

EPBC 2012/6538
CAIRNS SHIPPING DEVELOPMENT PROJECT

Offsets Management Plan



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GLOSSARY

ALARP	As Low As Reasonably Practicable
CSDP	Cairns Shipping Development Project
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWE	Department of Agriculture, Water and Environment
DCR	Dredge Completion Report
DoEE	Department of Environment and Energy
EOI	Expression of Interest
FNQ	Far North Queensland
FSM	Fine Sediment Methodology
JCU	James Cook University
LTSP	Reef 2050 Long Term Sustainability Plan
NRM	Natural Resource Management
OMP	Offset Management Plan
PDA	Project Delivery Agreement
TAG	Technical Advisory Group
WHA	World Heritage Area
WQIP	Reef 2050 Water Quality Improvement Plan

1.OBJECTIVES

The purpose of this Offsets Management Plan (OMP) is to detail the objectives, actions and performance measures to compensate for agreed fine sediment contributions during the delivery of the Cairns Shipping Development Project (CSDP).

The OMP identifies actions and commitments to be followed by Ports North and GreenCollar, who Ports North propose to enter into an agreement with to undertake the works specified within this plan.

2.BACKGROUND

2.1 Ports North

The proponent for this project is the Far North Queensland Ports Corporation Limited, trading as Ports North.

Ports North manages nine ports in Far North Queensland (FNQ) which are essential to the economic well-being of the region and in connecting remote communities in the Cape York Peninsula, the Gulf of Carpentaria and Torres Strait Islands. This includes the Ports of Cairns, Cape Flattery, Karumba, Mourilyan, Skardon River, Quintell Beach, Thursday Island, Burketown and Cooktown.

The Port of Cairns is the vital node from which this network of ports operates. Its Reef Fleet Terminal, Cairns Marlin Marina and International Cruise Liner Terminal support Cairns' status as a premier tourism destination. The Port's industrial area - the Cairns Marine Precinct - services a growing defence sector and is supported by one of the biggest collection of ship repair businesses in Queensland. A major commercial fishing fleet is also based at the Port.

2.2 Cairns Shipping Development Project

In 2019, Ports North delivered the Cairns Shipping Development Project (CSDP). The CSDP involved dredging a wider and deeper entrance channel and cruise ship swing basin to allow access for larger cruise ships with all dredge material disposed of to land.

The project also included upgrades to wharf infrastructure within Trinity Inlet to cater for the larger vessels and the relocation of the cargo ship swing basin to accommodate future Navy base expansion. The widened and deepened channel and swing basin will allow larger cruise ships up to 300 metres in length to berth at the Cairns Cruise Liner Terminal to accommodate the forecast demand for 70 additional cruise ships through the Port of Cairns' Trinity Wharves each year by 2031.

While the main purpose of the Project was to take advantage of cruise shipping opportunities, there are other significant benefits including:

- Enabling future expansion of the HMAS Cairns Base by relocating the existing cargo swing basin.
- Allowing improved channel access for the existing Royal Australian Navy vessels and larger visiting overseas Navy vessels (in particular US Navy carriers) to enter the Port for rest and relaxation visits.
- Reduced tidal and loading restrictions on bulk cargo ships accessing the Port of Cairns, improving Port efficiency.
- Increased resilience for the Port of Cairns against an extreme weather event.

The works were undertaken between January and September 2019, supported by comprehensive environmental monitoring and management plans that were prepared as part of the Environmental Impact Statement (EIS) for the project. These monitoring and management plans were developed in consultation with an independent Technical Advisory Group (TAG) that were also utilised during the delivery of the project.

2.2.1 Cairns Shipping Development Approval (EPBC 2012/6538)

A controlled action approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was granted and issued by the (former) Department of the Environment and Energy (DoEE) on 28 November 2018. A copy of the approval is included in **Attachment A**.

Fine Sediment Methodology

Condition 8 of the approval required Ports North to undertake the following:

8. The approval holder must submit a Fine Sediment Methodology (FSM) to the **Minister** for approval. Dredging must not occur unless the FSM has been approved by the **Minister**. If the **Minister** approves the FSM, the approved FSM must be implemented. The FSM must include, but is not limited to:
- (a) a methodology for quantifying the amount (in tonnes) of **fine sediment** returned to the environment from:
 - (i) the dredging of **stiff clays**; and
 - (ii) the dredging of **soft clays** and from tailwater discharge at the **Northern Sands Dredged Material Placement Area**;
 - (b) written evidence of input and peer review by a **suitably qualified person** of the adequacy of the FSM and a table of any changes made in response to the peer review.

In response, Ports North developed a Fine Sediment Methodology (FSM) using the following approach:

- Utilise the existing, peer reviewed 3D hydrodynamic and water quality numerical model that had developed as part of the CSDP EIS.
- Update the existing modelling using:
 - Actual dredge logs (hypothetical dredge logs were used in the EIS).
 - Actual tailwater discharge data (flow volumes and quantities of fine sediment fractions).
 - Pre- and post-dredge bathymetry data for the dredge channel to calculate the actual volume of fine sediment removed.
 - The most up to date geotechnical data for the dredge site
- Collect additional field data using industry accepted and proven methods to inform numerical modelling assessments.
- Adopt multiple sampling methods and approaches in order to ensure multiple sources of data inform the results. For example, water samples were collected and taken for laboratory analysis in parallel with field based in-situ instrumentation and the results compared against modelled outputs.
- Interrogate outputs from the numerical modelling, in combination with interpretation of field data, to calculate the quantity of fine sediment fractions returned to the environment.

The FSM was reviewed and endorsed by TAG and their feedback was incorporated into a FSM report. This FSM report was sent to the (former) DoEE on 5 June 2019. On 18 June 2019 the (former) DoEE advised that they were satisfied that the FSM met the requirements of Condition 8 of EPBC 2012/6538 (**refer Attachment B**).

Dredge Completion Report

Condition 10A of the approval required Ports North to undertake the following:

- 10A. The approval holder must submit a Dredging Completion Report (DCR) to the **Department** within 6 months of the completion of dredging. The DCR must include, but is not limited to:
- (a) details of the type and extent (in hectares) of **sensitive receptors** present in the **channel and swing basin footprints** that were removed as a result of dredging undertaken for the action;
 - (b) an assessment as to whether any **sensitive receptors** (delineated by type and extent) present outside of the **channel and swing basin footprints**:
 - (i) are vulnerable or likely to experience **sub-lethal** impacts as a result of the action; and
 - (ii) have experienced lethal impacts as a result of the action;
 - (c) the amount of **fine sediment** returned to the environment calculated in accordance with condition 8(a)(i) and condition 8(a)(ii); and
 - (d) for any potential impacts identified in accordance with condition 10A(b)(i), details of a program (to be undertaken from submission of the DCR until 24 months after the completion of dredging) capable of monitoring the viability of those **sensitive receptors**.

The FSM was verified through modelling and monitoring activities undertaken during dredging activities. As a result of this work, a total of 3,813 tonnes of fine sediment was put forward as the volume that should be offset as part of the CSDP. This was documented in a Dredge Completion Report (DCR) dated 23 March 2021.

On 22 July 2020, DAWE advised that they were satisfied that the DCR met the requirements of Condition 10A. They also confirmed that the offset volume of 3,813 tonnes of fine sediment should be addressed in the OMP (**refer Attachment C**).

Offsets Management Plan

Conditions 11, 12 and 13A of the approval require Ports North to undertake the following:

11. To compensate for residual significant impacts of the action and to achieve a net benefit to the outstanding universal value of the Great Barrier Reef World Heritage Area, the approval holder must deliver offsets:
- (a) to compensate for the extent of any impacts to **sensitive receptors** reported in accordance with condition 10A(a);
 - (b) to compensate for:
 - (i) the amount of **fine sediment** returned to the environment, calculated in accordance with condition 8(a)(i);
 - (ii) any lethal impacts to **sensitive receptors** reported in accordance with condition 10A(b)(ii); and
 - (iii) any **sub-lethal** impacts to **sensitive receptors** reported in accordance with condition 10B.
12. The approval holder may choose to provide a contribution to **Reef Trust** to deliver all or part of offset(s) required under condition 11, condition 13A, condition 13B and condition 13C.

- 13A. Within 12 months of the completion of dredging, the approval holder must submit an Offset Management Plan (OMP) to the **Minister** for approval. If the **Minister** approves the OMP, the approved OMP must be implemented. The OMP must include, but is not limited to:
- (a) details of offset(s) in accordance with condition 11(a) and condition 11(b)(i);
 - (b) details of offset(s) in accordance with condition 11(b)(ii) and details of the source and amount of **fine sediment** (reviewed by a **suitably qualified person**) considered by the approval holder to have caused the impact;
 - (c) timeframes for delivery and completion of the offset(s); and
 - (d) for any part(s) of the offset(s) not delivered by providing a contribution to **Reef Trust**:
 - (i) details of how the offset(s) align with the broader strategies and programs for the Great Barrier Reef, including but not limited to the **Reef 2050 Long-Term Sustainability Plan**;
 - (ii) a description of the management measures (including timing, frequency and longevity) that will be implemented to deliver the offset(s);
 - (iii) performance and completion criteria for evaluating the success of the management measures and criteria for triggering remedial action (if necessary);
 - (iv) a program, including timelines to monitor and report on the effectiveness of the management measures, and progress against the performance and completion criteria; and
 - (v) a description of potential risks to the successful implementation of the management measures and a description of the contingency measures that would be implemented to mitigate against these risks and residual risk ratings.

Condition 13A was subsequently varied to “*Within 24 months of the completion of dredging...*”.

This document fulfills Ports North’s requirements under Conditions 11, 12 and 13A.

2.2.2 Summary of Approval Conditions

Table 1 outlines how this plan meets the conditions of EPBC 2012/6538.

Table 1 – Summary of Approval Conditions

Condition	Conditions met within the Plan
13A. Within 24 months of the completion of dredging, the approval holder must submit an Offset Management Plan (OMP) to the Minister for approval. If the Minister approves the OMP, the approved OMP must be implemented. The OMP must include, but is not limited to:	This OMP is submitted in accordance with the conditions.
(a) details of offset(s) in accordance with condition 11(a) and condition 11(b)(i);	Sections 3 and 4 of this OMP detail how Ports North will offset 3,813 tonnes of fine sediment.
(b) details of offset(s) in accordance with condition 11(b)(ii) and details of the source and amount of fine sediment (reviewed by a suitably qualified person) considered by the approval holder to have caused the impact;	Section 3 of this OMP describes the location and source of offset material in the Upper Herbert Catchment.
(c) timeframes for delivery and completion of the offset(s); and	Section 3.5 of this OMP details the timeframes for delivery and completion of the offset.
(d) for any part(s) of the offset(s) not delivered by providing a contribution to Reef Trust:	The entire offset of 3,813 tonnes of fine sediment will be met by this project

Condition	Conditions met within the Plan
(i) details of how the offset(s) align with the broader strategies and programs for the Great Barrier Reef, including but not limited to the Reef 2050 Long-Term Sustainability Plan	Section 2.5 of this OMP details how the proposed offsets align with broader strategies and programs for the Great Barrier Reef.
(ii) a description of the management measures (including timing, frequency and longevity) that will be implemented to deliver the offset(s);	Details of the gully repair project and the use of Reef Credits to meet the offset are included in Section 3 of this OMP.
(iii) performance and completion criteria for evaluating the success of the management measures and criteria for triggering remedial action (if necessary);	Success of the management techniques is measured through the independent validation and issuance of Reef Credits which meet strict measurement and independent auditing requirements under the Reef Credit Scheme. This is detailed in Section 4 of this OMP.
(iv) a program, including timelines to monitor and report on the effectiveness of the management measures, and progress against the performance and completion criteria; and	Reef Credits are issued once the fine sediment reduction has been achieved in line with the Reef Credit Scheme rules. This is described Section 3 of this OMP. Ports North offsets will be achieved against audited outcomes that do not require further monitoring.
(v) a description of potential risks to the successful implementation of the management measures and a description of the contingency measures that would be implemented to mitigate against these risks and residual risk ratings.	A full risk assessment is included Section 6 of this OMP
11. To compensate for residual significant impacts of the action and to achieve a net benefit to the outstanding universal value of the Great Barrier Reef World Heritage Area, the approval holder must deliver offsets: {a) to compensate for the extent of any impacts to sensitive receptors reported in accordance with condition 10A{a); {b) to compensate for: (i) the amount of fine sediment returned to the environment, calculated in accordance with condition 8{a)(i); {ii) any lethal impacts to sensitive receptors reported in accordance with condition 10A{b){ii); and {iii) any sub-lethal impacts to sensitive receptors reported in accordance with condition 10B.	This OMP details the process that will be followed to deliver the offset requirement of 3,813 tonnes fine sediment.

2.3 Ports North's Approach to Offsets

Whilst Condition 12 allows Ports North to make a contribution to Reef Trust, from the outset Ports North's preference has been to partner with service providers on a locally relevant catchment improvement project that delivers the required fine sediment offset.

To inform Ports North's decision making, an Expression of Interest (EOI) was sent out to suitably qualified service providers. As part of this process the following information was sought:

- Which catchment improvement project(s) will be delivered and whether there are opportunities to develop locally relevant projects.
- How the projects will remove 3,813 tonnes of fine sediment and the timeframe over which this will

occur.

- Governance arrangements for the provision of these projects to meet agency and community expectations, including any partnerships that would be established to allow delivery of the project.
- How the delivery of fine sediment reduction will be measured and verified to allow sign off on Port's Norths obligations under EPBC 2012/6538 by DAWE.

Responses from the EOI identified opportunities in the Barron, Daintree, Johnstone and Herbert River Catchments. GreenCollar and Terrain NRM's proposal to improve gully erosion within the Innot Hot Springs area of the Upper Herbert River was chosen as the preferred option following the EOI process. This was based on the ability to deliver the required sediment volumes as well the strong governance associated with the Reef Credit Scheme, through which GreenCollar will be delivering verified and independently audited fine sediment reductions. Further details on this project are included in **Sections 3 and 4**.

Ports North worked closely with DAWE throughout the process of developing the EOI and selecting a preferred project and service provider.

2.4 EPBC Act Environmental Offsets Policy

The EPBC Act Offsets Policy outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the EPBC Act. The policy outlines a set of overarching principles that are applied in determining the suitability of offsets. This OMP addresses each principle as outlined in **Table 2**.

Table 2 – How proposed offsets will meet Commonwealth offset principles.

EPBC Act Offset Principle	Project Compliance
Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted.	The project will remove fine sediment from the Upper Herbert Catchment and contribute to improved water quality outcomes within the Great Barrier Reef World Heritage Area.
A flexible approach should be taken to the design and use of environmental offsets to achieve long-term and certain conservation outcomes which are cost effective for proponents.	Utilising the independently audited and transparent Reef Credit Scheme will result in verified and independently audited long-term fine sediment offset outcomes.
Environmental offsets should deliver a real conservation outcome.	The project will facilitate the remediation of a large historical tin mining tailings dam complex on Nettle Creek, in the vicinity of Innot Hot Springs. The project will provide long term bank stability and re-establish riparian vegetation connectivity.
Environmental offsets should be developed as a package of actions – which may include both direct and indirect offsets.	The project will be delivered as part of a broader partnership between Ports North and GreenCollar. Through this partnership, opportunities to promote research and link the project in to related community initiatives will be explored.
Environmental offsets should, as a minimum, be commensurate with the magnitude of the impacts of the development and ideally deliver outcomes that are 'like for like'.	The project delivers a 'like for like' offset of the impacts calculated during the project. It will address the agreed offsettable volume of 3,813 tonnes of fine sediment.
Environmental offsets should be located within the same general area as the development activity.	The project is located within the broader Cairns region. Sediment from the Upper Herbert enters the Great Barrier Reef World Heritage area near Ingham where it travels north via longshore drift and ends up settling within the Port of Cairns and surrounding environments.

EPBC Act Offset Principle	Project Compliance
Environmental offsets should be delivered in a timely manner and be long lasting.	Environmental offsets are predicted to be delivered before 2028. It is worth noting that because this project will be established under the Reef Credit Scheme, it will be managed throughout the 25-year project life span by GreenCollar in partnership with the landholder. Ongoing investment over the project lifespan ensures long term maintenance and protection of site improvements well beyond the Ports North project timeline.
Environmental offsets should be enforceable, monitored and audited.	Establishing the project under the Reef Credit Scheme ensures permanence, additionality, integrity, independent audit and verification and long-term monitoring. These provisions are clearly outlined in the rules (Standard) and Gully Repair methodology of the Reef Credit Scheme. Further details of these provisions are outlined in Sections 3 and 4 .

2.5 Broader Strategies and Programs for the Great Barrier Reef

As shown in **Table 3**, the OMP is consistent with broader strategies and programs for the Great Barrier Reef including The Reef 2050 Long Term Sustainability Plan (LTSP):

Table 3 – Project Consistency with the Reef 2050 LTSP

Reef 2050 Long Term Sustainability Plan (LTSP) Priority	OMP Outcome
2050 LTSP Outcome: <i>Reef Water Quality sustains the Outstanding Universal Value, builds resilience and improves ecosystem health over each successive decade</i>	Gully repair projects improve water quality by reducing land based pollutants (fine sediment) from entering the Great Barrier Reef.
Reef 2050 Water Quality Action 17 (WQ17): <i>“Understand the port sediment characteristics and risks at the major ports and how they interact and contribute to broader catchment contributions within the World Heritage Area.”</i>	This project leverages information gathered by Ports North regarding interaction with the Great Barrier Reef World Heritage Area (WHA).
Reef 2050 Plan Cumulative Impact Policy	<p>The Cairns Shipping Development EIS <i>“Identifies past, present and reasonably foreseeable pressures; and examines their combined effects on Great Barrier Reef values”</i></p> <p>Through the successful implementation of leading practice environmental monitoring and management measures along with the delivery of this OMP, this project also <i>“Designs and applies appropriate management measures to avoid and mitigate impacts.”</i></p>
Reef 2050 Net Benefit Policy	<p>This project will <i>“reduce pressures and impacts on the Great Barrier Reef deliver a positive change in the condition and trend of Great Barrier Reef values”</i>.</p> <p>It will do this by facilitating investment beyond the life of the project that will reduce sediment pollution by a further 30,000 tonnes.</p>

The OMP will also help support outcomes being sought as part of the Reef 2050 Water Quality Improvement Plan 2017-2022 (WQIP) (refer **Table 4**):

Table 4 – Project Consistency with the Reef 2050 WQIP Reef 2050 WQIP Outcome	OMP Outcome
<p>Sets targets for reduction in sediment, nitrogen and pesticide pollutants and seeks to meet these targets through:</p> <ul style="list-style-type: none"> • Applying minimum standards across all industries and land uses • Supporting innovation and stewardship that goes beyond minimum standards • Restoring catchments through works to improve or repair streambanks, gullies, riparian vegetation and wetlands 	<p>This project repairs a high priority gully erosion site in the Upper Herbert Catchment and addresses the WQIP's strategy to achieve water quality targets through catchment restoration.</p>
<p>Reduce fine sediment pollution by 25% overall, equating to 1,933 kilotonnes load reduction</p>	<p>This project directly contributes to fine sediment pollution priorities by repairing a high priority gully erosion site in the Upper Herbert catchment. The OMP will reduce fine sediment pollution by 3,813 tonnes and the project overall will reduce fine sediment pollution by over 30,000 tonnes over the 25 year project lifetime.</p>
<p>Reduce fine sediment pollution from the Wet Tropics Region by 240 kilotonnes, of which 99 kilotonnes is attributed to the Herbert Catchment (30% reduction in current loads) and is the highest priority catchment for fine sediment reduction in the Wet Tropics</p>	<p>This project directly addresses sediment pollution in the highest priority catchment in the Wet Tropics and one of the five highest priorities across all GBR catchments. The lifetime pollution reduction (beyond the offset) will reduce sediment pollution by a further 30,000 tonnes toward the Wet Tropics fine sediment target.</p>
<p>Ecosystem repair and restoration is important as farm practice change alone, will not meet the water quality targets</p> <p>Implement catchment repair projects to reduce sediment delivery to the reef including gully remediation</p>	<p>This project delivers against the priority action to remediate gullies to help reach the water quality targets.</p> <p>This project is classified as a catchment repair project that will reduce sediment delivery to the reef.</p>
<p>Seeks to accelerate progress toward targets by ensuring that on ground programs are supported by:</p> <ul style="list-style-type: none"> • Robust science • Coordinated investment • Effective governance and evaluation 	<p>Robust Science – This project is subject robust scrutiny through the application of the Reef Credit Scheme rules and the requirement to operate under the <i>Method of Accounting for Reduction in Sediment Run-Off through Gully Rehabilitation Version 1.4</i>. As outlined in Section 4, this method is based on robust science and extensive peer review.</p> <p>Coordinated Investment – This project uses environmental market investment to build on the funds provided by Ports North to deliver and maintain this project over a 25 year period, beyond the offset and funding scope of the offsets project.</p> <p>Effective Governance – This project leverages the Reef Credit Scheme which provides robust governance and transparent and independent audit and verification of the outcomes of the project to confirm that offsets have been delivered. Eco-Markets Australia independently administer the Scheme ensuring credibility and quality assurance against the measurement and quantification of the water quality outcomes via the Reef Credit method. The Reef Credit Standard, crediting procedures and accounting methodologies are publicly available. Generation, sale, transfer and retirement of Reef Credits are also on the public record, on the Reef Credit Registry.</p>

3.PROJECT DESCRIPTION

3.1 Overview

Ports North will achieve like-for-like fine sediment offsets through the direct purchase of Reef Credits from GreenCollar. Reef Credits are a tradable unit of water quality improvement, generated and verified through the Reef Credit Scheme. Each Reef Credit is equal to 1 kilogram of dissolved inorganic nitrogen or 538 kilograms of fine sediment prevented from reaching the Great Barrier Reef. Reef Credits are only generated and sold once a verified pollution reduction has been achieved and audited.

GreenCollar is a Reef Credit project developer/broker who will be partnering with a local landholder to repair a major gully complex in the Upper Herbert Catchment, within the Wet Tropics Region. Applying the peer reviewed and approved method for accounting for fine sediment reduction through gully repair, the project will generate independently audited and verified fine sediment pollution reductions.

GreenCollar enters into a formal 25 year contract (Reef Credit Project Delivery Agreement – PDA) with the landholder for the construction and maintenance of the gully project enabling ongoing monitoring and generation of Reef Credits. This provides regular revenue to the landholder for site maintenance and implementation of improved land management practices. The PDA is a legally binding mechanism that ensures the “asset” (i.e. the gully repair works) are protected for the life of the project. This can be achieved through a caveat on title or a lease arrangement with the landholder. A PDA and the protection mechanisms are standard practice in Environmental Market projects, such as Reef Credits.

Ports North will enter into a Reef Credit Purchase agreement with GreenCollar for fine sediment offset of 3,813 tonnes, which is equal to 7,087 Reef Credits. The Ports North purchase represents a portion of the total Reef Credits that will be generated from the project site over a 25 year period, providing long term investment and resources for the landholder to maintain the gully repair asset and funds for GreenCollar to monitor the site, generate Reef Credits and source buyers.

GreenCollar will work with Terrain NRM and local contractors to complete the gully repair capital works. The gully repair project will remediate a large historical tin mining tailings dam complex in proximity to Nettle Creek, in the vicinity of Innot Hot Springs. The tailings dam complex is located on private grazing land and comprises extensive excavation pits and waste stockpiles which contain very little vegetation. The fine sediment associated with erosion at this location makes its way from Nettle Creek, into the Herbert River.

