Alternatives

The ‘do nothing’ and the ‘do minimum’ options were evaluated but would not enable safe and efficient berthing and mooring of the SDA so were rejected. A number of alternative designs were evaluated but were not considered viable due to cost, logistics, safety or environmental constraints.

Description of Proposed Development 2 – Sourcing Local Rock

In order to provide the rock fill required for the Rothera Wharf reconstruction and the coastal stabilisation works, it is proposed to quarry rock from Rothera Point. The intended site which is approximately 6000 m², is within the current overall footprint of the station operations, directly adjacent to the current Biscoe Wharf. In order to produce the necessary rock fill, it is anticipated that a gross quantity of approximately 65,000 – 80,000 tonnes (24,000-30,000 m³) of in-situ rock will be sourced.

In order to source the rock the following activities will have to be undertaken:

- drilling and blasting;
- loading and hauling rock; and
- processing, crushing and screening.

Alternatives

Sourcing the rock fill from alternative locations at Rothera Point and outside of Antarctica was considered. Other locations to source rock locally were discounted on environmental grounds because they were outside of the current operational footprint and in a more sensitive location or too close to station buildings. Sourcing rock fill from outside of Antarctica was rejected as an option owing to the high risk of accidentally importing non-native species.

Description of Proposed Development 3 – Coastal Stabilisation

In association with the construction works for the wharf, it is proposed to reinforce an area of shore protection. The location of these works is a small man-made cove situated between the runway at

Rothera and the current Biscoe Wharf. The rock embankment which is built up around the cove, provides shore protection to both the aforementioned structures. It is predicted that due to the new wharf design, which will protrude further into the sea than the current one, that there is a small risk that the wave and ice effects within the cove will be amplified. Any subsequent damage to the existing cove embankment could impact the safe operation of either the Rothera Runway or the wharf. It could also impede the main sea water intake location in the cove that is used to supply all drinking water at Rothera. As a result of a qualitative assessment (completed since the submission of the Draft CEE), which analysed the anticipated impact of the wharf on wave energy and subsequent erosion in the cove, the anticipated works are now smaller in scale. It is anticipated that the proposed works will require a gross quantity of approximately 1,600 tonnes, (800m³) of in-situ rock also to be sourced from Rothera Point.

Alternatives

The 'do nothing' and 'do minimum' options were considered but discounted because neither option will maintain the performance of the shore protection for a further 25 years. The preferred option was chosen because it was considered to provide optimal protection with minimal maintenance.

Description of Support Activities

The anticipated volume of cargo required for the construction works will require the use of a commercial charter vessel at the start of the construction programme. Dependent on the future programming of BAS ships, it will be necessary to charter a vessel for demobilisation at the end of project. Construction personnel will be deployed to Rothera using existing BAS logistics. All personnel will be housed in either the existing permanent accommodation at Rothera or within temporary accommodation units proposed to be installed in the 2017-2018 season.

Power generation for all construction activities will be provided independently to normal BAS operations. Other site services such as water, power and sewerage required for domestic use by construction staff will be provided by existing BAS services.

A temporary jetty is proposed to be constructed in order to continue the normal BAS small boating operations, during the reconstruction of the wharf. The jetty will also be used during resupply of the station by the BAS ship's tender vessel whilst the wharf is unavailable for use. This will be located in South Cove.

Description of the Environment

Rothera Research Station has been used operationally on a continuous basis since 1975. The station was initially planned and constructed in phases, after which other infrastructure was added as operational requirements changed. The works proposed in this CEE are predominantly within the current operational footprint and previously developed areas of the site.

Levels of biodiversity at Rothera Point are not high compared to other equivalent areas in Antarctica. However, it does contain some examples of Antarctic fellfield environment, which is reasonably rare in the wider area. This is typically a dry, cold terrestrial habitat prone to rapid freezing and thawing, that experiences seasonal snow cover and long hours of daylight in summer and to which organisms have adapted in order to survive the extreme conditions. In contrast, the near shore marine environment is considerably more species diverse and the subject of most biological research in the area. South polar skuas are the most abundant breeding birds at Rothera with occasional pairs of kelp gulls nesting and one Wilson's storm petrel nest has been found. Adélie Penguins are regular visitors but do not breed at Rothera. Although no seals breed at Rothera, Weddell and leopard seals are

present all year round. Crabeater, elephant and fur seals are also present during the summer months. Minke, humpback and killer whales are seen in Ryder Bay each summer.

Antarctic Specially Protected Area (ASPA) 129 is located on the northern end of Rothera Point, which was designated to protect scientific values, and to serve as a control site, against which the effects of human impact associated with the adjacent Rothera Research Station could be monitored in an Antarctic fellfield ecosystem. It is more than 500 metres away from the propose construction activity.

