Draft Comprehensive Environmental Evaluation (CEE) for the Proposed Scott Base Redevelopment

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**A working paper submitted by New Zealand**

***Summary***

A draft Comprehensive Environmental Evaluation (CEE) has been prepared by Antarctica New Zealand for the proposed Scott Base Redevelopment and replacement of the Ross Island Wind Energy network. The draft CEE was prepared following the requirements of Article 3, Annex I to The Protocol on Environmental Protection to the Antarctic Treaty. The Non-Technical Summary is attached as Annex A to this Working Paper.

The draft CEE considers the proposed construction and logistics activities, the potential environmental impacts and proposed mitigation and monitoring measures and concluded that the proposed activities are likely to have more than a minor or transitory impact on the Antarctic environment.

***Circulation and translation of the CEE***

New Zealand has circulated of the draft CEE to the Parties to the Protocol. It was made available by Antarctica New Zealand on 15 February 2021 from [Comprehensive Environmental Evaluation | Antarctica New Zealand (antarcticanz.govt.nz)](https://www.antarcticanz.govt.nz/draftcee). Notification of the report was sent by Diplomatic Note to all Parties to the Protocol on Environmental Protection to the Antarctic Treaty and was also circulated by the Antarctic Treaty Secretariat (through CEP Circular 5/2021).

In accordance with the Procedures for intersessional consideration of Draft CEEs, an Intersessional Contact Group was established, convened by Spain, to review the draft CEE. ICG correspondence is available to CEP Members and Observers via the CEP discussion forum. New Zealand is grateful to all participants of the ICG and will address all comments when producing the final CEE.

***CEE findings***

The draft CEE has been prepared to assess the potential environmental impacts associated with the proposed Scott Base Redevelopment and replacement of the Ross Island Wind Energy network.

The proposed activities are required because the current Scott Base buildings, facilities and associated infrastructure including the wind farm, are reaching the end of their functional life and safety and environmental risks are escalating.

It is proposed to replace the existing Scott Base with a full new station at the same location on Pram Point, Ross Island. The Scott Base Redevelopment proposes the deconstruction and removal of the existing Scott Base. The new station is proposed to be fully constructed in New Zealand and shipped as modules in a single voyage on a large vessel, to be assembled again once on Pram Point. The proposed Scott Base is designed to be more efficient, resilient, and sustainable in order to provide a safe and healthy environment for its occupants and support the New Zealand science programme for the next 50 years. The Ross Island Wind Energy network replacement proposes two options. The second and preferred option is to install four new turbines on the existing Crater Hill site, to supply 98% of the energy demand.

Pram Point and Crater Hill have been the site of scientific and operational activities since 1957. They are representative of an ice-free environment that has been the receptor of significant and ongoing human impacts for more than 60 years and the terrestrial and nearshore marine environments are well understood.

The draft CEE presents a full Environmental Impact Assessment of the proposed activities. The assessment identifies a range of direct, indirect and cumulative impacts on environmental receptors. The most significant potential impacts identified are the release of greenhouse gases contributing to global climate change; changes to the physical landscape, to watercourses and meltwater pathways and disturbance of the permafrost; physical damage, destruction and modification in the distribution, abundance or biodiversity of terrestrial flora and micro fauna; and contamination of the nearshore marine environment and smothering of the nearshore biota from increased sediment discharges. Mitigation measures are proposed, ranging from the design and location of the proposed Scott Base, to construction methodology and on-site practices.

Following the comprehensive assessment of the proposed activities and associated mitigation measures, it is concluded that the proposed activities are likely to have more than a minor or transitory impact on the Antarctic environment. The draft CEE concludes that this level of impact is considered acceptable, in light of the positive safety, environmental and scientific support improvements that the proposed activities will deliver.

***Response to ICG***

New Zealand is grateful to Spain for convening the ICG, and to all ICG participants for their constructive comments on the draft CEE. Comments raised by the ICG process, and any additional comments made during discussions at CEP XXIII, will be addressed in the final CEE.

***Annex A***

**Non-technical summary**

*Introduction*

This draft Comprehensive Environmental Evaluation (CEE) has been prepared by Antarctica New Zealand to assess the potential environmental impacts associated with the proposed Scott Base Redevelopment and replacement of the Ross Island Wind Energy network. The proposed activities are required because the current Scott Base buildings, facilities and associated infrastructure are reaching the end of their functional life and safety and environmental risks are escalating.

The three wind turbines of the Ross Island Wind Energy network have a design capacity of 990kW and an end of life period of 2030. The current Ross Island Wind Energy network was developed to supply renewable energy to the existing station and infrastructure. Energy modelling for the proposed Scott Base indicates that the total energy load is higher than the current Scott Base energy load. Therefore, replacement of the existing Ross Island Wind Energy network, in conjunction with the Scott Base Redevelopment, is proposed in order to optimise and utilise logistics and construction resources. The larger design capacity will support the increased energy load of the proposed Scott Base and provide more renewable energy for Ross Island (both Scott Base and McMurdo Station (United States)).