The scope of works at this location will include intensive earthworks and reshaping areas of significant bare earth and gullying/rilling as well as selective revegetation and soil surface treatment amongst patches of existing vegetation.

By purchasing Reef Credits to achieve sediment offsets, Ports North will not only be buying audited and verified water quality outcomes, but will also help establish a project that will support land management beyond the offsets timeline to ensure long term maintenance and ongoing pollution reduction. This ensures permanence and ongoing effectiveness of the investment by Ports North

Reef Credits purchased from the Upper Herbert gully repair project will:

- Provide fully independently audited sediment offsets.
- Implement a local Wet Tropics project for sediment reduction that also contributes to priority water quality targets in the Reef 2050 Water Quality Improvement Plan.
- Support local farmers and graziers, on whose land the projects generate the Reef Credits.

The process flow of a Reef Credit Project is summarised below in **Figure 1**.



Figure 1 – Reef Credit Project – Process Flow

3.2 Proposed Offset Project

The proposed Herbert River gully repair project will prevent up to 3,850 tonnes of fine sediment per annum (end of catchment load) from entering the Great Barrier Reef by remediating an historical alluvial tin mining tailings dam complex. Fine sediment flowing from this site is the result of erosion arising from decades of rain impacting bare tailings material which is fine in nature and contains considerable clay content. The tailings dam material contains a relatively high fines proportion compared to surrounding natural ground. The tailings dam complex is also considerable in size. These factors means the remediation of this site a key priority for sediment reduction focussed works in the upper Herbert River catchment.

The combined reshaping, soil treatment and revegetation of multiple gully heads at this site will reduce erosion by aiding in dispersing water flow more evenly across the landscape, thereby preventing the ongoing and highly active erosion in steep gully areas only. The soil conditioning and revegetation components will assist in providing soil cover, thereby reducing the impact of direct rainfall onto the fine tailings material. By re-establishing a more natural landscape formation and providing protection to the underlying tailings material from direct rainfall, it is anticipated the proposed scope of works will reduce sediment losses to the tonnages estimated.

A location map is provided below in **Figure 2**. Further details, including photos of the site are included in **Attachment D**.



Figure 2 – Proposed Offset Project Location

3.3 Project Delivery Partnership

The Offset Management Plan proposes a delivery partnership between Ports North, GreenCollar and Terrain NRM to deliver the required sediment offset within the Wet Tropics region, that also contributes positively to local water quality projects.

The primary relationship is between Ports North and GreenCollar, via a Reef Credit Purchase Agreement, committing Ports North to purchase 7,087 Reef Credits prior to September 2028. This volume of Reef Credits is equivalent to 3,813 tonnes of fine sediment prevented from entering the Great Barrier Reef world heritage area.

GreenCollar will partner with the landholder, Terrain and local contractors to deliver the gully repair works on site.

Terrain NRM and GreenCollar staff bring more than 45 collective years' experience in successful water quality project development and delivery in the Wet Tropics. Terrain and GreenCollar staff have detailed knowledge of sediment reduction projects and solutions for catchments across the Wet Tropics, within the context of the Reef 2050 Long Term Sustainability Plan and Reef 2050 Water Quality Improvement Plan.

Bringing together Terrain's on ground water quality project delivery results and GreenCollar's environmental markets experience with Ports North's desire to play a positive role in the far north will deliver high quality independently audited and verified sediment offsets, with assurance of long term asset protection through a twenty five year Reef Credits project.

3.3.1 About GreenCollar

GreenCollar is a profit-for-purpose organisation, and the leading environmental markets project developer and investor across the carbon, water quality, biodiversity and plastics markets in Australia.

Founded in 2011, GreenCollar partners with landholders and managers throughout Australia to develop projects that improve the productivity of their land and generating environmental credits, while caring for the environment. GreenCollar was fundamental in establishing Australia's carbon market framework and more recently, the new Reef Credits market.

Projects are designed to suit the circumstances and objectives of each landholder, with the income returned to landholders as an important new and long-term revenue stream for their business. Environmental credits are sold to buyers, such as large corporations and government.

GreenCollar is an incorporated "for purpose" company and operates under the Carbon Industry Code of Conduct and is a registered B-Corporation which provide for best practice principles of corporate governance and project development.

GreenCollar is both the largest developer of land based environmental markets projects in Australia and a leader in the development of new markets such as the Reef Credit Scheme. GreenCollar delivers market based projects on more than 140 projects across 5 millions hectares nationally. In partnership with land managers, GreenCollar generated and sold the world's first Reef Credits in 2020, establishing a new market for verified and audited tradable units of pollution abatement for the Great Barrier Reef. In the last financial year nearly 25,000 Reef Credits were generated and sold representing an independently audited and verified reduction of 25 tonnes of Dissolved Inorganic Nitrogen flowing to the Great Barrier Reef.

3.3.2 About Terrain NRM

Terrain NRM is an independent, not for profit and community-based natural resource management organisation established in 2003. Terrain operates innovatively and acts collaboratively to protect and restore the water, soil, biodiversity and landscapes of the Wet Tropics region from the Daintree in the north, down to Ingham in the south and across the Atherton Tablelands.

Terrain works with partners and local communities to:

- Identify and communicate the most pressing natural resource challenges facing our region.
- Lead the development of pro-active and inclusive solutions.
- Source, interpret and provide trusted advice to policy and funding decision-makers.
- Secure funding and finance to pilot and rapidly scale-up transformative solutions for our environment, community and economy.
- Provide independence, balance and science-based objectivity.

Over the past five years Terrain has delivered \$50M worth of environmental projects across the Wet Tropics that vary in scale from \$30,000 to \$15 million. In particular, Terrain is currently responsible for 4 projects valued at \$13.2M to reduce sediment pollution between 5,000 and 10,00 tonnes per annum between 2017 - 2022. These projects are being delivered in the Johnstone, Daintree, Mossman and Herbert Catchments. All projects are being delivered in partnership with landholders and the community and meet stringent government technical and monitoring requirements, including Reef Trust processes.

3.4 Reef Credits

The Reef Credit Scheme is an innovative finance solution that will directly improve Great Barrier Reef (GBR) water quality and help to achieve the water quality targets described in the Reef 2050 Water Quality Improvement Plan. The Reef Credit Scheme is a market-based incentive mechanism, designed specifically for the GBR catchments. Land managers and project proponents generate and sell Reef Credits generated by on-farm actions and system/catchment repair that have delivered an audited and verified reduction in sediment or nutrient pollution reaching the GBR. One Reef Credit equals one less kilogram of dissolved inorganic nitrogen (DIN) entering the GBR or 538 kg of sediment.

The Reef Credit Scheme is a voluntary environmental market solution to Great Barrier Reef Water quality and the first of its kind in the world. It has been developed over the past four years through a partnership between GreenCollar, Terrain NRM, NQ Dry Tropics, the Queensland government, researchers and landholders. The Queensland government has recently committed to purchasing Reef Credits to the total value \$10M as part of its strategy for improving water quality.

Reef Credits are sold to a range of buyers such as government, corporate, industrial or philanthropic entities wishing to improve GBR water quality, meet their Environmental and Social Goals (ESG) or offset pollution. This market is designed to also scale up and diversify investment in GBR water quality. The Reef Credits market works alongside other environmental markets such as those for carbon and biodiversity.

In October 2020, the world's first Reef Credits were issued by GreenCollar and purchased by HSBC and the Queensland government, concluding the design and pilot phase of the Scheme and moving into full implementation. In the last financial year nearly 25,000 Reef Credits were generated and sold, representing a 25-tonne reduction of nitrogen (dissolved inorganic nitrogen) flowing to the Great Barrier Reef.

Reef Credits incentivise land management improvements that reduce pollution flowing to the GBR over a 10-25-year timeframe, audited against approved/peer reviewed Methodologies. Reef Credits are issued for offsets or pollution abatement beyond that achieved through regulated and legal requirements or existing farm practices.

Reef Credits are generated and sold upon the delivery of an audited and verified water quality outcome, ensuring that payments are for real, unique and measured results for the GBRF. Reef Credits leverage additional investment, enduring beyond project funding cycles while providing diversified income for farmers and graziers to realise long term change and maintain assets such as wetlands and gully repairs.

The Reef Credit Scheme is administered by an independent not-for-profit organisation, Eco-Markets Australia. Eco-Markets Australia has oversight of the Reef Credit Scheme rules, approval of methodologies, validation, verification and management of a Reef Credit registry. **Figure 3** provides a

diagram of the key components of the Reef Credit Scheme. In this figure, GreenCollar is the Project Developer.

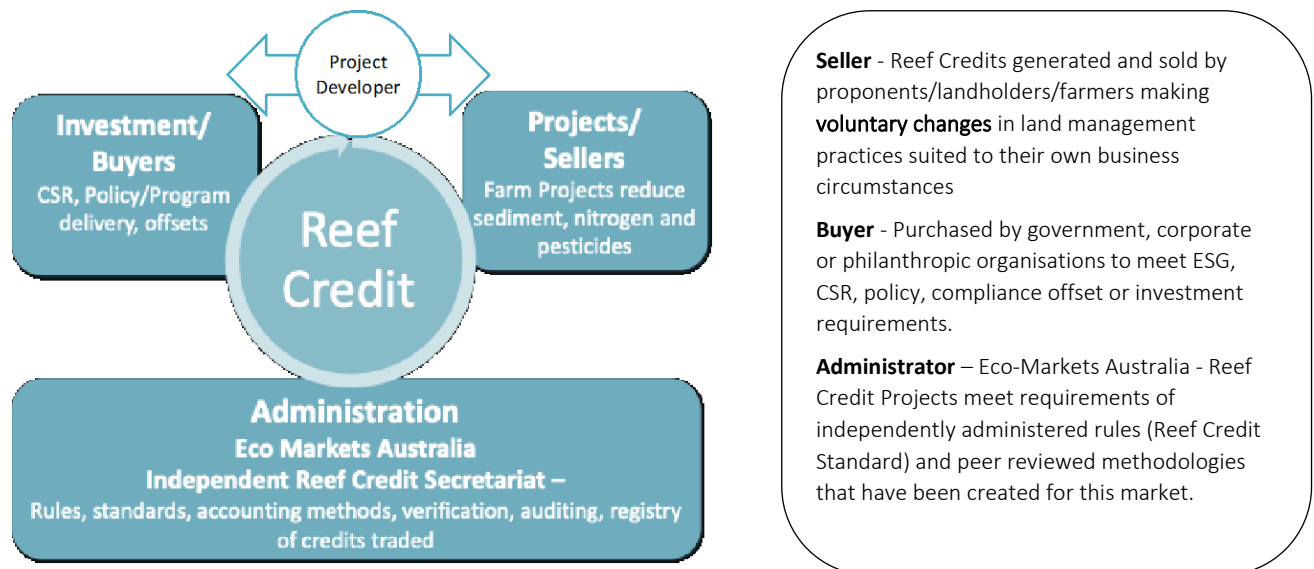


Figure 3 – Reef Credit Scheme Components

Reef Credit projects must be developed under approved methodologies. The two approved methodologies are:

- Method for Accounting Reduction in Nutrient Run-off through Managed Fertiliser Application
- Method for Accounting for Reduction in Sediment Run-off through Gully Remediation

Three additional methodologies are under development including Methodologies for Nitrogen abatement through Treatment Wetlands (nearly completed), Sediment Reduction through Streambank remediation and Sediment reduction through Grazing Land Management. Methodologies are scientifically developed and peer reviewed instructions to account for the pollution abatement resulting from any Reef Credit project. The Upper Herbert sediment project would operate as a Reef Credit Project under the approved Method for Accounting for Reduction in Sediment Run-off through Gully Remediation.

Under the Reef Credit Scheme, Project Proponents or developers are responsible for securing buyers for Reef Credits. Eco-Markets Australia does not facilitate the buying and selling of Reef Credits, other than the formal recording of transactions via the Reef Credit Registry.

3.4.1 Assurance

The Upper Herbert Reef Credit project design, implementation, registration, measurement and verification will be completed in accordance with the Reef Credit Standard including the requirements of the peer reviewed and approved Methodology for Gully Repair. This methodology was developed in partnership with research institutes and was subject to a rigorous consultation and peer review process. It prescribes the techniques required to measure the sediment reduction from a gully remediation process.

The Reef Credit Scheme rules require Reef Credits be verified by an independent Auditor. This is a mandatory component required by Scheme administrator, Eco-Markets Australia in order issue and register Reef Credits. Reef Credits cannot be issued or sold without this verification process.

The independent audit/verification process tests if the Methodology has been correctly applied and that appropriate evidence has been collated to prove the pollution reduction outcome has been achieved. All Auditors must meet the following criteria established by the Reef Credit rules:

Verifiers must have experience and qualifications commensurate with the technical, integrity, independence and operational requirements of Australian environmental markets.

Experience relevant to the mechanism would include 5 years or more of audit team leadership in existing or previous environmental market mechanisms in carbon, biodiversity or water quality including UNFCCC CDM, VCS, CCBA, NGER audits, CFI/ERF audits, NSW GGAS or equivalent mechanisms regulated by state, territory and federal departments.

Verifiers must be accredited either by:

1. The Clean Energy Regulator as a Category 2 (Team Leader) Greenhouse and Energy Auditor.
2. An organisation accredited by the Joint Accreditation System of Australia and New Zealand Environment Scheme.

This process must be completed every year that Reef Credits are generated.

3.4.2 Contractual Arrangements

Project Delivery and Reef Credit Generation

Similar to all environmental market projects, the Project Proponent ensures delivery of the on-ground project and all processes associated with generation, auditing, issuance and sale of Reef Credits, for the life of the project. For the Upper Herbert gully repair project, GreenCollar will be the Project Proponent, entering into a Reef Credit Delivery Contract with the landholder. This contract provides the mechanism for legal ownership of the Reef Credits (and therefore capacity to sell them), asset protection and management of the gully repair site, revenue sharing arrangements with the landholder and mechanisms for ongoing monitoring/modelling of pollution abatement and Reef Credit generation over the life of the project.

The Project Delivery Contract is a recognised mechanism by the Reef Credit Scheme (and environmental credit schemes globally) to secure the legal rights to the Reef Credits, provide returns to the landholder, specify roles and responsibilities and to ensure permanence of the asset.

The Reef Credit Standard provides clear rules and auditing requirements to ensure that all Reef Credits meet the following requirements outlined in **Figure 4**.

Real	Must be the result of eligible project activities that yield quantifiable and verifiable pollutant reductions or removals.
Measurable	Pollutant reductions and removals must be quantifiable using a credible baseline established in Reef Credit Methodologies approved by Eco-Markets Australia.
Permanent	Pollutant reductions or removals are generated by Projects that carry the risk of Reversal, must have adequate safeguards must be in place
Additional	Pollutant reductions and removals must be over and above Business As Usual scenarios, legal requirements and what is already funded to occur
Unique	Each Reef Credit must be unique and only associated with a single Reef Credit Project
Transparent	There must be sufficient and adequate public disclosure of information to ensure Reef Credit information such as rules, methods, registration and sale are available to the community
Independently Audited	Reef Credits must be verified by an independent, accredited Verifier with the necessary expertise.

Figure 4 – Reef Credit Standard

Ports North Purchase of Reef Credits

GreenCollar will enter into Reef Credit Purchase contract with Ports North to buy the required number of Reef Credits to meet the sediment offset required. Once purchased, Ports North will then retire the Reef Credits which formally recognises the pollution reduction/offset and extinguishes the Reef Credits. This ensures that the pollution reduction is unique and the Credits cannot be sold after retirement, nor can other parties claim that same pollution reduction.

Ports North are not required to enter into any contracts with landholders or project delivery contractors. Ports North are guaranteed the fine sediment offset through the purchase of Reef Credits, which have been generated once the pollution reduction has been achieved.

Figure 5 below demonstrates the two alternative purchase approaches for Ports North, including forward purchase or purchase on delivery of Reef Credits. This also provides for risk management for Ports North and capacity to amend the agreement if, in the very unlikely event of project failure, that other solutions are required.

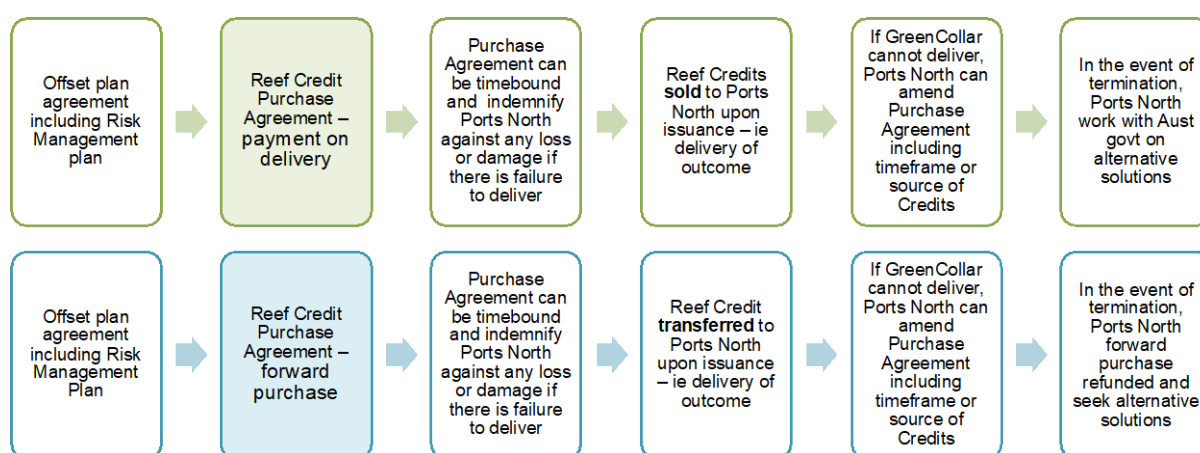


Figure 5 – Reef Credit Purchase Options

3.4.3 The Case for Reef Credits for Ports North Offsets

Reef Credits drive and sustain land management change by investing in projects that suit farmer and business circumstances by valuing and monetising actions that deliver cleaner water while diversifying farm income. They provide a tangible, credible, verified and independently audited tradable unit of pollution reduction that can be purchased to meet compliance, offset, policy and ESG requirements for government, corporates, philanthropic and statutory authorities. Reef Credits have been formally recognised by the Queensland government water quality offsets policy to offset both point source and diffuse pollution compliance requirements. The Queensland government has recently approved the first use of Reef Credit for compliance offsets for the Aquaculture sector.

Benefits of a Reef Credit project:

- Independently audited and verified sediment abatement against the peer reviewed Gully Methodology, recognised by the Australian government. The Reef Credit Scheme is independently administered by Eco-Markets Australia, providing third party verification of the project outcomes and the sediment abatement.
- Ports North only pays for delivered outcomes upon issuance of verified sediment abatement and the purchase and transfer of Reef Credits. This is a “pay for performance” Scheme.
- Sediment reductions are accounted under methodologies approved under the Reef Credit Scheme and align and report in a format consistent with the Reef 2050 Water Quality Improvement Plan.
- Positive partnership opportunity for Ports North to leverage additional corporate and other investment to ensure long term maintenance and protection of the completed works beyond the offsets project timeline.

- Measured and verified sediment load reductions at the project site will continue well beyond the funding period of Ports North offsets payments and are managed through the long term Project Delivery Agreement between GreenCollar and the landholder.
- Provision of diversified and regular income stream for land manager (ie beyond the time frame of the Offsets project) helping to support local communities.
- Using an environmental market that will drive effective and efficient delivery of reef projects that are real, additional, measurable, permanent, unique, independently audited and transparent. Reef Credits supports land managers to adopt best practice strategies.

3.5 Project Timeframes

An indicative project timeframe is provided below in **Figure 6**.

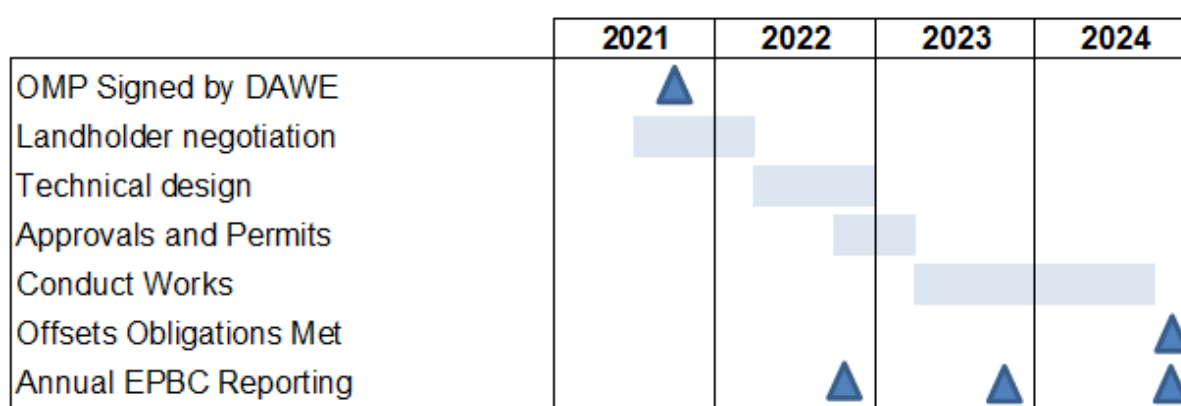


Figure 6 – Indicative Project Timeframe

Based on current project planning and forecast sediment reductions, it is expected that offsets obligations are likely to be fulfilled by the end of 2024.

However, should a wet season yield lower than expected rainfall, the above timeframes may need to be extended.

The current approval is valid until 2028. As outlined in Section 6, the risk of the offsets not being met by this time is considered low and manageable.

4.METHODOLOGY

4.1 Summary

The *Method Of Accounting For Reduction In Sediment Run-Off Through Gully Rehabilitation – Version 1.4* was approved by Eco-Markets Australia in 2020.

The Methodology describes the process by which fine sediment pollution reduction is to be accounted for in order to generate Reef Credits. Once measured, the outcomes are then subject to independent audit prior to Reef Credits being issued and subsequently purchased by Ports North. The methodology was written by Griffith University Centre for Coastal Management with GreenCollar and incorporated significant input via broad consultation and independent peer review. A copy can be found in **Attachment E**.

Detailed step by step instructions are provided in the Methodology for each stage of a gully project. The Method exceeds requirements under the existing Gully Toolbox, developed by CSIRO, and utilised by the Australian Government's investment in gully repair projects. The Reef Credit method considers additionality, accuracy, certification, project design, uncertainty, sampling and laboratory analysis and leakage.

Key elements of the methodology are as follows

- Determine eligibility
- Establish project boundaries and scope
- Quantify Baseline fine sediment yields
- Quantify project fine sediment yields
- Quantify project fine sediment yield reduction
- Quantify Reef Credit units
- Project Monitoring
- Project Reporting and Credit Issuance

The project must follow the Reef Credit methodology to be eligible to generate Reef Credits and the independent audit verifies that the project delivery, monitoring and assessment has followed the method and provided appropriate evidence to support the results.

4.2 Reef Credit Methodology Approval Process

The process for Reef Credit Methodology approval is documented in the Reef Credit Standard V 1.2.

The summary timeline for completion of the Reef Credit Methodology is outlined in **Table 5** below:

Table 5 – Timeline for Reef Credit Method Development

Date	Activity
2017 – March 2018	Method development workshops
15 October – 14 November 2019	Method Public consultation and peer review process – 221 comments received
January 2020 – October 2020	Revision of Method and further consultation with peer reviewers and Technical Advisory Committee review
29 October 2020	Reef Credit Secretariat Technical Advisory Committee meets to consider final updated version of the Method and responses to all feedback
7 November 2020	Method approved

4.2.1 Authors

The method was developed in consultation with the Reef Credit Methodology Technical Working Group. Members of the working group included representatives from Industry, Qld Government, CSIRO, JCU, Griffith University, advocacy groups, NRM groups and subject matter experts. The method approach arose from discussion at two workshops, the first in September 2017 and the second in March 2018.