No non-native plants or invertebrates are known to be present at Rothera Point or in the adjacent marine environment.

Impact Identification & Mitigation

A full assessment of the potential environmental impacts is included within this CEE. Most of the predicted impacts will be minimised by implementing existing BAS procedures or with the addition of specific mitigation and monitoring. The most significant potential impacts predicted are:

- Introduction of non-native species
- Terrestrial or marine pollution from fuel spills
- Removal of rock resulting in a change in the aesthetics of Rothera Point
- Loss of ice free ground for terrestrial habitat
- Disturbance to marine mammals by underwater noise
- Loss of marine benthic habitat

The introduction of non-native species as a result of importing cargo or the deployment of personnel could have a significant impact in the longer term, but these impacts are less likely because normal biosecurity procedures will be followed.

The most significant potential impact is the permanent removal of rock for use in the wharf construction. This will potentially alter the aesthetic value for Rothera Point and reduce the available ice free terrestrial habitat. The decision to quarry rock locally was influenced by the need to reduce the risks associated with the importation of large quantities of aggregate which have the potential to introduce non-native species.

The probability of impacts associated with fuel spills occurring will also be reduced by compliance with standard operating procedures with during refuelling. In the unlikely event of a spill, oil spill contingency plans are in place and will be followed to minimise the severity of impacts.

Disturbance or harm to marine mammals from changes in underwater noise could result in avoidance behaviour or hearing damage however, the robust mitigation measures outlined will be adhered to, to ensure that the risk of this occurring is minimised and where possible avoided.

The extension of the wharf will result in a small reduction in the local marine benthic habitat within the footprint of the new wharf. A further impact to the surrounding benthic communities could occur from disturbance through underwater construction activity. The wharf design has sought to reduce the amount of sea bed preparation required and therefore the extent of this potential impact. Additionally a long term monitoring programme is already underway in order to verify the predicted impacts.

The Rothera Wharf reconstruction and coastal stabilisation works, are essential activities for BAS to be able to fully utilise the new BAS ship, the SDA. The project has been designed to take account of environmental and social impacts which will be evidenced through the CEEQUAL assessment; this is a sustainability evaluation for infrastructure projects and undertaken by an independent verifier. The proposed plans largely avoid areas of ecological sensitivity and will predominantly occur in previously disturbed and developed locations at Rothera.

Monitoring & Audit Requirements

A monitoring plan has been produced which defines the monitoring activities to be undertaken during the project. The monitoring tasks are split into two types of activities;

- a) Short term monitoring of activities which could result in an immediate impact on the environment and can be modified during the construction programme to avoid adverse effects including:
 - Neutralisation of cement contaminated water
 - Sediment levels in seawater (turbidity)
 - Wildlife displacement
 - Noise from quarrying and construction activities
 - Vibration from quarrying and construction activities
 - Marine noise from construction activities
 - Airborne dust

- b) Long term monitoring of activities which could result in impacts that can only be measured over several Antarctic seasons. Such activities are unlikely to be modified during the construction period. This will include monitoring of the following activities:
 - Skua breeding success on Rothera Point
 - Marine benthic invertebrate communities

Gaps in Knowledge and Uncertainties

The information provided for the Draft CEE for Rothera Wharf was based on the '65% design details' available at the time of writing. There have been no significant departures from the 65% design to date. Minor changes to the design have been incorporated into this document. Impacts associated with any minor changes to the design have been evaluated and included in this final version of the CEE.

Since the submission of the Draft CEE the amount of rock required for the wharf has decreased significantly from 140,000 - 155,000 tonnes (52,000-27,400m³) to 65,000 – 80,000 tonnes (24,000-30,000 m³).

The final solution for coastal stabilisation works, will be confirmed after further investigations on site have been completed which is likely to be in April 2019. An EIA update will be provided if the final solution differs to proposed option presented in this CEE.

The Rothera Modernisation project is a future programme funded by NERC, which aims to upgrade the station infrastructure at Rothera over a 5-10 year period. It is anticipated that an EIA will be prepared for the works once further design detail is completed in 2019. The EIA will assess the cumulative impacts associated with works included in this assessment and any other known future developments.

Conclusion

Having prepared a full CEE and presented rigorous mitigation measures to reduce the risk of these impacts occurring, it is considered that some activities within the project will have a greater than minor or transitory impact. This level of impact is considered acceptable considering the significant scientific and operational advantage that will be gained as a result of the projects.

Authors of the CEE

This CEE has been prepared by Clare Fothergill of the BAS Environment Office. The baseline section was written by Kevin A. Hughes with input from a number of expert contributors listed in the acknowledgements section. Construction specific mitigation measures, biosecurity procedures, spill response and waste management procedures were written in conjunction with Neil Goulding of BAM.

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