This draft CEE has been prepared following the requirements of Article 3, Annex I to The Protocol on Environmental Protection to the Antarctic Treaty, the Revised Guidelines for Environmental Impact Assessments in Antarctica (Resolution 1 (2016)) and applicable New Zealand legislation.

The scope of this draft CEE includes two main components:

1. The Scott Base Redevelopment; and
2. The Ross Island Wind Energy network replacement.

*Description of the proposed activities*

The Scott Base Redevelopment involves the full replacement of the existing Scott Base with a new station. The site for the proposed activities is Pram Point, where the current station is located. The Scott Base Redevelopment proposes the deconstruction and removal of the existing Scott Base. Civil works including bulk earthworks are proposed to prepare the site and improve the safety of operations on the Scott Base to McMurdo Station road. Foundation and enabling works, including the relocation of some Long-Term Science experiments are also part of the proposed activities.

The new station is proposed to be fully constructed in New Zealand and shipped as modules in a single voyage on a large vessel, to be assembled again once on Pram Point. The proposal includes a temporary wharf consisting of bollards and cantilevered frames to accommodate the vessel at Pram Point. A temporary station, also on Pram Point, is proposed to support both the Scott Base Redevelopment and New Zealand’s scientific and environmental protection programmes during the proposed activities. The proposed Scott Base is designed to be more efficient, resilient, and sustainable in order to provide a safe and healthy environment for its occupants and support the New Zealand science programme for the next 50 years.

The Ross Island Wind Energy network replacement was developed to the feasibility stage at the time of preparing this draft CEE with two options under investigation. The first option is to install three new turbines to supply 80% of the proposed Scott Base’s energy demand. The second and preferred option is to install four new turbines to supply 98% of the demand. Both options are supported by a battery energy storage system to provide continuous energy in periods of low wind. The proposed activities place the new wind turbines on Crater Hill, where the current turbines are located. The proposed activities include the removal of the existing turbines and their foundations and their replacement with three or four larger wind turbines, placed on new foundations. The replacement of all ancillary plant (e.g. cabling, frequency converter, electrical substation) is also proposed.

The temporal scope for the Scott Base Redevelopment begins in the austral summer of 2021/22 until the end of the 2026/27 austral summer. The Ross Island Wind Energy network replacement is proposed to begin in the austral summer of 2023/24 until the austral summer of 2025/26.

The seasonal activities for the proposed project are:

Season 0 (2021/22) – Testing of foundation design and completion of Long-Term Science relocation;

Season 1 (2022/23) – Shipping and staging of equipment and plant, temporary station site preparations, prepare staging areas, commencing construction of new buildings in New Zealand;

Season 2 (2023/24) – Construction of a temporary base, Scott Base to McMurdo road realignment, water and wastewater intake and outlet structures installation, bulk fuel tank platform establishment and the preparation and piling for a temporary wharf, construction of new buildings in New Zealand;

Season 3 (2024/25) – Existing Scott Base decommissioning and deconstruction, bulk earthworks, piling/foundations, establishment of a haul road from temporary wharf to building site, temporary wharf bollard installation and first new wind turbine installation, construction of new buildings in New Zealand;

Season 4 (2025/26) – Finalise bulk earthworks and haul road, piling/foundations, decommission existing wind farm, install remaining turbines and commission new wind farm, install fenders on temporary wharf, ship new building modules to Pram Point, install new building modules on foundations, fit out and recommission new buildings over the winter of 2026; and

Season 5 (2026/27) – Occupy new Scott Base, deconstruct temporary Scott Base and remaining structures, final earthworks to finish building access ramps, demobilise plant and containers back to New Zealand.

*Summary of alternatives*

The alternative of not proceeding with the Scott Base Redevelopment was considered at the initiation of the project. The alternative was discounted because it would result in the closure of Scott Base, as the critical life support systems and infrastructure at Scott Base is at the end of its life. Alternatives for the design of the proposed Scott Base, its location on Pram Point, the type of civil and mechanical engineering solutions to build and operate the proposed station, as well as the logistics for the project and the deconstruction of the existing station were identified and assessed to identify preferred solutions.

The alternative of not upgrading the wind farm was considered. “Do nothing” would result in the wind farm being decommissioned after 2030 and Ross Island relying entirely on fossil fuels. The alternative was discounted because it goes against New Zealand’s commitment to managing its environmental impacts in Antarctica.

*Description of the environment*

Pram Point and Crater Hill are representative of an ice-free environment that has been the receptor of significant and ongoing human impacts for more than 60 years. Despite extensive ground disturbance moss, lichen and algae and micro-fauna are found around Scott Base and the wider Pram Point area. No significant vegetation has been recorded on Crater Hill. The Pram Point nearshore marine environment displays high biodiversity, as well as historical anthropogenic debris in some places. Wildlife is largely limited to Weddell seals that congregate on the sea ice in front of Scott Base. No birds breed at Crater Hill but Snow Petrels (Pagodroma nivea) are occasionally seen there. Antarctic Specially Protected Area No. 122 Arrival Heights is located near Crater Hill and Historic Site and Monument No. 75 Hut A (Trans Antarctic Expedition Hut) is found within the Scott Base footprint. No non-native species are known to be established in the terrestrial or in the nearshore marine environment.