The Methodology Authors are from Griffith Centre for Coastal Management – Andrew Brooks, Tim Pietsch, Robin Thwaites, John Spencer, James Daley, Nicholas Dorian and Justin Stout and from GreenCollar Group – James Schultz and Jenny Sinclair.

4.2.2 Review and Approval Process

The process undertaken to complete the review and approval process is documented on the Reef Credit Webpage (<https://www.reefcredit.org/approved-methodologies/>), and includes the following information:

Review Process

The methodology review process is set out in the Reef Credit Standard Schedule 5 and Methodology Approval Procedures.

*The methodology developer submitted to the Reef Credit Secretariat (**Secretariat**) the methodology documentation and nominated three peer reviewers. The Technical Advisory Committee (**TAC**) selected two peer reviewers from those proposed. The two peer reviewers selected are experts of high standing in their respective fields. One is a geomorphologist with expertise in the evaluation of environmental flows, understanding nutrient processes in sediments that lead to algal blooms, and optimization of stream management decisions. The other is an international carbon specialist with extensive experience evaluating the climate benefit of land use activities, carbon sequestration and carbon emission avoidance both on national and project-scales for forestry and agriculture projects. The peer reviewers conducted their assessment of the proposed methodology over a period of 30 days (from October-November 2019).*

The peer review process ran in parallel with a public consultation process. The Secretariat posted the draft methodology on the www.reefcredit.org website for public consultation for a period of 30 days (from 15 October – 14 November 2019), and the Secretariat also sent out a notice via email to key stakeholders on its mailing list informing them of the opportunity to comment. The Secretariat received a total of 221 comments on the draft method, from eight organisations and agencies including government, environmental non-government organisations, and research institutions.

The methodology developer responded to the peer reviewer findings and public consultation comments by incorporating revisions and/or justifications for the proposed approach. The peer reviewers then considered the methodology developer's responses to the peer reviewer comments and provided advice on the extent to which the methodology developer's revisions adequately responded to the matters raised.

The revised methodology was provided to the TAC to confirm the integrity of the process followed. The TAC confirmed that the methodology approval process had been properly followed and that the methodology had been assessed in accordance with the Reef Credit Standard and Guide. The revised methodology was then recommended by the TAC to the Reef Credit Interim Steering Committee for approval.

The Reef Credit Interim Steering Committee approved the methodology on 7 November 2020.

Reef Credit Technical Advisory Committee Considerations

*The Reef Credit Technical Advisory Committee (the **TAC**) considered the integrity of the process followed and, on 29 October 2020, confirmed that the methodology approval process had been properly*

followed and that the methodology had been assessed in accordance with the Reef Credit Standard and Guide. The revised methodology was then recommended by the TAC to the Reef Credit Interim Steering Committee for approval.

The Committee's recommendation was qualified in relation to 'matters of best available knowledge', noting the provisions of Section 4.9 of the Standard relating to periodic review or revision of methodologies. It was recognized that the approaches in the Gullies Methodology relating to managing uncertainty, the veracity of baseline trends, and boundary definitions for projects are at the edge of knowledge and are likely to evolve as knowledge is gained from project implementation.

The Committee made two further observations connected to the methodology for the Secretariat's consideration in the review of the beta phase of the Reef Credit Scheme:

1. In relation to the leakage, it was suggested that the Standard be adjusted to confine the scope of leakage to Great Barrier Reef catchments, as any changes in land management activities outside the catchment will not affect the reef or Reef Credit Scheme's accounting. Methodologies should also be able to rule out accounting for market-effects leakage where the market-effects of a project's activities within the Great Barrier Reef catchment are insignificant. For example, destocking beef cattle within a property may have a market effect of increasing stocking elsewhere, but given the extent of cattle grazing across Australia any leakage within the Great Barrier Reef catchment is likely de-minimum, and does not need to be accounted. This adjustment that allows market-effect leakage to be deemed de-minimum should be revisited as best available knowledge evolves.

2. In relation to Peer Review, it was noted that in this case the Peer Reviewers were asked to respond to the Developer's response to their initial review comments. This proved highly beneficial, especially given the complexity of the method, and noting that the outcomes of the reiteration around specific matters settled those matters as: 1) being agreed and incorporated, 2) not accepted by the Developer for sound reasons, or 3) a best judgement on approach adopted pending future review based on project implementation experience. This additional iteration was very valuable in this instance and may be applicable to other new methods. It was therefore suggested that the Peer Review methodology be revisited to ensure that this flexibility is supported for future methods if required.

4.2.3 Consultation and Peer Review Comments and Feedback

The details of the peer reviewer's comments and responses from the method developers is provided as a spreadsheet on the Reef Credit webpage as follows:

https://www.reefcredit.org/wp-content/uploads/2020/11/Gully_Method_PC-PR-Comments.xlsx

Please note that the public consultation spreadsheet is not available publicly nor the peer reviewers details. If the Australian Government requires such details, GreenCollar would need to receive access and approval from the Reef Credit Secretariat.

4.2.4 Outline of Reef Credit Method Approval Process

The following text is an extract from Section 4 of the Reef Credit Standard.

4. Methodology Requirements

4.1 General

1. Approved Methodologies that may be applied under the Reef Credit Standard are available through the Reef Credit Secretariat.
2. Methodology developers must first apply for approval of new Methodologies through the Reef Credit Secretariat and must comply with the requirements of the Reef Credit Standard, and any other applicable rules and principles set out in the Reef Credit Guide.
3. All new Reef Credit Methodologies applying for approval under the Reef Credit Scheme will be subject to scientific peer review and public consultation.

4. *Reef Credit Methodologies may use direct measurement and/or modelling approaches to estimate Pollutant reduction.*
5. *Reef Credit Methodologies must be founded on a comparative assessment of the Business As Usual scenario and the alternatives to determine the Baseline Scenario. This must include an assessment of the barriers to implementation of the proposed Methodology activities.*
6. *Reef Credit Methodologies must be consistent with the principles of the Reef Credit Scheme as described in the Reef Credit Guide and the rules as described in the Reef Credit Standard including clearly stating the assumptions, parameters and procedures involved in calculation of Pollutant reduction.*
7. *Methodologies must take into account any uncertainty and make an appropriate confidence deduction (correction factor).*
8. *Where Methodologies use models to determine Pollutant reduction the following principles must be adhered to:*
 - a. *Models should be publicly available from a reputable and recognised source such as Paddock to Reef;*
 - b. *Model parameters should be determined based upon studies by appropriately qualified experts;*
 - c. *Models should be peer reviewed and tested by appropriately qualified organisations or experts;*
 - d. *Where known and quantified, sources of model uncertainty should be identified and taken into consideration;*
 - e. *Models should apply conservative factors to discount for uncertainty;*
 - f. *Where models use discount or other default factors in the calculation of Pollutant reduction the data used to establish the factor must be provided; and*
 - g. *Models must be relevant to the location and parameters needed for the relevant Methodology.*
9. *Reef Credit Methodologies may use any combination of a Project (such as project specific history), activity (such as activities on a positive list) or performance (such as projects that meet or exceed an industry baseline) to determine baseline and additionality.*
10. *Reef Credit Methodologies must include sufficient information to allow readers to reach the same conclusion on the effectiveness of the Methodology as the validation and verification bodies in the Methodology approval process.*
11. *Only methodologies that comply with the Reef Credit Standard and the Guide and have been approved by the Reef Credit Secretariat may be used for a Reef Credit Project.*

A summary of the review and approval process is provided in **Figure 7**.

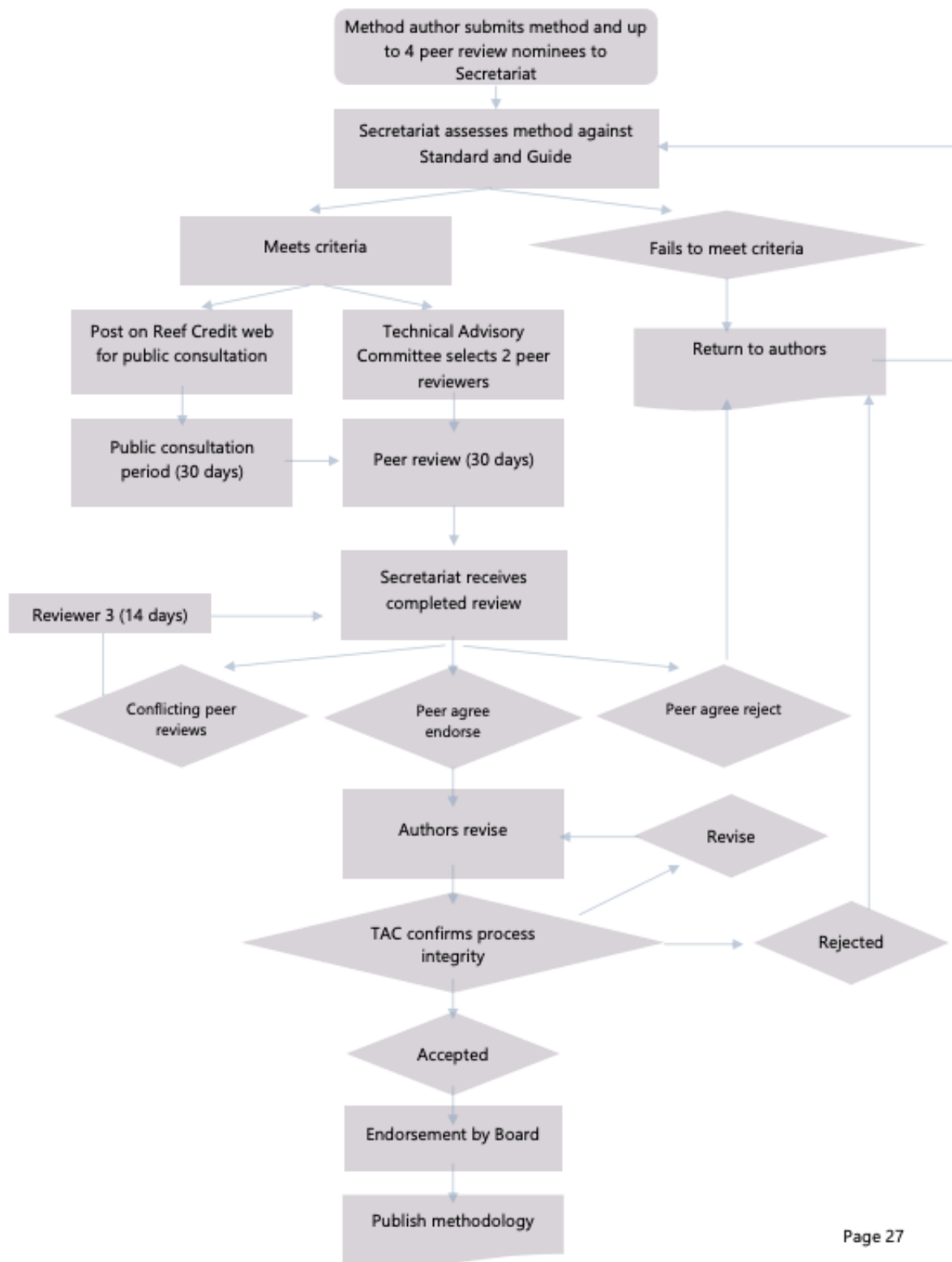


Figure 7 – Reef Credit Method – Review and Approval Process.

5. ROLES AND RESPONSIBILITIES

5.1 Ports North

5.1.1 Permit Holder

Under EPBC permit 2012-6538, Ports North is responsible for development of and delivery against an Offsets Management Plan. Ports North must achieve an offset equivalent to 3,813 tonnes of fine sediment that is prevented from reaching the Great Barrier Reef.

5.1.2 Purchase Reef Credits

Ports North will enter into a Reef Credit Purchase Contract with GreenCollar which will specify the number of Reef Credits to be purchased over what timeframe, location, source and price. The Purchase contract can incorporate reparation provisions if GreenCollar is unable to deliver the agreed Reef Credits in the timeframe agreed. This could include alternate sources of Reef Credits to meet the offset requirement. Ports North does not have responsibility for on-site project management, monitoring or asset maintenance. Once Reef Credits have been purchased for a proven and audited outcome, offset obligations will have been met. It is expected that this will occur by the end of 2024.

Ports North's agreement will be part of a larger 25 year Reef Credit project managed by GreenCollar in partnership with the landholder that delivers long term outcomes and ensures offset permanence.

5.2 GreenCollar

5.2.1 Reef Credit Project Proponent

GreenCollar is the formal project proponent for the Reef Credit Project and enters into a Project Delivery Agreement (PDA) with the landholder. GreenCollar takes on the responsibility for managing the project funding, delivery, monitoring, auditing, Reef Credit administrative processes and sale of Reef Credits. GreenCollar manages project delivery risk and Reef Credit issuance and sale.

The PDA provides the mechanism for legal ownership of the Reef Credits (and therefore capacity to sell them), asset protection and management of the gully repair site, revenue sharing arrangements with the landholder and mechanisms for ongoing monitoring/modelling of pollution abatement and Reef Credit generation over the life of the project.

The Reef Credit Project Delivery Agreement (PDA) between GreenCollar and the landholder incorporates legally binding mechanisms to secure the gully repair asset in the landscape for the 25 year life of the project. There are two mechanisms for this; either a caveat on title or a lease. The instrument deployed in the PDA depends on land titles, land holder preference and project type/logistics/scale.

The PDA is a recognised mechanism by the Reef Credit Scheme (and environmental credit schemes globally) to secure the legal rights to the Reef Credits, provide returns to the landholder, specify roles and responsibilities and to ensure permanence of the asset

The PDA also includes a land management plan that ensures maintenance and land management practices that support ongoing sediment pollution reductions. The PDA with the landholder includes revenue sharing provisions for the life of the project and outlines the landholder responsibilities for ongoing maintenance and site management for the duration.

Negotiation with traditional owners is incorporated in the project negotiations throughout. GreenCollar has been delivering Australian Carbon Credit projects successfully across Australia for over eleven years based on this legal framework.

GreenCollar directly contracts project delivery partners who implement the on ground works in conjunction with the landholder.

5.2.2 Reef Credit Project Delivery

Contracted through GreenCollar, Terrain NRM and site works contractors will be responsible for the design and delivery of the gully repair ground works.

6.RISK MANAGEMENT

A risk assessment has been undertaken for the project and a summary provided in this section. Detailed results are included in the Declaration of Accuracy and Risk outlined in **Appendix F**.

The risk assessment has been undertaken using a risk matrix and proforma provided by DAWE. The proforma required consideration of:

- Inherent risk
- Management measures/actions
- Residual risk
- Performance criteria
- Management triggers
- Corrective actions
- Monitoring mechanism

The risk assessment identified 14 key risks, of which zero (0) were extreme, one (1) was considered high, nine (9) were considered medium and four (4) were considered low. The one high risk is rated high due to the consequence which is considered 'critical'. The likelihood has been reduce to 'rare' due to the mitigation measures and as a result that risk is As Low As Reasonably Practicable (ALARP).

A summary of the high and medium risks is provided in **Table 6**.

Table 6 – Summary of Project Risk Assessment

Risk	Rating	Mitigation Measures
Offset fails due to no fault of the landholder.	High	<ul style="list-style-type: none"> • Strict design and construct guidelines are adhered to. • Design based on experience in a range of other gully repair projects. • Monitoring of site works in the first year to ensure works achieve the planned outcome and any initial breaches or project failures are repaired as part of the delivery contract.
The project site is subject to mining which impacts on the performance of the offset.	Medium	<ul style="list-style-type: none"> • A caveat or lease arrangement will secure the gully repair site for the 25-year project period. • This will ensure that GreenCollar will be notified of mining intentions.
The project site is impacted by drought and the sediment reductions are not realised.	Medium	<ul style="list-style-type: none"> • Ports North has until 2028 to deliver the water quality result achieved via the purchase of Reef Credits. • In the unlikely event that drought persists beyond 2 years, the Reef Credit system allows other sites to be targeted.
The project site is impacted by a cyclone or severe tropical low. Depending on timing this could damage or wash out the Gully repair site.	Medium	<ul style="list-style-type: none"> • Project delivery timing seeks to ensure the site is stable prior to wet season in the first year. • In later years the robust design of the gully repair aims to prevent flood wash out and a maintenance program funded through the sale of Reef Credits ensures the asset is maintained.
The project site is impacted by an early wet season prior to site stabilisation being achieved.	Medium	<ul style="list-style-type: none"> • Project delivery timing seeks to ensure the site is stable prior to wet season in the first year. • In later years the robust design of the gully repair aims to prevent flood wash out and a maintenance program funded through the sale of Reef Credits ensures the asset is maintained. • If an early wet season was forecast or occurred, site works can be postponed to the next year and still meet the offset timeframe for Ports North.

Risk	Rating	Mitigation Measures
The proposed works are not able to proceed without appropriate permits.	Medium	<ul style="list-style-type: none"> • Early negotiations with the relevant authorities and conduct work with experienced delivery agents. • Terrain NRM to ensure that permits and approvals will not be a barrier for project delivery. This is completed during project feasibility. • Work with consultant/delivery agent to ensure permit applications are timely and complete.
No rain during a wet season which means a water quality monitoring event isn't triggered to provide evidence that sediment pollution has been reduced.	Medium	<ul style="list-style-type: none"> • Located in the Wet Tropics, it is unlikely that this location will not experience wet season rains. • The Ports North permit requires the offsets to be met by 2028, which allows sufficient years for wet season event triggering sediment savings.
Sediment savings are reversed due to poor site management.	Medium	<ul style="list-style-type: none"> • Reef Credit Projects contain a binding agreement that protects the gully repair asset and includes a Land Management Plan to be delivered by landholders. • Site maintenance immediately following remediation works is built into construction contracts.
Project unable to be completed at Innot Hot Springs site because landholder does not want project implemented	Medium	<ul style="list-style-type: none"> • Early discussions have commenced with the landholder. • If agreement cannot be reached, there are alternate gully repair sites within the same Upper Herbert Catchment that can deliver sediments offsets within the 2028 timeframe
Impacts on traditional owner values/sites	Medium	<ul style="list-style-type: none"> • No active native title claims or determinations exist at the Reef Credit Project site. • During project design, local engagement will be completed with Traditional Owners and Cultural Heritage clearances will be required for the permits and subsequent earthworks. • If delays are experienced that impact project timeline the offset timeline of 2028 can still be met.

7.REPORTING

Ports North in conjunction with GreenCollar will prepare annual reports in September each year up to 2028 (or when offsets obligations have been met). The report will provide an overview of the status of the gully repair project and progress towards meeting overall fine sediment offsets obligations.

8.REFERENCES

- [Reef 2050 Long Term Sustainability Plan](#)
- [Reef 2050 Water Quality Improvement Plan](#)
- [Eco-Markets Australia](#)
- [Reef Credit Standard](#)
- [Reef Credit Gully Repair Methodology](#)
- [Reef Crediting Procedures](#)



**Attachment A – Cairns Shipping Development EPBC
Approval (EPBC 2012/6538)**



APPROVAL

Cairns Shipping Development (Trinity Inlet) Project, Queensland (EPBC 2012/6538)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act). Note that section 134(1A) of the EPBC Act applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Far North Queensland Ports Corporation Limited
ACN of approval holder	131 836 014
Action	To upgrade the existing shipping channel and associated infrastructure in the Port of Cairns [See EPBC Act referral 2012/6538] subject to the variation of the action accepted by the Minister under section 156B on Tuesday, 25 July 2017

Approval decision

My decisions on whether or not to approve the taking of the action for the purposes of each controlling provision for the action are as follows.

Controlling Provisions

World Heritage properties	
Section 12	Approve
Section 15A	Approve
National Heritage places	
Section 15B	Approve
Section 15C	Approve
Listed threatened species and communities	
Section 18	Approve
Section 18A	Approve
Listed migratory species	
Section 20	Approve
Section 20A	Approve
Commonwealth marine areas	
Section 23	Approve
Section 24A	Approve
Great Barrier Reef Marine Park	
Section 24B	Approve
Section 24C	Approve



Commonwealth land

Section 26	Approve
Section 27A	Approve

Period for which the approval has effect

This approval has effect until 30 September 2028

Decision-maker

Name and position	James Barker Assistant Secretary of Assessments and Governance Branch Department of the Environment and Energy
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Signature

Date of decision	28 / 11 / 2018
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Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

1. The approval holder must ensure that no more than 1 million cubic metres (in situ) of material is dredged. Dredging must only occur between 1 March and 30 September (inclusive) of any given year.
2. The approval holder must not place more than:
 - (a) 100 000 cubic metres of **stiff clay** dredged material at the **Tingira St Dredged Material Placement Area**; and
 - (b) 900 000 cubic metres of **soft clay** dredged material at the **Northern Sands Dredged Material Placement Area**.
3. The approval holder must ensure that:
 - (a) dredging does not occur outside the **channel and swing basin footprints**;
 - (b) the **dredged material pipeline** is only constructed within the **pipeline footprint**; and
 - (c) no more than 0.41 hectares of **mangrove habitat** is cleared within the **pipeline footprint**.

Note: To avoid doubt, reference to dredging in this approval means capital dredging undertaken as part of the action.



Dredge management plan

4. The approval holder must submit a Dredge Management Plan (DMP) to the **Minister** for approval. Dredging must not occur unless the DMP has been approved by the **Minister**. If the **Minister** approves the DMP, the approved DMP must be implemented. The DMP must include, but is not limited to:
- (a) the **baseline condition** of any **sensitive receptors** present in the **channel and swing basin footprints** and any **sensitive receptors** present outside of the **channel and swing basin footprints** predicted (by plume modelling) to be within the extent of the detectable plume as a result of dredging;
 - (b) a program to monitor marine water quality before, during and after dredging to validate plume modelling assumptions and to support prediction, detection and prevention of **sub-lethal** or lethal impacts to **sensitive receptors**. The monitoring program must be designed to delineate any impacts as a result of the action from other events and must include:
 - (i) the location of water quality monitoring sites, including control sites;
 - (ii) a description of the water quality parameters to be monitored (including photosynthetic active radiation, turbidity and or total suspended solids in real-time) and the methodology, effort, timing, frequency and responsibility for monitoring those parameters;
 - (iii) **trigger levels** for the water quality parameters to be monitored;
 - (iv) a description of the response measures for each **trigger level**;
 - (v) protocols to record and report (including timeframes) to the **Department** any exceedance of the **trigger levels**, the cause of the exceedance, the response measures taken, the relative success of the response measures, and actions taken to prevent further exceedances;
 - (c) a program, to start once dredging has commenced, to review the plume modelling assumptions and a timeframe to report the outcomes of the program to the **Department**;
 - (d) a **marine fauna** program including:
 - (i) measures to observe **marine fauna** (undertaken by a **suitably qualified marine observer**) and avoid impacts to **marine fauna** during dredging and dredge vessel movements associated with the action; and
 - (ii) protocols to record and report (including timeframes) to the **Department** any **interactions** with **marine fauna** during dredging and dredge vessel movements associated with the action;
 - (e) written evidence of input and peer review by a **suitably qualified person** of the adequacy of the DMP and a table of any changes made in response to the peer review.

Dredge material placement areas

5. The approval holder must ensure that there is no release of tailwater or release of placed dredged material from the **Tingira St Dredged Material Placement Area**.



6. The approval holder must ensure that there is no **uncontrolled release** of placed dredged material from the **Northern Sands Dredged Material Placement Area**.
7. The approval holder must submit a **Northern Sands Dredged Material Placement Area** Management Plan (NSMP) to the **Minister** for approval. Dredging must not occur unless the NSMP has been approved by the **Minister**. If the **Minister** approves the NSMP, the approved NSMP must be implemented. The NSMP must include, but is not limited to:
 - (a) the **baseline condition** of any **sensitive receptors** predicted (by plume modelling) to be within the extent of the detectable plume as a result of tailwater discharge;
 - (b) a program to monitor water quality before, during and after tailwater discharge to validate plume modelling assumptions and to support prediction, detection and prevention of **sub-lethal** or lethal impacts to **sensitive receptors**. The monitoring program must be designed to delineate any impacts as a result of the action from other events, be adequate to demonstrate whether the outcome in condition 6 is being met, and must include:
 - (i) the location of tailwater discharge point(s) and spillway(s);
 - (ii) the location of water quality monitoring sites, including control sites;
 - (iii) a description of the water quality parameters to be monitored and the methodology, effort, timing, frequency and responsibility for monitoring those parameters;
 - (iv) **trigger levels** for the water quality parameters to be monitored;
 - (v) a description of the response measures for each **trigger level**;
 - (vi) protocols to record and report (including timeframes) to the **Department** any exceedance of the **trigger levels**, the cause of the exceedance, the response measures taken, the relative success of the response measures, and actions taken to prevent further exceedances;
 - (c) a program, to start once tailwater discharge has commenced, to review the plume modelling assumptions and a timeframe to report the outcomes of the program to the **Department**;
 - (d) bund wall management measures including:
 - (i) details on how the bund wall will achieve the outcome at condition 6; and
 - (ii) a description of any management measures or requirements for the bund wall imposed by **Queensland**;
 - (e) written evidence of input and peer review by a **suitably qualified person** of the adequacy of the NSMP and a table of any changes made in response to the peer review.

Note: the approval holder may align the DMP and or the NSMP with any plans or other requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.



Fine sediment methodology

8. The approval holder must submit a Fine Sediment Methodology (FSM) to the **Minister** for approval. Dredging must not occur unless the FSM has been approved by the **Minister**. If the **Minister** approves the FSM, the approved FSM must be implemented. The FSM must include, but is not limited to:
- (a) a methodology for quantifying the amount (in tonnes) of **fine sediment** returned to the environment from:
 - (i) the dredging of **stiff clays**; and
 - (ii) the dredging of **soft clays** and from tailwater discharge at the **Northern Sands Dredged Material Placement Area**;
 - (b) written evidence of input and peer review by a **suitably qualified person** of the adequacy of the FSM and a table of any changes made in response to the peer review.

Dredging completion report

9. Within 20 **business days** after the completion of dredging, the approval holder must notify the **Department** of the actual date of completion of dredging.
- 10A. The approval holder must submit a Dredging Completion Report (DCR) to the **Department** within 6 months of the completion of dredging. The DCR must include, but is not limited to:
- (a) details of the type and extent (in hectares) of **sensitive receptors** present in the **channel and swing basin footprints** that were removed as a result of dredging undertaken for the action;
 - (b) an assessment as to whether any **sensitive receptors** (delineated by type and extent) present outside of the **channel and swing basin footprints**:
 - (i) are vulnerable or likely to experience **sub-lethal** impacts as a result of the action; and
 - (ii) have experienced lethal impacts as a result of the action;
 - (c) the amount of **fine sediment** returned to the environment calculated in accordance with condition 8(a)(i) and condition 8(a)(ii); and
 - (d) for any potential impacts identified in accordance with condition 10A(b)(i), details of a program (to be undertaken from submission of the DCR until 24 months after the completion of dredging) capable of monitoring the viability of those **sensitive receptors**.
- 10B. If monitoring is required in accordance with condition 10A(d), the approval holder must submit an updated DCR to the **Department** within 26 months of the completion of dredging. The updated DCR must detail the results of the monitoring program undertaken in accordance with condition 10A(d) and must identify any **sensitive receptors** (delineated by type and extent) that experienced **sub-lethal** impacts as a result of the action.



Offsets

11. To compensate for residual significant impacts of the action and to achieve a net benefit to the outstanding universal value of the Great Barrier Reef World Heritage Area, the approval holder must deliver offsets:
 - (a) to compensate for the extent of any impacts to **sensitive receptors** reported in accordance with condition 10A(a);
 - (b) to compensate for:
 - (i) the amount of **fine sediment** returned to the environment, calculated in accordance with condition 8(a)(i);
 - (ii) any lethal impacts to **sensitive receptors** reported in accordance with condition 10A(b)(ii); and
 - (iii) any **sub-lethal** impacts to **sensitive receptors** reported in accordance with condition 10B.
12. The approval holder may choose to provide a contribution to **Reef Trust** to deliver all or part of offset(s) required under condition 11, condition 13A, condition 13B and condition 13C.
- 13A. Within 12 months of the completion of dredging, the approval holder must submit an Offset Management Plan (OMP) to the **Minister** for approval. If the **Minister** approves the OMP, the approved OMP must be implemented. The OMP must include, but is not limited to:
 - (a) details of offset(s) in accordance with condition 11(a) and condition 11(b)(i);
 - (b) details of offset(s) in accordance with condition 11(b)(ii) and details of the source and amount of **fine sediment** (reviewed by a **suitably qualified person**) considered by the approval holder to have caused the impact;
 - (c) timeframes for delivery and completion of the offset(s); and
 - (d) for any part(s) of the offset(s) not delivered by providing a contribution to **Reef Trust**:
 - (i) details of how the offset(s) align with the broader strategies and programs for the Great Barrier Reef, including but not limited to the **Reef 2050 Long-Term Sustainability Plan**;
 - (ii) a description of the management measures (including timing, frequency and longevity) that will be implemented to deliver the offset(s);
 - (iii) performance and completion criteria for evaluating the success of the management measures and criteria for triggering remedial action (if necessary);
 - (iv) a program, including timelines to monitor and report on the effectiveness of the management measures, and progress against the performance and completion criteria; and



- (v) a description of potential risks to the successful implementation of the management measures and a description of the contingency measures that would be implemented to mitigate against these risks and residual risk ratings.

13B. If impacts are reported in accordance with condition 10B, the approval holder must submit an updated OMP to the **Minister** for approval. The updated OMP must be submitted within 32 months of the completion of dredging. If the **Minister** approves the updated OMP, the approved updated OMP must be implemented. The updated OMP must include, but is not limited to, details of offset(s) in accordance with condition 11(b)(iii) and details of the source and amount of **fine sediment** (reviewed by a **suitably qualified person**) considered by the approval holder to have caused the impact. The updated OMP must also address each of the matters described in condition 13A(c) and condition 13A(d).

13C. In deciding whether or not to approve the OMP or updated OMP, if the **Minister** is not satisfied that the offsets proposed by the approval holder in condition 13A(b) or condition 13B is adequate to account for the relevant impacts, the **Minister** may direct the approval holder (in writing) to revise the OMP or the updated OMP to provide offsets for the entire amount of **fine sediment** calculated in accordance with condition 8(a)(ii) instead.

Piling

14. The approval holder must:

- (a) establish an **exclusion zone** and **observation zone** for piling activities;
- (b) ensure that pre-start visual observations for **marine fauna** are undertaken across the **exclusion zone** and **observation zone**. Observations must be undertaken by a **suitably qualified marine observer** for at least 30 minutes immediately preceding the start of pile driving operations, and continue during pile driving operations;
- (c) not start pile driving operations if **marine fauna** have been identified in the **exclusion zone**;
- (d) initiate **soft-start procedures** at the start of pile driving operations and after breaks of pile driving operations of 30 minutes or more;
- (e) implement stand-by procedures to shut down piling equipment if **marine fauna** are sighted within the **observation zone**;
- (f) cease pile driving operations if **marine fauna** are observed in, or about to enter, the **exclusion zone**. If pile driving ceases due to this condition, pile driving operations must not start again until:
 - (i) all **marine fauna** are observed to move outside the **exclusion zone**; or
 - (ii) 30 minutes have passed since the last sighting of the **marine fauna** within the **exclusion zone**;
- (g) not start pile driving operations between 6:30 pm and 6:30 am.

15. The **exclusion zone** and **observation zone** must be based on relevant scientific evidence about the impact of noise on **marine fauna** likely to be present at the time of pile driving operations. A



report on the adequacy of the **exclusion zone** and the **observation zone** must be published by the approval holder on the **website** prior to any pile driving operations commencing. The report must include evidence of input and peer review by a **suitably qualified person**. Within 10 **business days** after publishing the report, the approval holder must notify the **Department** of the actual date of publication.

Part B – Standard administrative conditions

Commencement of the action

16. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action**.
17. If **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not undertake **commencement of the action** without the prior written agreement of the **Minister**.

Compliance records

18. The approval holder must maintain accurate and complete **compliance records**.
19. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department's** website or through the general media.

Preparation and publication of plans

20. The approval holder must:
 - (a) submit all **plans** and the FSM electronically to the **Department** for approval by the **Minister**;
 - (b) publish each **plan** and the FSM on the **website** within 20 **business days** of the date the relevant **plan** or the FSM is approved by the **Minister**, unless otherwise agreed to in writing by the **Minister**;
 - (c) exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public; and
 - (d) keep all **plans** and the FSM published on the **website** until the end date of this approval.
21. The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under a **plan**, is prepared in accordance with the **Department's Guidelines for biological survey and mapped data** (2018) and submitted electronically to the **Department** along with annual compliance reporting required at condition 22.

Annual compliance reporting

22. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or as otherwise agreed to in writing by the **Minister**. The approval holder must:
 - (a) publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;



- (b) notify the **Department** by email that a **compliance report** has been published on the **website** within 5 **business days** of the date of publication;
- (c) keep all **compliance reports** publicly available on the **website** until this approval expires;
- (d) exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and
- (e) where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department's** website.

Reporting non-compliance

23. The approval holder must notify the **Department** in writing of any: **incident**; non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than 2 **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:
- (a) the condition which is or may be in breach; and
 - (b) a short description of the **incident** and or non-compliance.
24. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:
- (a) any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;
 - (b) the potential impacts of the **incident** or non-compliance; and
 - (c) the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

25. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted as requested in writing by the **Minister**.
26. For each **independent audit**, the approval holder must:
- (a) provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;
 - (b) only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and
 - (c) submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.
27. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Revision of plans

28. The approval holder may choose to revise a **plan** approved by the **Minister** without submitting it for approval under the provisions of the **EPBC Act**, if the taking of the action in accordance with the revised **plan** would not be likely to have a **new or increased impact**.



29. If the approval holder makes the choice under condition 28 to revise a **plan** without submitting it for approval, the approval holder must:

- (a) notify the **Department** in writing that the approved **plan** has been revised and provide the **Department** with:
 - (i) an electronic copy of the revised **plan**;
 - (ii) an electronic copy of the revised **plan** marked up with track changes to show the differences between the approved **plan** and the revised **plan**;
 - (iii) an explanation of the differences between the approved **plan** and the revised **plan**;
 - (iv) the reasons the approval holder considers that taking the action in accordance with the revised **plan** would not be likely to have a **new or increased impact**; and
 - (v) written notice of the date on which the approval holder will implement the revised **plan** (the implementation date), being at least 20 **business days** after the date of providing notice of the revision of the approved **plan**, or a date agreed to in writing with the **Department**;
- (b) subject to condition 31, implement the revised **plan** from the implementation date.

30. The approval holder may revoke their choice to implement a revised **plan** under condition 28 at any time by giving written notice to the **Department**. If the approval holder revokes the choice under condition 28, the approval holder must implement the most recent **plan** approved by the **Minister**.

31. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised **plan** would be likely to have a **new or increased impact**, then:

- (a) condition 28 does not apply, or ceases to apply, in relation to the revised **plan**; and
- (b) the approval holder must implement the **plan** specified by the **Minister** in the notice.

32. At the time of giving the notice under condition 31, the **Minister** may also notify that for a specified period of time, condition 28 does not apply for one or more specified **plans**.

Completion of the action

33. Within 20 **business days** after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Baseline condition includes, but is not limited to, details of the type, species, location, extent (in hectares), density and condition collected by a **suitably qualified person** over a timeframe that serves as a basis for comparison to data collected after the relevant activity.

Business days means a day that is not a Saturday, a Sunday or a public holiday for the whole of Queensland.

Cetaceans means a member of the sub-order Mysticeti or Odontoceti of the Order Cetacea.

Channel and swing basin footprints is as shown by the map at [Attachment C](#).

Commencement of the action means the point at which physical works associated with dredging, piling, or construction of the **Northern Sands Dredged Material Placement Area**, the **Tingira St**



Dredged Material Placement Area or **dredged material pipeline** are first undertaken. This does not include preparatory works such as the erection of signage or temporary fencing or site surveys or monitoring.

Completion data means an environmental report and spatial data information clearly detailing how the conditions of this approval have been met. The **Department's** preferred spatial data format is shapefile.

Completion of the action means the time at which all conditions have been fully met.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval. This includes documents or material in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance reports means written reports:

- (a) providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**;
- (b) consistent with the **Department's Annual Compliance Report Guidelines** (2014);
- (c) include a shapefile of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period; and
- (d) annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Dredged material pipeline means the pipeline to deliver dredged material to the **Northern Sands Dredged Material Placement Area** and the pipeline to discharge tailwater from the **Northern Sands Dredged Material Placement Area**.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Exclusion zone means a radius, from the centre of the pile to be driven, to minimise the risk of physiological impacts to **marine fauna** from pile driving operations.

Fine sediment means material less than 15.6 micrometres (μm).

Incident means any event which has the potential to, or does, impact on any **protected matters**.

Independent audit means an audit conducted by an independent and **suitably qualified person** as detailed in the **Department's Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines** (2015).

Interactions means any strike or other event that causes death or injury.

Mangrove habitat means vegetation surveyed by a **suitably qualified person** and confirmed to conform to Queensland Regional Ecosystem 7.1.1.

Marine fauna means Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricata*); Flatback Turtle (*Natator depressus*); Loggerhead Turtle (*Caretta caretta*); Olive Ridley Turtle (*Lepidochelys olivacea*); Leatherback Turtle (*Dermochelys coriacea*); Dugong (*Dugong dugon*); Australian Snubfin Dolphin (*Orcaella heinsohni*); Australian Humpback Dolphin (*Sousa sahulensis*); Humpback Whale (*Megaptera novaeangliae*) and all other **cetaceans**.

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Monitoring data means the data required to be recorded under the conditions of this approval.



New or increased impact means a new or increased environmental impact or risk relating to any **protected matter**, when compared to the likely impact of implementing the **plan** that has been approved by the **Minister**, including any subsequent revisions approved by the **Minister**, as outlined in the **Department's Guidance on 'New or Increased Impact' relating to changes to approved management plans under EPBC Act environmental approvals (2017)**.

Northern Sands Dredged Material Placement Area is as shown by the map at [Attachment B](#).

Observation zone means the zone around the **exclusion zone** where the movement of **marine fauna** is monitored to determine whether they are approaching or about to enter the **exclusion zone**.

PGPA Act means the *Public Governance, Performance and Accountability Act 2013* (Cth).

Pipeline footprint is as shown by the map at [Attachment D](#).

Plan(s) means the DMP required under condition 4, the NSMP required under condition 7, and the OMP required under condition 13A and or the updated OMP required under condition 13B.

Protected matter(s) means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Queensland means the Queensland Government Department responsible for administering the *Environmental Protection Act 1994* (Qld).

Reef 2050 Long-Term Sustainability Plan means the *Reef 2050 Long-Term Sustainability Plan—July 2018, Commonwealth of Australia 2018*.

Reef Trust means the account established through the **PGPA Act** (*Reef Trust Special Account 2014 Determination 01* by the Minister for Finance under section 78 of the **PGPA Act** or any other special account established by the Minister for Finance under section 78 of the **PGPA Act** for the purpose of protecting, repairing or mitigating damage to the Great Barrier Reef World Heritage Area or a fund approved by the **Minister** for an equivalent purpose.

Sensitive ecological data means data as defined in the **Department's Sensitive Ecological Data – Access and Management Policy V1.0**, (2016).

Sensitive receptor(s) means coral reefs, seagrass beds, or mangroves.

Soft clay means any material to be dredged that is not **stiff clays**.

Soft start procedures means a gradual increase in piling impact energy of no more than 50 per cent of full impact energy for 10 minutes.

Stiff clays means sediment to be dredged that has an undrained shear strength of greater than 50 kilopascals (kPa) (as per Australian Standard AS1726-1993).

Suitably qualified marine observer means a dedicated and suitably trained person, with demonstrated experience in **marine fauna** observation, identification and monitoring of **marine fauna**, distance estimation and reporting. The marine observer must only be tasked with undertaking visual observations for **marine fauna** whilst they are engaged to do so, and must not have any other duties while engaging in observations.

Suitably qualified person means a person who has professional qualifications, training, skills and or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and or literature.

Sub-lethal means where the viability of a **sensitive receptor** (as assessed by a **suitably qualified person**) has decreased to a point where that **sensitive receptor** is unable or unlikely to recover to its **baseline condition** or a similar condition to a comparable non-impacted **sensitive receptor** (being at a control site identified at condition 4(b)(i) or condition 7(b)(ii) as relevant).

Tingira St Dredged Material Placement Area is as shown by the map at [Attachment A](#).



Trigger levels means ecologically relevant water quality limits designed to support prediction, detection and prevention of **sub-lethal** and lethal impacts to **sensitive receptors** including early warning levels and levels to modify and or cease relevant activities.

Uncontrolled release means the release of placed dredged material from the **Northern Sands Dredged Material Placement Area** (including via tailwater or flooding) otherwise than in accordance with the NSMP approved by the **Minister**.

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

ATTACHMENTS

Attachment A: map showing the **Tingira St Dredged Material Placement Area**

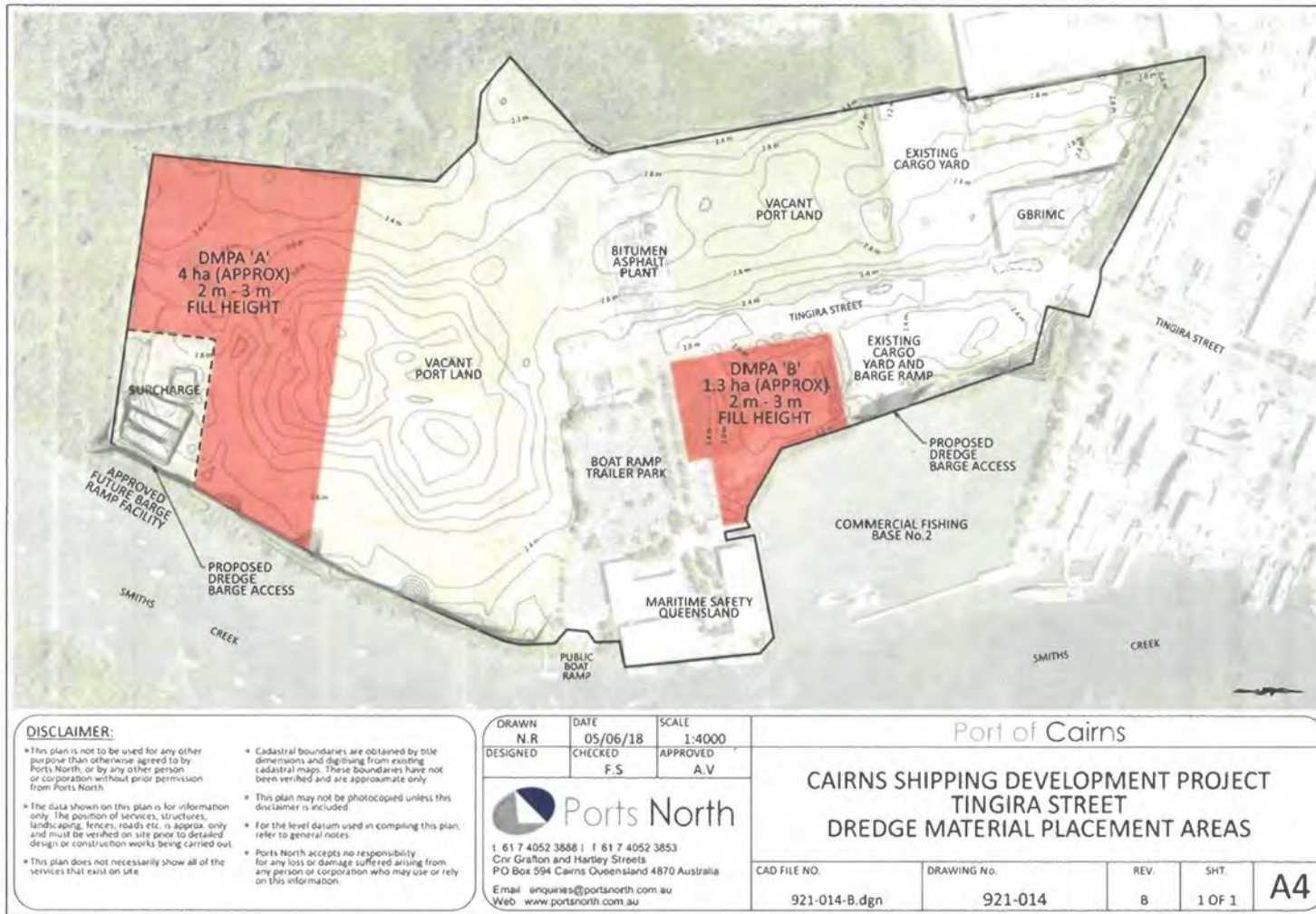
Attachment B: map showing the **Northern Sands Dredge Material Placement Area**

Attachment C: map showing the **channel and swing basin footprints**

Attachment D: maps showing the **pipeline footprint** (over four pages)