*Environmental Impact Assessment*

This draft CEE presents a full Environmental Impact Assessment of the proposed activities. The methodology for the impact assessment is informed by the Guidelines for Environmental Impact Assessments in Antarctica (Resolution 1 (2016)) and follows a four-step analysis including:

1. Identifying the aspects arising from the proposed activities;
2. Identifying the environmental receptors that may be affected;
3. Identifying the impacts; and
4. Assessing the significance of the identified impacts.

The assessment identifies a range of direct, indirect and cumulative impacts on environmental receptors. The most significant potential impacts expected to arise from the proposed activities are:

* The release of greenhouse gases contributing to global climate change;
* Changes to the physical landscape, to watercourses and meltwater pathways and disturbance of the permafrost;
* Changes to soil quality, release of soil salts and changes of the depth to ice-cement;
* Physical damage, destruction and modification in the distribution, abundance or biodiversity of terrestrial flora and micro fauna; and
* Contamination of the nearshore marine environment and smothering of the nearshore biota from increased sediment discharges.
* The operation of the proposed Scott Base and wind farm, on completion of the proposed activities, is expected to result in the following environmental impacts:
* Changes to baseline intrinsic values as a result of the changes in the appearance of Scott Base and the wind farm; and
* Changes in the intensity of potential contamination of the terrestrial and marine environments from accidental releases of hazardous substances due to increased volumes of hazardous substances stored at Scott Base.

In general, the proposed activities are expected to deliver a number of benefits on the environment including:

* Reduced contribution to global climate change thanks to increased generation of renewable energy and greater efficiency of buildings and systems of the proposed station;
* Reduced contamination of the local marine environment through best practice wastewater treatment;
* Reduced risk of introduction of non-native species with fit-for-purpose dedicated biosecurity facilities;
* Increased ability to support scientific research through improved lab spaces and better facilities;
* Improved resilience supporting New Zealand’s ability to conduct scientific research safely and efficiently; and
* Improved facilities that support the wellbeing and health and safety of Scott Base’s occupants better than the current station.

*Mitigation measures*

Preventative mitigation measures were considered at the outset of the project and integrated into the design of the proposed Scott Base. In summary, preventative mitigation measures include:

* Selecting an existing, highly impacted site, rather than finding a new, less impacted, site for Scott Base;
* Developing and applying a bespoke rating tool to build a sustainable Antarctic station;
* The proposal to upgrade the Ross Island Wind Energy network to support either 80% or 98% renewable energy use by Scott Base;
* Restricting construction and operational activities to the highly impacted operational area as far
* as practicable;
* Construction of the proposed station in New Zealand, thereby minimising the transport of materials and waste between New Zealand and Antarctica and reducing the build time;
* Early engagement of the preferred main contractor with environmental management requirements;
* The utilisation of existing infrastructure to establish a temporary base; and
* A full-time environmental advisor dedicated to the Scott Base Redevelopment project.

Mitigation measures for the proposed activities are planned to be delivered through Antarctica New Zealand’s Environmental Management System and project-specific mitigation and monitoring measures. A Construction Environmental Management Plan is under development, supported by a suite of specialised management plans, including but not limited to waste management, contaminated land remediation and biosecurity control.

*Monitoring programmes*

Antarctica New Zealand has established a monitoring programme that commenced in advance of, and will continue throughout and beyond the Scott Base Redevelopment, made of three components:

* The monitoring programme established as part of this draft CEE;
* Monitoring of construction activities, defined through the Construction Environmental Management Plan and topic-specific management plans; and
* Monitoring through the existing environmental and carbon management systems as part of the Antarctica New Zealand’s Environmental Management System.

*Gaps in the knowledge*

The scope and timeline of the proposed activities are based on funding being granted in its entirety in the 2021/22 Financial Year. Should the project’s funding be deferred, or partially granted, this draft CEE would be reviewed and updated as necessary.

This draft CEE was prepared using the design information known at the time of drafting. The temporary base and the Ross Island Wind Energy network replacement were at a feasibility stage only. While significant departures from the proposed activities described and assessed in this draft CEE are not anticipated, minor changes to the final design and delivery of the activities may occur.

The proposed construction and logistics strategies rely on a large vessel being able to berth at Pram Point. There is a high degree of confidence in the suitability of the location, with final confirmation expected in early 2021, after the finalisation of this draft CEE.

*Conclusions*

Following the comprehensive assessment of the proposed activities and associated mitigation measures, it is concluded that the proposed activities are likely to have more than a minor or transitory impact on the Antarctic environment. This draft CEE concludes that the proposed activities should proceed on the basis that the positive impacts in terms of improvements to safety, environmental protection and ability to support science are greater overall than the negative impacts associated with the proposed activities.