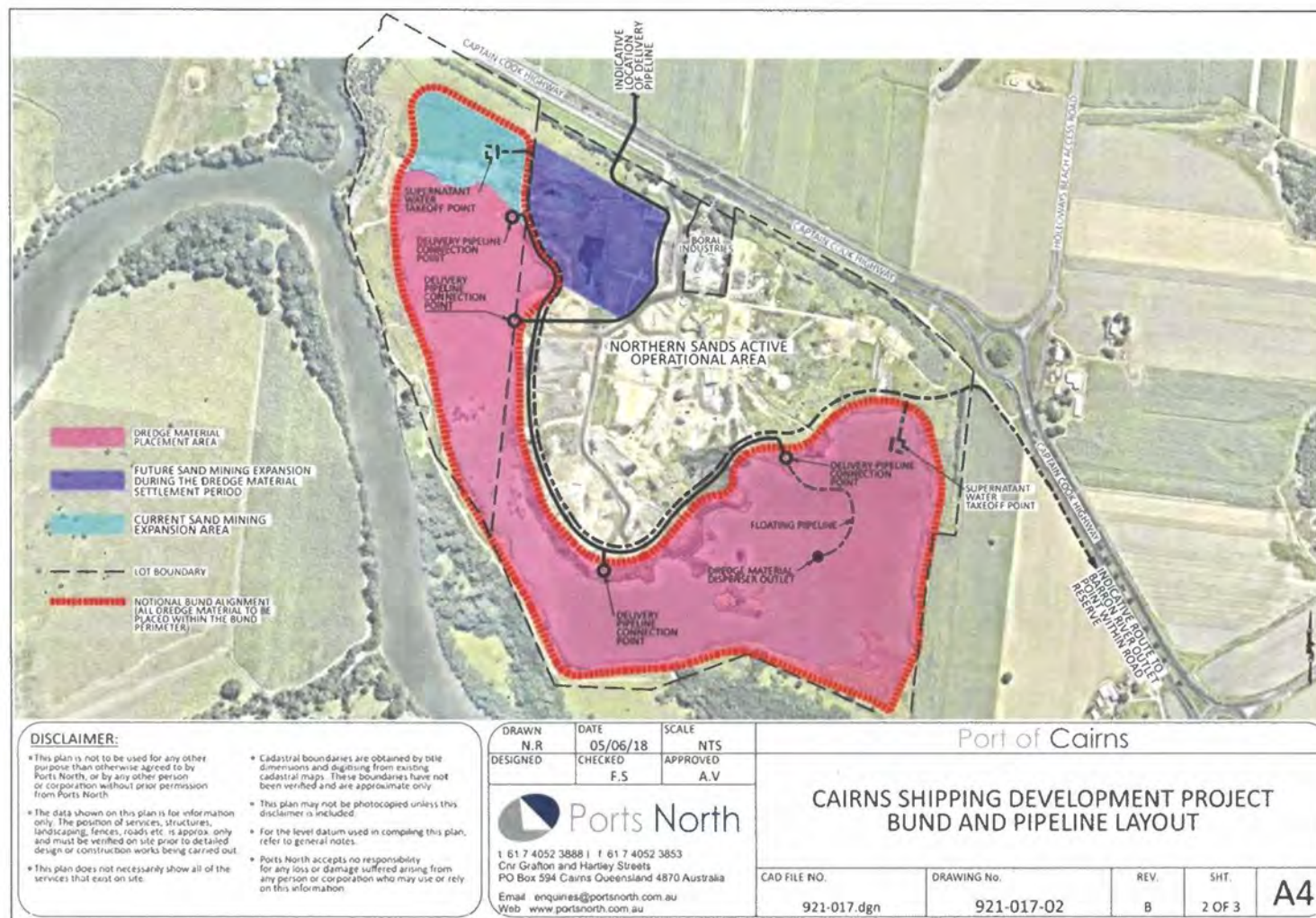
Attachment A: Map showing the Tingira St Dredged Material Placement Area



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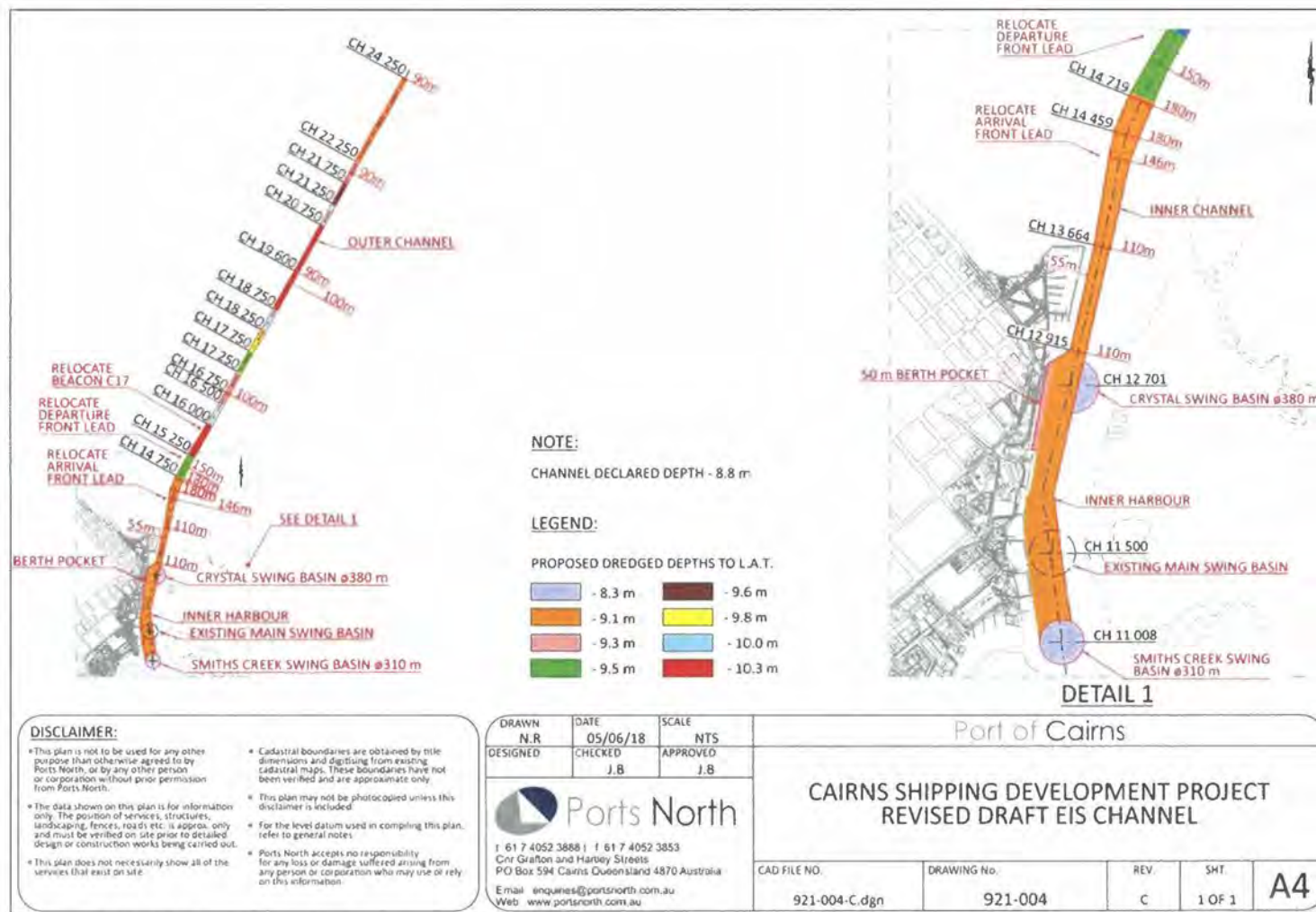
Attachment B: Map showing the Northern Sands Dredge Material Placement Area



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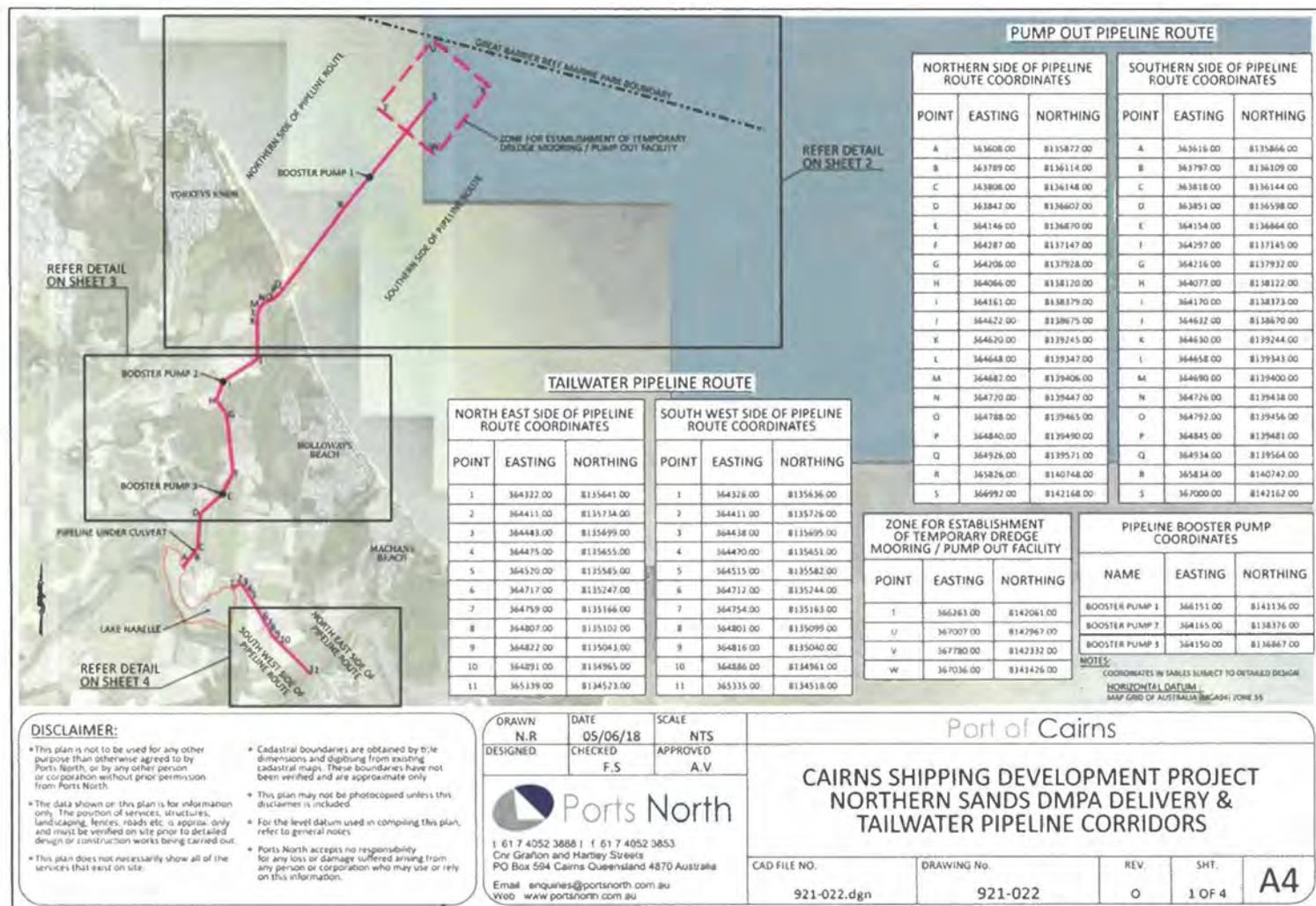
Attachment C: map showing the channel and swing basin footprints

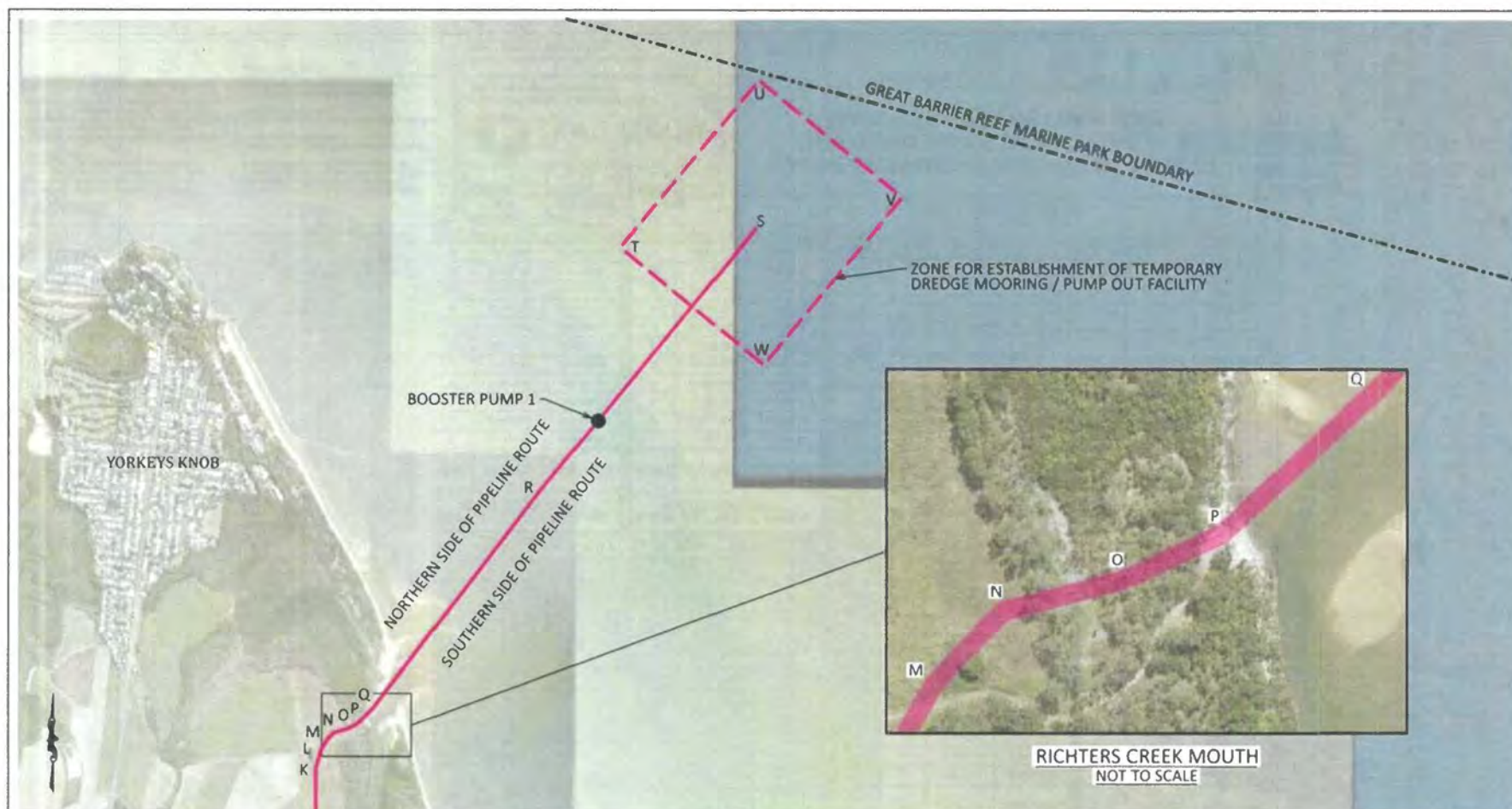


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Attachment D: maps showing the pipeline footprint (over four pages)





DISCLAIMER:

- This plan is not to be used for any other purpose than otherwise agreed to by Ports North, or by any other person or corporation without prior permission from Ports North.
- The data shown on this plan is for information only. The position of services, structures, landscaping, fences, roads etc. is approx. only and must be verified on site prior to detailed design or construction works being carried out.
- This plan does not necessarily show all of the services that exist on site.
- Cadastral boundaries are obtained by title dimensions and digitising from existing cadastral maps. These boundaries have not been verified and are approximate only.
- This plan may not be photocopied unless this disclaimer is included.
- For the level datum used in compiling this plan, refer to general notes.
- Ports North accepts no responsibility for any loss or damage suffered arising from any person or corporation who may use or rely on this information.

DRAWN	DATE	SCALE
N.R	05/06/18	NTS
DESIGNED	CHECKED	APPROVED
	F.S	A.V

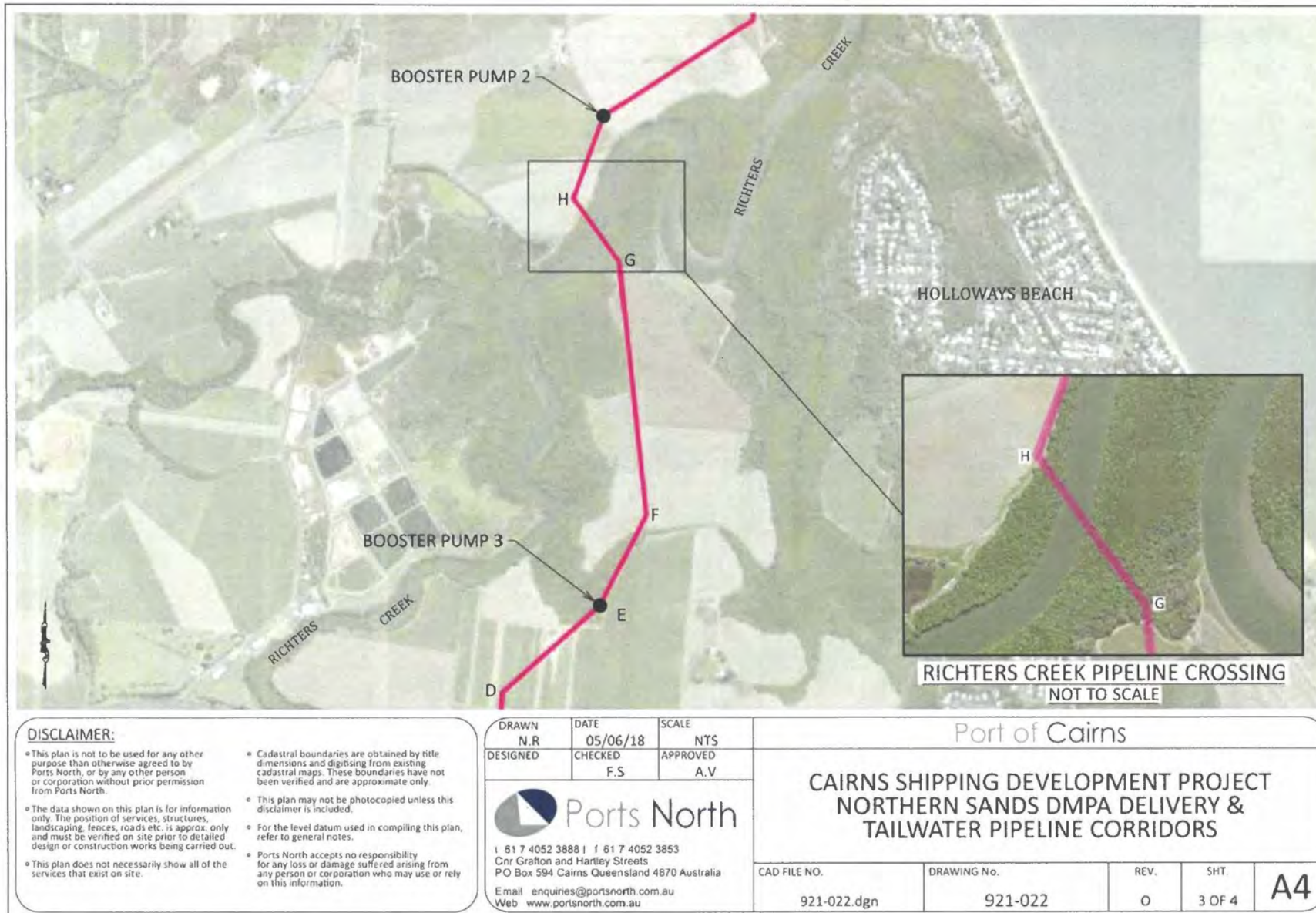


1 61 7 4052 3888 | 1 61 7 4052 3853
Cnr Grafton and Hartley Streets
PO Box 594 Cairns Queensland 4870 Australia
Email enquiries@portsnorth.com.au
Web www.portsnorth.com.au

Port of Cairns

**CAIRNS SHIPPING DEVELOPMENT PROJECT
NORTHERN SANDS DMPA DELIVERY &
TAILWATER PIPELINE CORRIDORS**

CAD FILE NO.	DRAWING No.	REV.	SHT.	
921-022.dgn	921-022	0	2 OF 4	A4





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DESIGNED	CHECKED F.S	APPROVED A.V

 **Ports North**

1 61 7 4052 3888 | f 61 7 4052 3853
Cnr Grafton and Hartley Streets
PO Box 594 Cairns Queensland 4870 Australia
Email enquiries@portsnorth.com.au
Web www.portsnorth.com.au

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Attachment B – DAWE (Former DoEE) Endorsement of Fine Sediment Methodology



Australian Government

Department of the Environment and Energy

Ms Lisa McKinnon
Principal Environmental Scientist
BMT WBM Pty Ltd
For Far North Queensland Ports Corporation Limited
PO Box 203
Spring Hill QLD 4004

Dear Ms McKinnon

EPBC 2012/6538: Cairns Shipping Development (Trinity Inlet) Project, Queensland – Approval of Dredge Management Plan Northern Sands Dredged Material Placement Area Management Plan and Fine Sediment Methodology.

Thank you for your communications dated 5 June 2019, and subsequent, to the Department of the Environment and Energy, seeking approval of the Dredge Management Plan Northern Sands Dredged Material Placement Area Management Plan and Fine Sediment Methodology, in accordance with conditions 4, 7 and 8 of the approval for the above project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Officers of the Department have considered the **Dredge Management Plan Northern Sands Dredged Material Placement Area Management Plan and Fine Sediment Methodology** and are satisfied they meet the requirements of conditions 4, 7 and 8 of the approval for this project respectively. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve the *Cairns Shipping Development Project: Dredge Management Plan Reference: R.B23336.002.06.DMP, June 2019; Fine Sediment Methodology for the Port of Cairns Shipping Development Project Reference: .B23336.006.04.FSM.docx, 5 June 2019 and Northern Sands Site Based Management Plan, 4 June 2019*. These plans must now be implemented.

Approval condition 28 for this project allows you (under certain circumstances) to implement revised plans without seeking the Minister's approval. If you require any advice on whether to submit a revised plan for approval, please contact the officer below. When submitting any revised plan to the Minister, please provide a 'tracked changes' version of the plan. I also attach a fact sheet providing guidance on 'new or increased impact' relating to changes to approved management plans under EPBC Act.

Should you require any further information please contact Peter Blackwell on (03) 62082927 or post.approvals@environment.gov.au.

Yours sincerely

Greg Manning, Assistant Secretary
Assessments (WA, SA, NT) & Post Approvals Branch

18 June 2019

Encl: Fact sheet on 'New or Increased Impact'



Guidance on 'New or Increased Impact' relating to changes to approved management plans under EPBC Act environmental approvals

Introduction

This guidance is for those environmental approvals under Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) containing an approval condition which uses the reference 'new or increased impact' in relation to revisions to approved management plans. This condition, referred to in this document as the Revised Management Plan (RMP) condition, allows revised plans to be implemented without approval by the Minister, provided that the proposed changes do not have a new or increased impact on matters protected under the approval.

The aim of this guidance is to assist approval holders and officers of the Department in determining whether or not a change is likely to have a 'new or increased impact' on a protected matter.

Background

Many EPBC Act Part 9 approvals include conditions for management plans, strategies or programs to be implemented, and usually these documents must be submitted for approval by the Minister prior to implementation. For the purposes of this guidance, such documents are referred to collectively as 'plans'.

Section 143A of the EPBC Act allows an approval holder to submit revisions to approved plans for re-approval by the Minister in certain circumstances. In some cases, revisions to approved plans under section 143A will incur a fee under cost recovery provisions of the EPBC Act and regulations.

From late 2015, the RMP condition was included in new approvals where appropriate, and in some cases the RMP condition has been retrospectively added to projects with an existing EPBC Act approval through formal variations to conditions.

In approvals that have the revised management plan condition, a 'new or increased impact' is typically defined as: *a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the plan, program or strategy that has been approved by the Minister.*

In broad terms, section 527E of the EPBC Act defines the term 'impact' as an 'event or circumstance' that is a direct or indirect result of the action taken by the approval holder or someone acting on behalf of the approval holder. A 'new or increased impact' in the context of the RMP condition is therefore very broad, and includes any direct or indirect increase in the impacts of an action, an increase to the risk of an impact occurring, or a change that reduces the acceptability of an impact such as a change to an environmental offset.

Scope of changes to a plan

Approvals are given for the purposes of one or more controlling provisions described in Part 3 of the EPBC Act, and plans may be required to avoid, mitigate or offset impacts to matters protected under those provisions (protected matters).

In some cases a plan may be required under both Commonwealth and state or territory approvals. It is possible that such a plan may require a revision in relation to state or territory matters only, and the changes may not relate to EPBC Act protected matters.

When considering whether a revised plan would have a new or increased impact, approval holders should have regard to all changes to the approved plan (ie. the latest version of that

plan that was formally approved by the Minister or delegate), not an unapproved revised plan (previously deemed by the approval holder to not have a new or increased impact under the RMP condition) or a plan only approved by the state or territory. In other words, if a revised unapproved plan is being implemented, and further revisions are being considered, all deviations (including incremental or cumulative changes) from the approved plan must be considered when making a decision on whether there is a new or increased impact.

The above emphasises the need to approval holders to use proper version control for plans. Further information about document version control can be found in the Department's Environmental Management Plan Guidelines available on the department's website: <http://www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines>

The following paragraphs are intended to provide general guidance about the types of changes to plans that are likely to result in a new or increased impact. They are not intended to be exhaustive or definitive. The particular facts and circumstances of a proposed revision to a plan will need to be taken into account in determining whether there is likely to be a new or increased impact.

What is a new impact?

A 'new impact' may be caused by a change to an activity or a change to circumstances surrounding the activity, and can include:

- new activities that may impact on protected matters;
- any change to an activity that creates a new potential impact to a protected matter; or
- an impact to a protected matter that was not previously foreseen.

It should also be noted that in some cases, a new activity may also require a formal variation to approval conditions (under section 143 of the EPBC Act); or may be beyond the scope of an approved action and could require separate EPBC Act approval.

What is an increased impact?

A change to a plan may increase a known impact. An 'increased impact' can include:

- a new activity;
- an increase in the scale, intensity or duration of impacts;
- an increase in the likelihood or consequences of an impact occurring;
- a change to a measure designed to avoid, mitigate or offset an impact;
- a reduced capacity to identify or measure an impact; or
- any other change that increases the risks or uncertainty associated with an impact.

Some changes above may not be considered an 'increase' if the change is a clear improvement.

Examples of a new or increased impact

Although determined on a case-by-case basis, the following changes to a plan are **likely** to result in a new or increased impact:

- The transition from construction phase to operations phase, where the approved plan only covers the construction period.
- Increasing the amount of habitat for a listed threatened species that will be cleared.
- A change in a measure designed to mitigate the impacts of an action on a RAMSAR wetland.
- A delay to the commencement of an environmental offset.
- A change to the timing of a temporary impact, to a time when a listed migratory species is more prevalent.
- A reduction in the frequency of monitoring.

What is unlikely to be a new or increased impact?

Changes unlikely to be a new or increased impact include:

- changes to the structure or layout of a plan or other administrative changes that are unrelated to environmental impacts or risks;
- a change to a plan which does not affect EPBC Act protected matters; or
- a clear improvement to a measure that avoids, mitigates or offsets the impacts of a proposal.

Examples unlikely to be a new or increased impact

Although determined on a case-by-case basis, the following changes to a plan are **unlikely** to result in a new or increased impact:

- Changes to a person's contact details.
- Changes to the name of a plan, or title page of a plan including version number or date.
- Changes to pagination or chapter format where content is not altered.
- Rectification of a clear typographical, grammatical error or mapping error, where the change does not relate to an impact or an avoidance, mitigation or offsetting measure.
- Changes to a plan that covers both state and EPBC Act requirements, and the change only relates to matters protected under state laws.
- The introduction of an additional mitigation measure.
- An increase in the frequency of monitoring.
- A change to the timing of a temporary impact, to a time when a listed migratory species is less prevalent.

Who decides whether a revised plan is likely to have a 'new or increased impact'?

The onus is on the approval holder to decide if a revision to a plan is likely to result in a new or increased impact.

If, after considering this guidance, approval holders are still unsure whether a proposed revision to a plan is likely to result in a new or increased impact, they may request advice or further information from the Department.

When submitting a revised plan under the RMP condition, the approval holder should include a document clearly explaining the revisions (such as a 'tracked changes' version of the plan) and reasoning why they believe that the revisions will not have a new or increased impact.

Approvals that include the RMP condition also include a condition which gives the Minister the power to require implementation of the previously approved plan if the Minister believes that a revision is likely to result in a new or increased impact. In order to reduce the likelihood of the Minister making this decision, the approval holder should contact the Department for advice if they have any doubt about whether a change is likely to result in a new or increased impact.

Option to submit revised plan to Minister for approval

Nothing in the RMP condition prevents an approval holder from choosing to submit a revised management plan to the Minister for formal approval under section 143A of the EPBC Act at any time.

Advice and further Information

Approval holders may request advice relating to the matters described in this document by emailing: post.approvals@environment.gov.au

Attachment C – DAWE Endorsement of Dredge Completion Report



Australian Government
Department of Agriculture,
Water and the Environment

Ref: 18/005133

Email: epbcmonitoring@awe.gov.au

Lisa McKinnon
Principal Environmental Scientist
BMT Commercial Australia Pty Ltd
PO Box 203
SPRING HILL QLD 4004

Dear Ms McKinnon,

**Cairns Shipping Development (Trinity Inlet) Project, Queensland (EPBC 2012/6538):
Dredge Completion Report.**

Thank you for your email of 3 April 2020 providing the Dredge Completion Report on behalf of Far North Queensland Ports Corporation Limited in accordance with condition 10A of the EPBC 2012/6538 approval.

The Environmental Audit Section and the Post Approval Section have reviewed the report and found that it satisfies the requirements of condition 10A of the approval. The compliance checklist contained within the report has been found satisfactory.

Please prepare your offset management plan in accordance with condition 13A of the approval. The offset volume of 3,813t noted in the Dredge Completion Report is accepted as the offset volume to be addressed in the Offset Management Plan. The submission of the Offset Management Plan is required to be submitted by the 24 September 2020.

Please note that conditions of the approval require the approval holder to maintain accurate records of all activities associated with, or relevant to, the approval conditions so that they can be made available to the Department on request. These documents may be subject to audit and be used to verify compliance. Summaries of audits may be published by the Department.

More information about the Department's Monitoring and Audit program is available at <http://www.environment.gov.au/epbc/compliance-and-enforcement/auditing>.

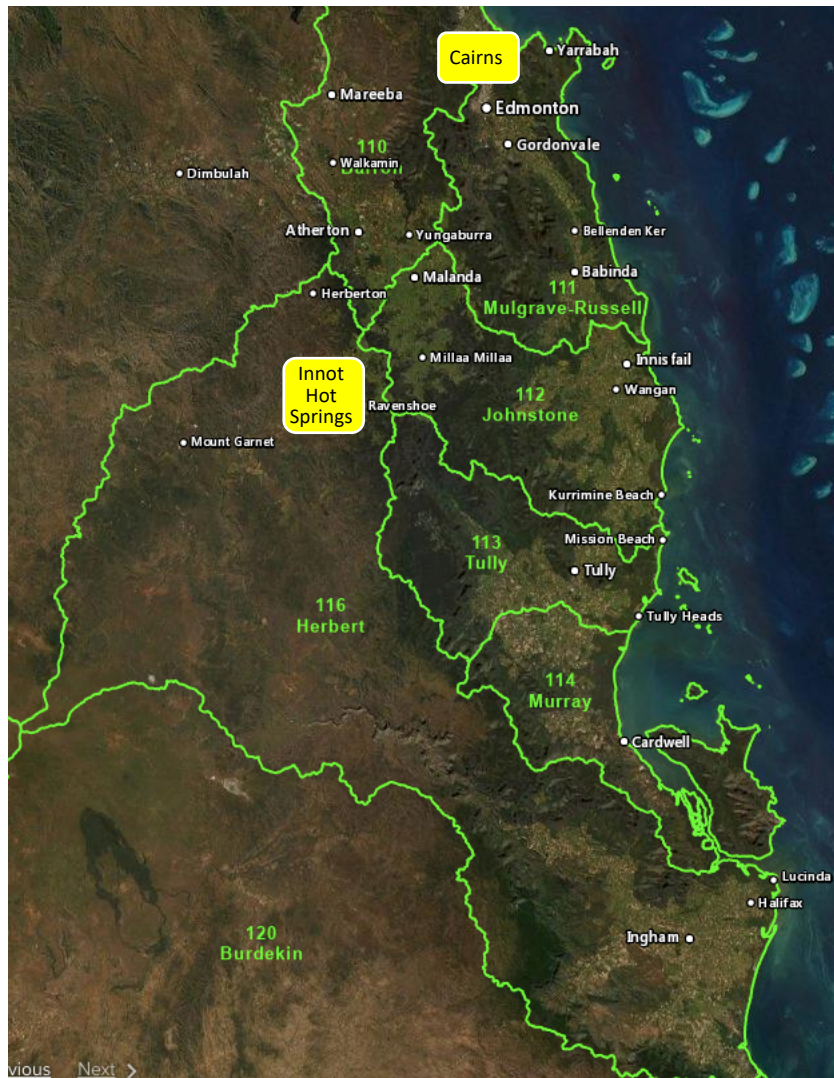
Section 142 of the *Environment Protection and Biodiversity Conservation Act 1999* requires an approval holder to comply with conditions attached to an approval. Penalties may apply to approval holders who contravene conditions.

If you would like to discuss this matter further, please contact Michaela Ballard on (02) 6274 1259.

Yours sincerely,

Tom Long
A/g Assistant Director
Environmental Audit Section
22 July 2020

Attachment D – Proposed Project Offset



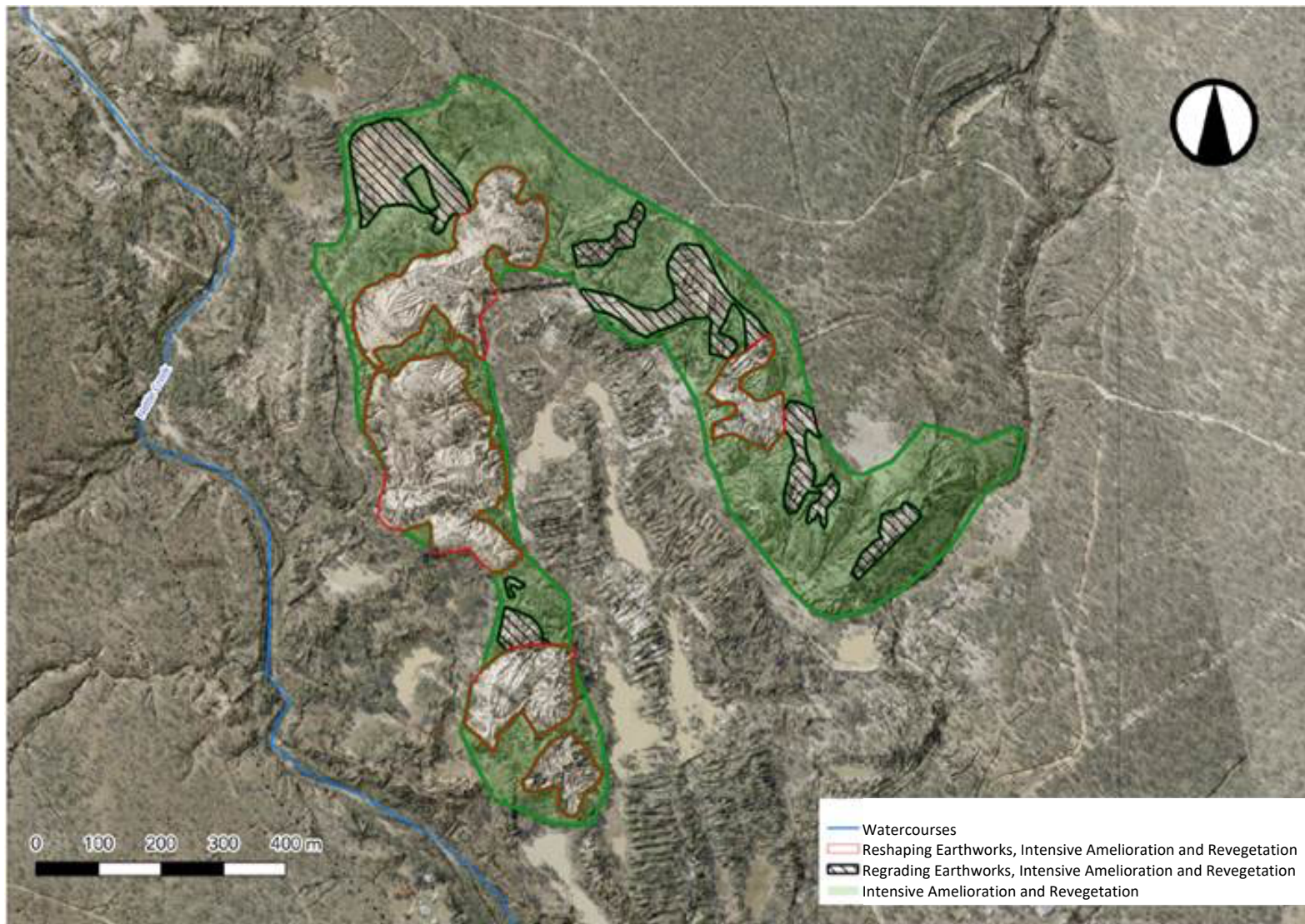
Map One - Location of Herbert River Catchment and Innot Hot Springs in relation to Cairns



Image 1 - Aerial Image of gully erosion remediation sites at Innot Hot Springs



Image 2 - Drone image of typical gully erosion at Innot Hot Springs



Map Two - Site Map Remediation Concepts Design

Attachment E – Offsets Methodology

METHOD OF ACCOUNTING FOR REDUCTION IN SEDIMENT RUN-OFF THROUGH GULLY REHABILITATION – VERSION 1.4

Authors: Andrew Brooks¹, Timothy Pietsch¹, Robin Thwaites¹, John Spencer¹, James Daley¹, Nicholas Dorian¹, Justin Stout¹, James Schultz², Jenny Sinclair² and Rachel Chiswell²

1 Griffith Centre for Coastal Management, Griffith University

2 GreenCollar Group, Sydney NSW

ACKNOWLEDGEMENTS

We would like to acknowledge the input and assistance in drafting this methodology from Mike Berwick (GreenCollar), Luke Shoo (GreenCollar), Elyce Coluccio (GreenCollar) and the Queensland Government. We also thank Scott Wilkinson and Rebecca Bartley (CSIRO) for their comments on an initial draft of this document.

CONSULTATION PROCESS

This method was developed in consultation with the Reef Credit Methodology Technical Working Group. Members of the working group include representatives from Industry, Qld Government, CSIRO, JCU, Griffith University, advocacy groups, NRM groups and subject matter experts. The method approach arose from discussion at two workshops, the first in September 2017 and the second in March 2018. This version of the Method incorporates feedback from the public consultation process and a peer review process, we thank Prof Ian Rutherford and Dr Tim Pearson for their detailed reviews.

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1 PROJECT DESCRIPTION

1.1 GOVERNING DOCUMENTS

Reef Credit Standard

Reef Credit Guide

1.2 REFERENCES

This methodology references the following policy documents and tools:

Reef 2050 Long Term Sustainability Plan

Reef 2050 Water Quality Improvement Plan 2017-2022

Paddock to Reef Integrated Monitoring, Modelling and Reporting Program 2018-22

Paddock to Reef Program Grazing Water Quality Risk Framework

Reef Trust Phase IV Gully and Streambank Toolbox

Agricultural ERA standard - Beef cattle grazing in the Great Barrier Reef catchment

Tool for the demonstration and assessment of additionality in VCS agriculture forestry and other land use project activities

Method of Accounting for Reduction in Sediment Run-off through Gully Rehabilitation Explanatory Statement

All other references are listed in section 7.

1.3 SUMMARY DESCRIPTION OF METHODOLOGY

This methodology (here onwards called the 'Method') describes the approach to achieve and quantify reductions in Fine Sediment (FS) from rural landscapes through gully rehabilitation, within the catchments of the Great Barrier Reef World Heritage Area (GBRWHA).

The core Method components are as follows:

1. Determine Eligibility: Sets the criteria for eligibility of projects under the methodology and the Reef Credit Standard.
2. Establish Project Boundaries and Scope: Provides guidelines for defining the geographical and temporal boundaries of the project, scope of activities and pollutant pools to be accounted for in the project.
3. Quantify Baseline FS Yields: Provides guidelines for determining FS yields for the baseline period.
4. Quantify Project FS Yield: Provides guidelines for determining project FS yield for the reporting period.
5. Quantify FS Yield Reduction: Details how to determine the reduction in FS resulting from project activities at end of catchment for the reporting period.

6. Quantify Reef Credit Units: Outlines the steps to determine the number of reef credits based on calculated pollutant reductions.
7. Project Monitoring: Provides guidelines for the implementation of a monitoring plan and identifies monitored parameters to assess the gully rehabilitation management strategy.
8. Project Reporting and Credit Issuance: Outlines requirements for reporting project abatement to the Reef Credit Secretariat and the application process for the issuance of Reef Credits.

1.4 PROJECT ACTIVITIES

The scope of this methodology includes the design and implementation of landscape rehabilitation measures to reduce the amount of sediment loss from gully erosion. Gully rehabilitation interventions may include:

- 1) Engineered rock-chute head control structures;
- 2) Engineered grade control structures;
- 3) Gully reshaping and capping with rock or mulch, or both;
- 4) Gully catchment drainage diversion structures (contour-banks and flow-spreaders);
- 5) Soil amelioration (i.e. with gypsum and other non-toxic chemical stabilisers);
- 6) Revegetation of treated gullies and gully catchments;
- 7) Grazing management in treated gullies and gully catchments
- 8) Other interventions undertaken to rehabilitate gullies which are fully described by the proponent in the ***Gully Rehabilitation and Management Plan***.

Project activity requirements and exclusions are outlined in section 2.3.

1.5 DEFINITIONS

Abatement – The reduction in fine sediment delivered to the GBRWHA as a result of interventions, calculated as the difference between projected yield and measured yield. Projected yield is determined by extrapolation of the trend observed in baseline sediment yield.

Additionality – as defined in the Reef Credit Standard Schedule 1.

Baseline period – a period of time immediately prior to project commencement that is either a) at least twenty (20) years where a linear growth trend is evident ; or b) the length of time since the gully commenced more recently than twenty (20) years, where it can be demonstrated that the gully is not a function of some land-use intensification or land-use practice implemented post 1 January 2017. Baseline period yield analysis (including provision for where full baseline period data is unavailable) is outlined in section 5.2.1.

Baseline sediment yield – The sediment yield determined over the baseline period. Baseline sediment yield must be reported as tonnes of fine sediment per annum (over water-year – 1 July – 30 June as defined by BOM) (t/a).

Crediting period – as defined in the Reef Credit Standard Schedule 1.

Crediting period length – 25 years

Fine sediment (FS) – particles < 20 µm, i.e. the clay and fine silt particle size fraction of the soil material judged to be the component most likely to impact the Reef. The proportion of fine sediment in a sample must be determined by particle size analysis undertaken by a certified laboratory.

Great Barrier Reef World Heritage Area (GBRWHA) – the marine and estuarine waters of the Great Barrier Reef from the low tide limit as defined by the Australian Government.

Gully – the defining characteristics of a gully (from Brooks et al. 2018) are:

- a) A persistent erosional landscape feature > 0.3m deep (from the surrounding residual land surface) that has multiple modes of expansion, but always typically including headward retreat into an otherwise un-dissected landscape since land use intensification.
- b) An active headscarp at the upslope limit, and sometimes the lateral margins of the gully. In some cases there may be a series of headscarps representing multiple incisional phases. A scalded area (i.e. an area stripped of its topsoil with degraded vegetative cover) may often fringe the upslope area of the headscarp.
- c) The land upslope of, or beyond, the gully may be a swamp or drainage depression in keeping with the incisional caveats above.
- d) Gullies are typically driven by ephemeral flows (i.e. associated with direct rainfall on the gully and in the gully catchment), although there are some alluvial gullies that can experience overbank flooding or backwatering from river channels to which they are connected (sensu Brooks et al., 2009; Shellberg et al., 2013a).
- e) Sediment transported from a gully is primarily sourced from within the erosion feature itself (i.e. it is dominated by an 'autochthonous' source).
- f) While gullies can have temporary depositional units within the gully floor, comprising materials predominantly eroded from within the feature (i.e. an 'autochthonous' source), they are not as spatially organised as the depositional features within a stream channel bed that will also have materials that can be identified as deriving from outside the feature location ('allochthonous' sources).
- g) There is a wide diversity of gullies, differentiated into two fundamental types: alluvial and hillslope (i.e. in residual soil or colluvium) gullies (as well as their possible intergrade/combination type). They are also found in a wide variety of soils, soil materials, and sediment types. The diversity of gullies is described in Brooks et al., 2018a.

Gully erosion – A persistent erosional landscape feature > 0.3m deep (from the surrounding residual land surface) that has multiple modes of expansion, but always including one or more instances of headward retreat into a landscape otherwise undissected by channels formed prior to land use intensification (from Brooks et al., 2018).

Gully Rehabilitation and Management Plan – Documented proposal for implementing project activities for the duration of the project period

Monitoring period – As defined in the Reef Credit Standard. For this method, the maximum monitoring period length is 5 years.

NRM Regions – The six Natural Resource Management Regions as defined by the Queensland Government that comprise the catchments that drain to the GBRWHA. In Cape York this is the

eastern draining catchments only. See <https://data.qld.gov.au/dataset/natural-resource-management-regional-boundaries-queensland>.

Project application – As defined in the Reef Credit Standard.

Project application date – As defined in the Reef Credit Standard.

Project commencement – As defined in the Reef Credit Standard.

Project end date – 25 years after project commencement and must be defined at project application.

Reef Credit – Quantified mass of nutrient, pesticide or sediment reduction under the Reef Credit Standard.

Reef Credit Accounting Zone (RCAZ) - the catchment area (including the active gully) upslope of the most downstream point of the gully(ies) being monitored for Reef Credits. See Section 3.4.

Reef Plan Water Quality Risk Framework for Grazing: see – https://www.reefplan.qld.gov.au/data/assets/pdf_file/0034/78865/grazing-water-quality-risk-framework-2017-22.pdf

Soil Material Analysis – Laboratory analysis for each main soil material layer identified including particle size analysis; major cations (**Ca, Mg, Na, K; and Al**) and cation exchange capacity (CEC); electrical conductivity (EC) and chlorides (Cl⁻) for salinity; the R1/R2 dispersion ratio, and bulk density.

Sodic soils: Normally expressed as the Exchangeable Sodium Percentage (ESP). A farmed soil with an ESP > 6 is generally regarded as being a sodic soil in Australia. The equivalent SAR (sodium adsorption ratio) threshold is > 3 (assuming a 1:5 soil:water extract).

1.6 DOCUMENTATION REQUIREMENTS

This section outlines the documentation required for project application and for issuance of Reef Credits.

1.6.1 PROJECT APPLICATION

When applying for a project, the project documentation must include a **Project Summary**. The Project Summary report must include:

- a. Names of project proponents and key partners with interest in the land parcel or enterprise.
- b. Project location.
- c. Summary description of gullies at the site, including:
 - i. Gully area spatial files including active portion; partially active areas (e.g. scalded but not gullied) and gully catchment area;
 - ii. Estimate of Baseline sediment yield and proportion of fine sediment (< 20 µm);
 - iii. Estimate of abatement potential over the crediting period.

The project application must also include a **Project Eligibility Report** outlining how the project complies with the Reef Credit Standard and the methodology eligibility requirements, and a **Gully Rehabilitation and Management Plan**.

1.6.2 PROJECT CREDITING

When applying for issuance of Reef Credits, project documentation must include:

1. Project Summary
2. Project Eligibility Report
3. Project Spatial Report
4. Gully Rehabilitation and Management Plan
5. Project Abatement Report
6. Monitoring Report
7. Evidentiary Documents

In addition to the requirements outlined in this methodology, the project proponent must address how the project adheres to all Reef Credit rules when applying this methodology (e.g. documentary evidence of land ownership or rights to land management over the project area).

2 PROJECT ELIGIBILITY

This section outlines the project eligibility criteria to be eligible to implement this methodology under the Reef Credit Standard. For each of the eligibility criteria, credible evidence in the form of analysis, documentation and/or third-party expert reports is required as part of the project application.

2.1 LOCATION

Proposed project area must be located within the boundaries of one of the following Great Barrier Reef NRM Regions:

1. Cape York Peninsula (eastern seaboard draining catchments only)
2. Wet Tropics
3. Burdekin
4. Mackay-Whitsunday
5. Fitzroy
6. Burnett-Mary

Note that the sediment reductions are credited based on the volume delivered to the Great Barrier Reef, sediment delivery ratio for the specific site location/s is determined in Equation 7.

2.2 PROJECT LAND CHARACTERISTICS

The project area must include land that:

- 1) has demonstrated gully erosion contributing to the sediment load entering the GBR during the **baseline period**;
- 2) contains gullies for which the current rate of gully erosion cannot be attributed to land management practices implemented post 1 January 2017;

- 3) will continue to contribute sediment to the GBR through gully erosion without intervention; and
- 4) the project proponent has the legal right to manage through implementation of project activities.

2.3 PROJECT ACTIVITIES

Project activities must:

- 1) Include landscape rehabilitation measures with the intent to reduce the amount of sediment loss from gully erosion; and
- 2) Be consistent with those described in the latest version of the Gully Toolbox from the Reef Trust phase IV – <https://www.environment.gov.au/system/files/pages/661595d3-749f-4aef-9c4a-6e4d245ecc59/files/reef-trust-phase-iv-toolbox.pdf> or otherwise provide a justification as to why the strategies in the Toolbox are not appropriate; and
- 3) Address mitigative actions and monitoring approach to prevent additional erosion. For example, infrastructure, such as linear features (roads, tracks, fences, firebreaks, and water points) must be located and constructed to prevent new erosion; and
- 4) Be consistent with the regional NRM Plan, or otherwise provide a justification as to why the regional NRM Plan should be over-ridden.
- 5) Be compliant with all Federal, State and Local Government regulations.
- 6) Include ongoing site maintenance and management of weeds and pest animals.

2.3.1 EXCLUSIONS

The following treatments are not eligible:

- 1) Reshaping of gullies in sodic soil materials (be they dispersive and/or slaking) without the application on the reshaped surface of either:
 - a. a stable topsoil; or
 - b. organic mulch; or
 - c. rock capping to an appropriate depth.

Note: This applies regardless of whether the sodic soils are treated with gypsum, seeded and/or have fertiliser added.

- 2) Gully plug dams, i.e. non-porous dam walls constructed to occupy the entire gully cross section.
- 3) Treatments that will increase the risk of downstream pollution.
- 4) High intensity grazing (cattle stomping) on sodic dispersive/slaking alluvial soil materials.
- 5) Any activity on the negative list outlined in the Reef Credit Standard or Method.

2.4 ADDITIONALITY

For a project to qualify as additional it must initially fulfil three requirements:

1. The law must not require the proposed project activity/ies;

2. The project activity/ies must be on the 'positive list' outlined in the Reef Credit Standard or Method; and
3. The project activity/ies must not be on the negative list outlined in the Reef Credit Standard or Method.

Project proponents must then demonstrate additionality by applying the Reef Credit Additionality Tool or if not available or applicable, the Tool for the demonstration and assessment of additionality in VCS agriculture forestry and other land use project activities. When applying the tool project proponents shall consider any activity eligible under this method as an "eligible AFOLU activity". Further project proponents should substitute "pollutant reductions" for "GHG emissions" and "Reef Credits" for "GHG Credits" and where appropriate "Reef Credit Standard" for "VCS".

2.5 LEAKAGE

Leakage may be considered to occur if there is an increase in erosion due to a move to higher risk land management practices on areas outside the project RCAZ but under the management of the same land manager that is responsible for implementation of project activities.

Project proponents must complete steps under 2.5.1 at the time of project application and each monitoring period to determine if there is a risk of project leakage and if so the appropriate procedure to account for it.

2.5.1 DETERMINE IF THE PROJECT MAY BE AT RISK OF LEAKAGE

Step 1. Determine if the land owner and/or land manager is responsible for the management of other agricultural land outside the project RCAZ(s) within the Great Barrier Reef Catchments.

If the answer is no, then the risk of project leakage is considered to be zero and the project proponent should proceed to Section 3. If answer is yes, then proceed to Step 2.

Step 2. The project proponent must determine the area of **land subject to leakage** under the control of the land manager that is not a part of the project RCAZs. This would include, for example, areas of land that would be under the same kind of agricultural enterprise as the areas within the RCAZs. Project proponents should follow the same procedures for mapping land subject to leakage as described in Section 3. Project Mapping.

Step 3. Once the area of land has been identified, the project proponent must determine the **credible risk** of the **land subject to leakage** shifting to a management scenario as a result of the project where a higher risk level of management practice is undertaken as defined in the **Reef Plan Water Quality Risk Framework** or equivalent framework in place at time of **project application date**.

Credible risk should be qualified as either likely or unlikely. If the risk is considered to be likely the proponent must prepare a leakage management plan detailing the steps that will be taken to ensure that project leakage does not occur. The area must be monitored for compliance with the leakage management plan and reported on at the end of each monitoring period.

Step 4. At the end of each monitoring period the project proponent must provide evidence that the steps outlined in the leakage management plan were implemented to mitigate the risk of leakage. If the leakage management plan was not implemented, then the project will not be eligible to receive

reef credits until the proponent can demonstrate that the risk of leakage has been mitigated by complying with the existing plan or implementing a revised plan.

3 PROJECT MAPPING

The project area boundaries must be delineated in accordance to the requirements of this section to include all RCAZ and exclusion areas within its extent.

For the purposes of stratification of the project area into Reef Credit Accounting Zones (RCAZ), the project proponent must use remotely-sensed and/or imagery products.

3.1 GEOSPATIAL CAPTURE

A project proponent may use any of the following sources of data to delineate the boundaries and/or features within the project area:

- a) Aerial LiDAR
- b) Terrestrial LiDAR
- c) UAV (drone)-derived photogrammetry
- d) Air-photo photogrammetry
- e) Ortho-rectified aerial photographs
- f) Ortho-rectified satellite imagery
- g) Cadastral database

The application of each method must comply with the accepted current best-practice requirements at the time of reporting, commensurate with the technique's resolution and "limit of detection" and its application within the monitoring framework.

3.2 FITNESS FOR PURPOSE

Prior to using a dataset, project proponents should assess the appropriateness of the dataset for the intended use, or its fitness-for-purpose against criteria that include:

- a) Age
- b) Scale
- c) Resolution
- d) Accuracy
- e) Signal-to-noise ratio – or "limit of detection"
- f) Classification, aggregation, generalisation systems (e.g. smoothing)
- g) Integrity of dataset

3.3 ACCURACY

For all projects under this method, the minimum requirement for spatial data is a horizontal accuracy of at least 0.5 m (95 % Confidence Interval (CI)) and for 3D data +/- 0.3 m vertical accuracy (95 % CI). Historical airphoto analyses should aim to achieve +/- 1.0m accuracy.

For post-treatment spatial monitoring data the required horizontal accuracy is +/- 0.1 m (95 % CI) and a vertical accuracy of +/- 0.1 m (95 % CI).

3.4 REEF CREDIT ACCOUNTING ZONES

For accounting purposes, it is necessary to place interventions within a Reef Credit Accounting Zone (RCAZ), with credits from each zone being claimed separately. As a guide, a RCAZ will ideally comprise and encompass a single gully and its catchment, including all the monitoring points either in or associated with it. Where interventions are undertaken in the gully catchment (e.g. fencing out livestock) then the catchment (or part thereof) will be included within the RCAZ. Where gullies are clustered together such that their catchments are adjoining, then the proponent may choose to treat the entire cluster as a single RCAZ, providing the output from the cumulative gully area can be monitored and has a baseline yield determined for the whole area.

4 GULLY REHABILITATION & MANAGEMENT PLAN

A Gully Rehabilitation and Management Plan ('The Plan') outlining the project design, implementation & monitoring must be submitted with the project application. Any updates to The Plan must be provided with the accompanying Monitoring Report.

4.1 GULLY REHABILITATION & MANAGEMENT PLAN CERTIFICATION

A Gully Rehabilitation and Management Plan must be developed in collaboration and signed off by a suitably qualified person with the following qualifications and/or experience:

- 1) Professional training in the field of geomorphology and/or soil conservation; and/or
- 2) Is certified by one of the following professional bodies:
 - a) EIANZ CEnvP Specialist Geomorphologist (Professional Geomorphologist certification developed by the Australian and New Zealand Geomorphology Group and EIANZ).
 - b) Certified Practicing Soil Scientist (CPSS, Australian Soil Science Society)
 - c) Certified Practicing Erosion and Sediment Control (CPESC, International Erosion Control Association); and/or
- 3) A person approved as suitably trained by the Reef Credit Secretariat.

4.2 GULLY REHABILITATION & MANAGEMENT PLAN PROJECT DESIGN

The Plan must include the following project design documentation:

- 1) The gully rehabilitation project plan which is appropriate to the gully type. The Plan will identify which portions of the site require a design that requires an engineering design signed off by a RPEQ. If it is considered that a design does *not* require sign off by an Engineer, justification as to why not will need to be provided. Activities requiring an engineering design include:
 - a) Rock chutes
 - b) Fully or partially reshaped gullies with major cut-and-fill and rock armouring
 - c) Major rock grade control structures
- 2) A project area map with description and location of each gully and gully sub-unit to be rehabilitated. These will typically be synonymous with the RCAZ.
- 3) The contributing catchments for each gully/gully complex (as per Brooks et al., 2018a).
- 4) Site stock management plan(s).

- 5) A site access plan (roads, tracks etc and a strategy for minimising any impact during construction, and a plan for post-construction rehabilitation).
- 6) A maintenance plan (proactive and reactive). Proactive maintenance must include: fence maintenance, plans for weed and feral animal management within the gully exclusion area; fire management. Reactive management must include a strategy to deal with repairs to structures in a timely fashion.
- 7) A whole-of-property land management plan that includes:
 - a) identification of enterprise and project area map indicating agricultural management zones;
 - b) identification of all existing and new fence lines relevant to the rehabilitation site(s) to ensure appropriate stock management into the future;
 - c) a summary report on the grazing management strategy that will be employed on the remainder of the property, specifically addressing leakage.
- 8) A Workplace Health and Safety Plan for the construction phase, and the ongoing monitoring phase must be in place prior to the commencement of works.
- 9) Locations of any new or existing quarries that will be developed/accessed for the project. If these require permits, evidence of approval to be supplied.
- 10) Evidence for permit approval for working in designated streams and/or for any unavoidable tree clearing.
- 11) A heritage/cultural assessment and associated site clearance report.

4.3 GULLY REHABILITATION & MANAGEMENT PLAN SOIL ANALYSIS

The Plan must include a section outlining soil material analysis for the purposes of calculating baseline and projected fine sediment yields, as well as to enable incorporation of geotechnical considerations into engineering designs, in accordance with the following criteria:

- 1) Gully soil material analysis comprising a minimum of three (3) soil material exposure profile descriptions and associated soil material analyses at the major soil material units within each gully. A minimum of three (3) samples must be collected and analysed for each soil material exposure profile, and more where there is more complex stratigraphy and/or vertical soil material differentiation, ensuring all soil material variants are adequately sampled. The boundaries of the major soil material units must be mapped so that the relative volume of the different soil units can be estimated, and their relative contribution to the historical and projected sediment yields assessed. Soil material analyses must include:
 - a) Particle size analysis (using Mastersizer method, or similar, with mechanical dispersion only; or hydrometer method – see Appendix 1: Soil Sampling and Laboratory Analysis)
 - b) Standard soil physicochemical analysis (major cations; CEC, pH, ESP, and bulk density) as described in Appendix 1.
 - c) If topsoil is being used from the site and applied as a surface growth medium it must comply with the requirements for suitable topsoil material used in mine land rehabilitation (see Appendix 1: Soil Sampling and Laboratory Analysis).
- 2) Soil material amelioration treatments, including justification for the chemical application rates as a function of the soil material analyses outlined above in (1).
- 3) Soil cores must be obtained within the land into which the gully is projected to grow during the crediting period (based on the project gully growth rate as per 5.2.1) to demonstrate that the soil materials are similar to those found in the gully walls. A minimum of six (6) cores must be collected within three (3) transects, with one sample per transect at the furthest extremity of the maximum projected growth distance, and one at half the distance, to a depth of the

projected gully floor. Sample selection and analysis will follow the same approach as in 4.3.1. In some situations fewer cores may be required (e.g. for a large linear gully), however, pre-approval to collect less samples is required from the Secretariat under this scenario.

4.4 GULLY REHABILITATION & MANAGEMENT PLAN MONITORING

The Plan must include a project monitoring proposal. This must include a combination of some form of topographic monitoring, coupled with water quality and quantity monitoring that will enable sediment loads to be determined for the post intervention period. The monitoring plan must include:

- 1) the location of all monitoring points;
- 2) topographic monitoring that includes surveys using one of the following techniques:
 - a) Repeat high-resolution aerial LiDAR survey (minimum 50 points/m²)
 - b) Repeat terrestrial LiDAR survey (minimum 500 points/m²) over at least 10 % of the treated gully area, encompassing representative sections of all residual, erosional, and depositional surfaces within the gully system (see Brooks et al 2018a for full description), if they have been retained, or reshaped areas that were formerly occupied by said features if wholesale reshaping has been conducted. Active zones to be delineated using the methods detailed in Brooks et al., 2020b.
 - c) Hand-held LiDAR surveys (e.g. Zeb-Revo) (minimum 500 points/m²) over at least 10 % of the treated gully area, encompassing representative sections of all residual, erosional, and depositional surfaces within the gully system (see Brooks et al., 2018a for full description) if they have been retained, or reshaped areas that were formerly occupied by said features if wholesale reshaping has been conducted.
 - d) Other high intensity survey methods that enables creation of a digital elevation model of equivalent precision and accuracy to that achievable using methods described in a-c above.
- 3) Water quality/quantity monitoring (minimum requirements are outlined below, and are based on the need for redundancy in the difficult conditions prevailing in many gullies as per Brooks et al., 2020a):
 - a) Tipping bucket rain gauge within a 500 m radius of any monitored gully (closer if possible).
 - b) At each gully outlet a monitoring station including:
 - i) Rising-stage samplers (three (3) minimum assuming relatively narrow gully outlet (< 2m); 2 sets of 3 for wider outlet channels); and
 - ii) Stage recorder (pressure-transducer type with a 5-minute minimum sampling interval); and
 - iii) A velocity meter (doppler type) or in the absence of a velocity meter – manually measured flow velocity data such that a flow rating curve can be derived (according to best practice methods) across the typical flow stage likely to be encountered in 80 % of the flows experienced within the gully; alternatively discharge may be determined by means of an installed hydraulic structure (flume or weir). In most situations this is likely to be the most practicable means of measuring discharge.
 - iv) A PASS sampler (time-weighted continuous sampler, after Doriean et al., 2019) or similar; and
 - v) A time-lapse camera; or
 - vi) Other instrument array that can be shown to provide data equivalent to, or better than, that obtainable with the instrumentation described in i-v above.
 - vii) Other instrument array(s) which will be subject to the discounts described below.

- c) For gullies with a treated area > 1 ha an autosampler must be added to the array of equipment outlined above in (3)b).
- 4) estimates of uncertainty associated with each load measurement (i.e. the measurement based on topographic monitoring and the measurement based on water quality/quantity monitoring);
- 5) the anticipated timing of monitoring activities. Note that it is anticipated that the timing of monitoring activities will be variable through the post-intervention period, such that water quantity/quality monitoring will be more frequent in the early years, for example every year for the first 3 years, declining in frequency thereafter; topographic monitoring will need to occur immediately after intervention and then at intervals of between 5 to 10 years thereafter. Where significant repair/maintenance works are undertaken additional topographic surveys should be done prior to repair. An example monitoring schedule is provided, noting that this should be adapted for each individual circumstance:

Timing	Water Quality Monitoring	Topographic Survey
Year 1	✓	✓
Year 2	✓	
Year 3	✓	
Year 5	✓	✓
After damaging storm		✓
Year 10	✓	
Year 15	✓	✓
Year 20		
Year 25	✓	✓

5 PROJECT ACCOUNTING

This section outlines the steps which must be followed to determine project FS reductions as a result of project activities.

5.1 RELEVANT SEDIMENT POOLS

For this section, the relevant sediment fraction is the fine silt and clay fraction (< 20 µm) delivered to the GBRWHA (see definition of 'fine sediment').

5.2 BASELINE SCENARIO

This section outlines the procedure to determine the sediment yield for the baseline period.

5.2.1 BASELINE FINE SEDIMENT YIELD ANALYSIS

Project proponents must complete a baseline sediment yield analysis for each gully being rehabilitated.

Baseline sediment yield analysis must include historical air-photo reconstruction of the gully expansion and may also include direct monitoring, or LiDAR change-detection, over more recent

years. Photo (and LiDAR if available) time series should include at least 4 data points, and proponents should make all reasonable efforts to obtain the entire photo record held by QLD Government.

A longer historical air-photo time series (> 40 years), having at least 5 time periods, must be used where gully volume is observed to have increased in a non-linear fashion. Furthermore, a non-linear yield can only be used where the fitted model used for extrapolation has a coefficient of determination (R^2) value greater than 0.6. Finally, regardless of the actual determined non-linear growth rates, a ceiling is set at twice the yield at the beginning of the project, such that the yield used for any period within the 25 year abatement period can never be more than twice that projected for year 1. The extrapolation from a non-linear trend to determine projected erosion rates requires this increased data and extra constraint given the greater potential for non-linear trends to amplify small discrepancies between model and actuality.

Shorter term baselines (of at least 5 years) derived from monitored data are acceptable if longer term rates cannot be determined from historical aerial photography, particularly for smaller gullies obscured by vegetation.

Project proponents must specify how the two-dimensional (2D) change data has been transformed into three-dimensional (3D) volumetric change data, including detailed survey data of the remnant surfaces that have been used to reconstruct the prior gully volume. The 2D to 3D data transformation must be fit for purpose and done in accordance with industry standard and/or best practice. Baseline sediment yield should be reported as tonnes of fine sediment per annum.

An example of the method can be found in Stout et. al. (2019).

5.2.2 CALCULATION OF BASELINE FINE SEDIMENT YIELD

Project proponents must apply the following equation to calculate baseline fine sediment yield for each gully/gully system for which credits are being claimed:

$$FSL_b = \sum \frac{\Delta V_{b,i} * BD_i * FS\%_i}{t_b}$$

EQUATION 1

where:

FSL_b = fine sediment yield in baseline period, b , in tonnes year⁻¹;

$\Delta V_{b,i}$ = change in gully volume in RCAZ, i , during the baseline period, b ;

- If a non-linear trend in volume increase during the baseline period is being claimed, a full report justifying the non-linear trend must be included in project application;
- Gully volume is to be determined by comparing the present day surface with a constructed pre-erosion surface, built via three dimensional interpolation amongst residual surfaces (see Stout et al., 2019);
- Detailed field verification of the residual surface levels used to reconstruct the former 3D land surface prior to gullying must be provided and audited in the field.

BD_i = sediment field bulk density of RCAZ, i , (using standard field sampling and laboratory methods as described in Appendix 1); the proponent may use standard values of 1.6 g/cm³ for all other material as an alternative to taking field measurements.

$FS \%_i$ = proportion of gully source sediment in RCAZ, i , that is < 20 µm. (This requires particle size analysis as outlined in Section 4.3;

t_b = baseline period in years.

5.2.3 DETERMINE MEAN ANNUAL RAINFALL DURING BASELINE PERIOD

To determine the Mean Annual rainfall for the site for the baseline period based on the relevant grid cell in the BOM 0.05 degree (~5km) grid data apply:

$$Rf_{avsb} = \frac{Rf_{TSb}}{t_b}$$

EQUATION 2

where:

Rf_{avsb} = mean annual rainfall, in mm year⁻¹, for site, S , during baseline period, b ;

Rf_{TSb} = total rainfall, in mm, for site, S , for baseline period, b ;

t_b = baseline period in years

Note for the purposes of calculating total rainfall, the Baseline Period begins on the 1st of July in the first year of the Baseline Period and ends on the 30th of June in the last year of the Baseline Period.

5.3 PROJECT MONITORING PERIOD CALCULATIONS

The methodology estimates fine sediment yield (in accordance with Shellberg et al. 2013a) based on empirical measurements of rainfall and water runoff, sediment production at gully head scarp modelled from retreat rates and change in gully area over time, and sediment transport loads using a combination of empirical data and modelling (i.e. empirical modelling). This section outlines the procedure to determine the sediment yield during the current project monitoring period.

5.3.1 PROJECT SEDIMENT YIELD MEASUREMENT

Project proponents must measure the fine sediment yield (**FS**) from each RCAZ, i , in tonnes.

The proponent must use a multiple lines of evidence approach whereby a best estimate of the sediment yield over the monitoring period is arrived at by consideration in parallel of both topographic measurement and the water quality/quantity monitoring. The proponent must describe how the results from each independent approach are consistent with each other, or provide detailed description of, and analysis of the reasons for, any discrepancies.

Topographic surveys must be undertaken prior to and immediately after any ongoing maintenance undertaken during the monitoring period.

Over the first ~5 years, sediment yields will be determined from water quality/quantity monitoring alone, as the estimate based on topographic monitoring will not be available until after the first repeat topographic survey is conducted in year 5 (see Table in Section 4.4.5). As such, these calculations may need to be adjusted once they can be reconciled against the topographic survey based estimates of sediment yield.

5.3.2 CALCULATION OF FINE SEDIMENT YIELD FOR PROJECT MONITORING PERIOD

Determine the total Fine Sediment Export for the current project monitoring period using the following equation:

$$FSE_r = \sum FS_i$$

EQUATION 3

where:

FSE_r = Total fine sediment export for the current project monitoring period, r ;

FS_i = Measured fine sediment yield from RCAZ, i , in tonnes as determined in section 5.3.1

5.3.3 DETERMINE MEAN ANNUAL RAINFALL FOR MONITORING PERIOD

Determine the mean annual rainfall for the site for the current project monitoring period based on on-site tipping bucket rain gauge data. Use:

$$Rf_{avSr} = \frac{Rf_{TSr}}{t_r}$$

EQUATION 4

where:

Rf_{avSr} = mean annual rainfall, in mm year⁻¹, for site, S , during the project monitoring period, r ;

Rf_{TSr} = total rainfall, in mm, for site, S , for current project monitoring period, r ;

t_r = monitoring period in years.

Note, as for Section 5.2.3, the Crediting Period should align with the Water Year (1st July – 30th June)

5.3.4 PROJECT RAINFALL ADJUSTMENT FACTOR

Determine the Rainfall Adjustment factor (A_{Rf}). Use:

$$A_{Rf} = \frac{Rf_{avSr}}{Rf_{avSb}}$$

EQUATION 5

where:

A_{Rf} = rainfall adjustment factor;

Rf_{avSr} = mean annual rainfall, in mm year⁻¹, for site, S , during the project monitoring period, r , as determined in Equation 4;

Rf_{avSb} = mean annual rainfall, in mm year⁻¹, for site, S , during baseline period, b , as determined in Equation 2.

5.4 CALCULATE CHANGE IN FINE SEDIMENT YIELD

The following equation is used to determine the change in fine sediment yield resulting from project activities (i.e. the abatement):

$$\Delta FS_r = (FSL_b \times t_r \times A_{Rf}) - FSE_r$$

EQUATION 6

where:

ΔFS_r = the change in fine sediment yield, in tonnes, for the project monitoring period, r ;

FSL_b = baseline fine sediment load in tonnes year⁻¹ as determined using Equation 2;

t_r = monitoring period in years;

A_{Rf} = rainfall adjustment factor as determined in Equation 5;

FSE_r = Fine sediment export, in tonnes, for the current project monitoring period, r , as determined by Equation 3.

5.5 CHANGE IN FINE SEDIMENT ENTERING THE GREAT BARRIER REEF

The reduction achieved during the monitoring period in fine sediment exports transported to the end of catchment, must be calculated by applying the following equation:

$$FSA_r = \Delta FS_r * SDR$$

EQUATION 7

where:

FSA_r = fine sediment abatement, in tonnes, exported to the Great Barrier Reef for monitoring period, r .

ΔFS_r = the change in fine sediment yield, in tonnes, or the project monitoring period, r , calculated in accordance with Equation 6;

SDR = the sediment delivery ratio or contribution to export, which reflects the proportion of FS that is transported to the GBR based on project location¹.

In order to be eligible for Reef Credits, FSA_r must be greater than zero.

¹ Contribution to export is a dataset generated by the Queensland Government. Please refer to the Reef Credit website for information on accessing the data.

5.6 CALCULATION OF MONITORING PERIOD REEF CREDITS

To determine the quantity of Reef Credits generated by project activities during the Crediting Period, apply the following equation:

$$RC_r = (FSA_r \times C_f) + RC_{r-1}$$

EQUATION 8

where:

RC_r = Reef Credits generated in monitoring period, r ;

FSA_r = fine sediment abatement, in tonnes, exported to the Great Barrier Reef for monitoring period, r .

C_f = the correction factor to convert a fine sediment reduction to an equivalent Reef Credit as stated in the Reef Credit Standard.

RC_{r-1} = negative balance of Reef Credits brought forward from previous monitoring period (if applicable).

If RC_r is zero or less than zero, then no credits are issued for the monitoring period.

5.6.1 WATER QUALITY MONITORING REQUIREMENTS FOR CALCULATION OF REEF CREDITS

For Reef Credits to be claimed in any one monitoring period at least three (3) separate flow events must be sampled for each water-year, including a minimum of three (3) samples per event at a range of discharges in accordance with the requirements of Section 4.4 of this methodology.

Sediment yields across a water-year will need to be determined either through the construction of a one-dimensional (1D) flow model (HEC-RAS V 5.0.6 or equivalent), calibrated with the monitored fine sediment concentration data, or through the construction of a calibrated 'at-a-station' discharge rating curve (see Shellberg et al., 2013a).

If claiming credits in the **first year** post-treatment, at least five (5) separate events must be sampled with a minimum of three (3) samples per event across a range of discharges. In the event that insufficient events occur, or insufficient samples are successfully collected in a single water-year, the data from one year can be accrued to the next year/monitoring period.

For the purposes of monitoring, an event is defined by reference to the rainfall record, where an event is defined as a peak on the rainfall time series separated from other peaks by 24 hours or more of rain <5mm/day and where the total event rainfall exceeds 50 mm.

A pressure transducer stage recorder must be installed at each water quality sampling station to both keep a record of the gully discharge hydrograph so that the sample points can be identified on the hydrograph, as well as determining whether the samples have been impacted by backwatering from downstream. No samples can be used that are influenced by backwatering (see Brooks et al., 2020b).

5.7 UNCERTAINTY

Estimates of monitoring period sediment savings at the gully calculated in accordance with this methodology are based on direct site measurements/surveys using a multiple lines of evidence approach. The relative uncertainty associated with interim sediment yield estimates made in years when only one line of evidence is available (e.g. in the first five years or so before repeat topographic data is available) will be higher than those associated with estimates based on the multiple lines of evidence approach. However, the interim sediment yield estimates will need to be adjusted (along with any reef credits claimed) if/when the totality of data available after repeat topographic survey suggests that the estimates were inaccurate.

If the approach outlined in this method is followed then no additional confidence deduction is required to account for uncertainty.

6 MONITORING AND RECORD-KEEPING REQUIREMENTS

This section sets out monitoring and record-keeping requirements for a sediment reduction through gully remediation project that is a registered Reef Credit project.

A Monitoring Report must be submitted as a requirement for each monitoring period. The project proponent must monitor the RCAZs of the project for compliance with the Gully Rehabilitation and Management Plan (section 4.4) and document land management activities and any unplanned disturbances to project area.

The Monitoring Report must also include all spatial data, a change detection analysis and a detailed report on the documentary evidence of water quality monitoring during the reporting period including, but not limited to:

- a detailed description of the monitoring setup;
- all laboratory results;
- photographs of equipment setup;
- all field monitoring data and analysis, showing the time of sampling on the flow hydrographs;
- any digital elevation model (DEM) of difference data for the monitoring period, including the ground control data and the spatial tolerances;
- time-lapse camera imagery of the monitoring site.

Records must be kept in relation to each of the requirements for remotely-sensed imagery set out in Section 3, including but not limited to:

- i. The defined gully being treated;
- ii. Historical airphoto rectification points;
- iii. Shapefile polygons of the gully areas defined for each historical time slice;
- iv. The location of monitoring points;
- v. The location of soil sampling points and associated soil mapping indicating the representative nature of the soil materials sampled under the Method;
- vi. The field evidence used for the 3D reconstruction of the prior gully form (from which historical sediment yields have been calculated), i.e. the identification of the remnant surfaces used in the field for reconstructing the 3D land surface prior to gullying.

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8 APPENDICES

8.1 APPENDIX 1: SOIL SAMPLING AND LABORATORY ANALYSIS

8.1.1 FIELD ASSESSMENT

8.1.1.1 DEVELOP A SIMPLE SAMPLING PLAN

A simple sampling plan should aim to sample all the distinct soil material layers that have been identified. It should also include a check on the spatial variation of these layers if the gully site being investigated is large or complex, or both.

The most appropriate observation and sampling plan depends on:

- the type of gully (or gully system);
- the size of gully (or gully system);
- the perceived spatial complexity and number of the soil material layers;
- the time available for field assessment.

The number of samples to be taken for laboratory analysis will depend upon:

- the spatial complexity and number of soil materials layers;
- the scale of rehabilitation works being considered;
- the budget available.

8.1.1.2 SELECT SOIL MATERIAL OBSERVATION POINTS (OPs)

The number of observations of the soil materials to be recorded will depend on the size of the Gully or Gully (Sub-)System being investigated. See '*Sampling Intensity*' below.

- Observation Points should be selected where:
 - a full sequence of layers can be clearly seen and accessed, especially in the active erosion zones;
 - there is evidence of most active erosion of heads and walls;
 - there is the greatest depth of exposure through the soil materials.

8.1.1.3 SAMPLING INTENSITY

At least three (3) OPs will be required to characterise the soil materials in any gully or gully system. It is recommended that at least three (3) OPs usually be used to sample the soil material layers for any gully site investigation for rehabilitation management.

At least three (3) OPs for observing, recording and sampling for laboratory analysis will be required, depending on the size of the gully or gully system being investigated. Further soil material OPs will be required to describe the layer variation and to map the soil material pattern over the whole gully area.

For small, isolated, gullies, up to 0.75 ha, two OPs for observing, recording and sampling soil material layers for laboratory analysis may be sufficient. Further soil material OPs (as 'Check Sites') may be required to describe the layer variation and to map the soil material pattern.

A rule of thumb should be **no less than three (3) OPs per hectare** for recording soil materials, with **four (4) OPs per hectare** for more complex sites. All these specified OPs are 'Sample Sites' and should

be used for sampling for laboratory analysis. Further soil material OPs (as Check Sites) may be required to describe the layer variation and to map the soil material pattern.

Multiple soil material systems and Stratified systems may need further OPs. Choose further Sample Sites and Check Sites if soil material complexity demands it.

8.1.1.4 SITE DESCRIPTIONS

Soil site descriptions should be undertaken with the provided field data recording protocols which are in accordance with the *Australian Soil Survey and Land Survey Field Handbook 3rd edition* (NCST, 2009), where relevant. Soil material site descriptions include a soil material exposure profile description and site observations of erosion features and processes at each location.

Soil material profile descriptions include (where applicable) the following details (see Table: Soil Sampling Methods for sampling procedures):

- Layer depth and thickness, and designation;
- Dominant colour;
- Presence and colour of mottles;
- Fabric (texture/structure);
- Segregations (nodules or soft precipitations, e.g. calcium carbonate);
- Gravel/rock inclusions (isolated or as beds/lines);
- Field tests (pH, CaCO₃, aggregate stability).

8.1.1.5 SOIL MATERIAL SAMPLING

- Gully exposures should be cut back by 0.2 m wherever possible by spade or pick.
- Samples should be taken from every main layer identified, starting at the top where sample material should be taken from the surface to 0.1m below the surface. It is preferable to sample the top layers (up to 0.1 m) by soil auger about 1 m back from the gully edge.
- **At least three (3) samples** down the exposure profile will be required to characterise the soil materials at any specific site, even if there are fewer than three layers.
- Bulk density samples also need to be taken from each sample site (see table below).

8.1.1.6 SOIL MATERIAL SAMPLING METHODS

TABLE 1. THIS TABLE OUTLINES THE SOIL MATERIAL SAMPLING METHODS

Activity	Details
Soil Material OP locations	Sampling locations are recorded with a handheld Global Positioning System (GPS) unit with an accuracy of generally +/-4 m.
Soil Material observation	Appropriate gully exposure cut back by 0.20 m where possible by spade or pick to access fresh, unexposed material. Soil hand-auger can be used to gain fresh material from the top 1.0 m, 1 m back from the gully wall.
Abandonment	Any soil hand-auger holes on the land surface must be backfilled to the existing natural ground level using soil material retrieved during soil coring and surrounding material.
Soil description	Soil material characteristics are described on provided field data sheets. These aid the description of the land surface condition in the vicinity, and the characteristics of each soil material layer in the gully exposure at each OP.
Field tests	Field tests are also conducted on each layer at each OP. Field pH

Activity	Details
	<p>Soil material aggregate stability test for slaking and dispersion. Status recorded a) at immersion and b) after 10 mins: 0-nil; 1-some; 2-obvious; 3-total.</p> <p>1 M HCl drops on nodules to test for calcium carbonate (CaCO_3).</p> <p>Rate of reaction</p> <p>No audible or visible effervescence: non-calcareous</p> <p>Audible and slightly visible effervescence: moderately calcareous</p> <p>Moderate to strong visible effervescence: highly calcareous</p>
Soil material sampling	<p>Soil material samples, approximately 500 g in weight, should be obtained directly from the exposure or the auger from each evident layer between clear boundaries. If only two layers or one layer can be discerned then at least three samples must be taken down the profile: at 0.20 m from the surface, 0.20 m from the bottom, and one from the approximate middle.</p> <p>Topsoil / top layer samples (5-10) should be gained from at least three different locations within the vicinity of the OP and bulked together (composite sample).</p> <p>Discrete soil material samples must be collected and placed into resealable plastic bags and appropriately labelled for dispatch to the laboratory.</p>
Labelling	<p>Sample bags should be labelled with the site name or code and site OP number; the layer ID; the sampling depth; the date of collection; and the unique ID for the sample. This data should also be recorded on a separate label and inserted in the sample bag with the soil material sample.</p> <p>For instance, a sample collected at OP 'DEL S01' at a depth of 0.10 m below the surface in layer 'DEL_01' is labelled as follows: DEL S01; DEL_01; 0.10 m; dd/mm/yy, 09886 (unique ID number)</p>
Dispatch	<p>Samples should be stored out of direct sunlight and transported for analysis. Topsoils requiring nitrogen and organic carbon analysis should be kept cool and dispatched to the laboratory as soon as possible.</p>
Bulk density sampling	<p>Samples for bulk density (BD) should be taken using a BD ring or square tin, open both ends, of known volume. The ring or tin should be pushed/eased into a fresh exposure (at least 0.2 m from the exposed face) and sunk into place by digging around the ring/tin so that the coherent, undisturbed soil material fills the ring/tin and extends beyond it for at least 5 mm. The back end of the ring/tin should then be dug out with the soil material still extending well beyond the margins of the tin.</p> <p>Once extracted, the excess soil material should be carefully shaved off both ends until flush, flat with the ring/tin edges. The enclosed soil material can then be fully emptied into a zip-lock sandwich bag, with any soil material adhering still to the inside of the ring/tin also included in the bag. The bag can then be suitably labelled as above and despatched for lab analysis.</p>

8.1.2 LABORATORY ANALYSIS

All soil materials samples should be analysed in an ASPAC/NATA accredited laboratory.

Any soil material management recommendations and amelioration rates are derived from this data.

Laboratory certificates for all sample sites analysed should be provided in the reporting as an appendix.

For consistency purposes it is recommended that the laboratory use the methods described in Rayment and Lyons (2010) which are a common standard Australia-wide. The Rayment and Lyons analytical code is provided after each analyte presented below.

- C = carbon
- Ca/Mg = Calcium: Magnesium ratio
- EAT = Emerson's Aggregate Test

- EC = electrical conductivity
- ESP = exchangeable sodium percentage
- N = nitrogen
- OM = organic matter
- PSD = particle size distribution
- P = phosphorus
- **Topsoil / top layer**
(sample depth 0.0 – 0.2 m and bulked/composite from at least three locations in the vicinity)
 - pH (1:5 water) [4A1]
 - EC (1:5 water) [3A1]
 - Cl (1:5 water) [5A2b]
 - Exchangeable cations (Ca, Mg, Na, K,) (aqueous NH₄Cl [15A1] or if soil pH > 7.3[alcoholic NH₄Cl 15C1])
 - Exchangeable Al (15G1)
 - Total C (6B3) and OM (6G1)
 - PSD: < 2 µm (clay), 2 – 20 µm (silt), 20 – 50 µm (fine-medium sand), 0.05 – 2 mm (coarse sand) [Mastersizer or Hydrometer method for fines];
 - Colwell P (for alkaline soils) [9B2]
 - Total N [7A1, 7A5]
 - Total CEC [15J1]
 - ESP [15N1]
 - Ca/Mg [15M1]
 - Bulk density [oven-dry (105°) wt. / BD ring volume]
 - Mechanical dispersion:
 - EAT [Emerson, 1967; Australian Standard, 1980]
 - Dispersion ratio (R₁, R₂) [Baker & Eldershaw, 1993]
- **Subsoil / lower layers**
(at nominated depths within the layers)
 - pH (1:5 water) [4A1]
 - EC (1:5 water) [3A1]
 - Cl (1:5 water) [5A2b]
 - Exchangeable cations (Ca, Mg, Na, K,) (NH₄Cl [15C1] or ammonium acetate [15D3] depending on pH and EC of sample)
 - Exchangeable Al (15G1)
 - PSD: < 2 µm (clay), 2 – 20 µm (silt), 20 – 50 µm (fine-medium sand), 0.05 – 2 mm (coarse sand)) [Mastersizer or Hydrometer method for fines];
 - Total CEC [15J1]
 - ESP [15N1]
 - Ca/Mg [15M1]
 - Bulk density [oven-dry (105°) wt. / BD ring volume]
 - Mechanical dispersion:
 - EAT [Emerson, 1967; Australian Standard, 1980]
 - Dispersion ratio (R₁, R₂) [Baker & Eldershaw, 1993]

8.1.3 TOPSOIL

Determination of suitable soil to conserve for later use in gully rehabilitation can be conducted in accordance with modification of that proposed by Elliot and Veness (1981) with respect to mined land materials. The approach involves the assessment of soil materials based on their physical and chemical parameters. The key parameters are presented in Table 2. Topsoil / top dressing suitability criteria.

TABLE 2. TOPSOIL / TOP DRESSING SUITABILITY CRITERIA

Criterion	Desirable state or range
Structure Grade	Some structure evident (i.e. aggregates, peds)
Coherence	Coherent when wet and dry
Mottling	Absent
Texture	Finer than sandy loam
Gravel and Sand Content	< 50%
pH	5 to 8
Salinity (EC)	< 1.5 dS/m
Sodic Limit (ESP)	6 %

8.1.4 REFERENCES

Australian Standard, 2006 Determination of Emerson class number of a soil. In 'Methods of testing soils for engineering purposes. Method 3.8.1: Soil classification tests - Dispersion'. *Standards Association of Australia No. AS 1289.3.8.1-2006*.

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Attachment F – Declaration of Accuracy and Risk

Declaration of Accuracy

I declare that to the best of my knowledge, all the information contained in, or accompanying this document is complete, current and correct.

I am duly authorised to sign this declaration on behalf of the proponent/approval holder. I am aware that:

Section 490 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) where the person knows the information or document is false or misleading.

I acknowledge that the above offences are punishable on conviction by imprisonment, a fine or both.

Signed:



Paul Doyle
Manager Sustainability and External Policy
North Queensland Bulk Ports

EPBC Referral Number: EPBC 2012/6538

**Cairns Shipping Development Project
Offsets Management Plan**

08 December 2021

The text of this declaration must not be altered in any way. It must be signed once a final draft has been agreed between the Department and the approval holder as ready to go before the delegate for approval or refusal.

Risk Analysis

This Strategy has considered the risks that may inhibit achieving the completion criteria for the offset site, including risks that may be wholly outside the approval holder's control. The risks have been assessed against the Risk Matrix below, supplied by the Department of Agriculture, Water, and the Environment. The risk analysis:

- Identifies events and threats that will, may, or are likely to impact the attainment of the completion criteria
- Assesses the likelihood and consequences of those events and threats eventuating, both before and after risk controls are applied, and assesses residual risk levels
- Identifies levels of uncertainty in mitigating the risks, with appropriate trigger criteria for corrective actions should risks and threats eventuate. The proposed corrective actions will be detailed in full in the Offset Management Plan

RISK MATRIX						
<u>Likelihood (L): A qualitative measure of likelihood how likely is it that this event/circumstances will occur both before and after management activities are implemented</u>						
Highly likely	Is expected to occur in most circumstances					
Likely	Will probably occur during the life of the project					
Possible	Might occur during the life of the project					
Unlikely	Could occur but considered unlikely or doubtful					
Rare	May occur in exceptional circumstances					
<u>Consequence (C): Qualitative measure of what will be the consequence/result if the issue does occur</u>						
Minor	Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving strategy objectives, implementing low-cost, well-characterised corrective actions)					
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short-term delays to achieving strategy objectives, implementing well-characterised, high cost/effort corrective actions)					
High	Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions)					
Major	Major loss of environmental amenity and real danger of continuing (e.g. strategy objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies)					
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage (e.g. strategy objectives are unable to be achieved, with no evidenced mitigation strategies)					
Final Risk Rating (R): A function of multiplying <u>Likelihood (L)</u> and <u>Consequence (C)</u>						
		Consequence				
Likelihood		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Risk Analysis Table

This Risk Table considers the risks that may prevent the offset succeeding. It must be included in all Offset Strategies, in this format. The format must not be modified, including the colour-coding scheme (though the specific ratings and colours included here are examples indicating how the table works, not expectations that those will be those risks’ ratings for every project). Colours and ratings are taken from the matrix above. The table requires risks be evaluated both before management measures being enacted (the “Initial Risk Rating” columns), and the expected risk ratings once management measures are applied (the “Residual Risk Rating” columns).

The example risks listed are considered the minimum set for all analyses. Where a site has additional risks to completion criteria achievement, those must be included. For example, the single high-level entry for “feral animals” was for a site with little feral presence. Where, for example, both wild dogs and feral horses are present, but threaten the site in distinct ways, they would need separate entries.

Please note there are risks in the example provided where the application of risk controls did not alter that risk’s likelihood, consequence, and overall rating (e.g.) erosion. That is not necessarily a problem, though the Department will still expect relevant risk managements and mitigations to be implemented.

Some risks are acknowledged as beyond the approval holder’s control (*Force Majeure* risks). They must still be included and are relevant to the delegate’s overall consideration of whether the proposed offset is acceptable.

Finally, there are risks in the example where the residual risk remains severe – notably ‘catastrophic bushfire’. That does not mean the proposed offset is unacceptable. Rather, the delegate must acknowledge the possibility of a risk that would plausibly destroy an offset site without realistic possibility of remediation. Acknowledging such risks protects both the Department and the approval holder, because it means established procedures to address those risks’ consequences and acknowledges it may not be appropriate to require full remediation from certain types of catastrophes. Catastrophic bushfire is a particularly useful risk to note, because it has been separated from the ‘standard’ risk of “unplanned or not controlled fire in offset area”. This reflects that the approval holder’s capacity to prevent and/or respond to those risks is radically different depending on the size and intensity of the fire. Where a risk must be managed in fundamentally different ways depending on the severity of the instance of that particular type of risk, it is appropriate to treat each tier of severity as a separate risk, as that permits appropriately scaled responses.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Force Majeure Events												
Mining of the offset site	The site of the gully repair is subject to mining which impacts on the performance of the offset	Rare	Major	Medium	A caveat or lease arrangement will secure the gully repair site for the 25-year Reef Credit Project Delivery Agreement, which means that GreenCollar will be notified of mining intentions.	Rare	Major	Medium	Audit of Project Delivery Agreement Conditions	Notification against caveat or land holder notification	GreenCollar will act to protect the gully repair site to ensure the works will continue to reduce sediment pollution to the Great Barrier Reef beyond meeting the Ports North offset	Ongoing communication with landholder for 25-year duration of Reef Credit project. Caveat or lease notifications
Drought	The location of the gully repair site is impacted by drought and the sediment reductions are not realised due to requirement for a rain event to measure sediment reduction to the GBR	Possible	Moderate	Medium	Drought will not impact the gully repair works, only the timing of the measurement of water quality improvement. Ports North has until 2028 to deliver the water quality result achieved via the purchase of Reef Credits. It is very unlikely that drought would persist beyond two years in the Upper Herbert catchment, which is situated in the Wet Tropics region.	Possible	Moderate	Medium	Integrity of gully repair works	Lack of rainfall events	Monitor weather events and ensure communication with DAWE regarding potential impact on timing of offset delivery during the timeframe to 2028. If there is a prolonged drought, then options may be to purchase sediment Reef Credits from other locations to achieve an offset	Wet season weather monitoring and site monitoring that measures reduction in sediment flowing downstream.
Cyclones/ Severe tropical lows / flooding	The location of the gully repair is impacted by a cyclone or severe tropical low. Depending on timing this could damage or wash out the Gully repair site.	Likely	High	High	Project delivery timing seeks to ensure the site is stable prior to wet season in the first year. In later years the robust design of the gully repair aims to prevent flood wash out and a maintenance program funded through the sale of Reef Credits ensures the asset is maintained.	Possible	Moderate	Medium	Integrity of gully repair works	Major cyclone or flooding events	Reef Credit Project anticipate Majeure events and Mitigation that can include holding Credits in a buffer account in the event of any reversal of credits or a “hold” in crediting while the asset is repaired. Project insurance can also be considered in the instance of major capital items	Site condition and impact from flooding. Data collected from WQ monitoring equipment
Catastrophic Bushfire	The site of the gully repair is subject to a major fire event	Unlikely	Moderate	Low	The offsets through gully repair projects result from earth works and rock remediation. Flood and water are the main impacts on site stability. In the event of rain, grass cover is critical in the first year of site stabilisation. Once the site is stable, the site is unlikely to be negatively impacted by a fire. Site stability and resilience is not dependent upon trees. Recovery of site groundcover would be relatively rapid compared with tree cover.	Unlikely	Moderate	Low	Integrity of gully repair works	Impact on ground cover and likely vulnerability to erosion	Monitor site for fire events and determine if the fire and any impacted ground cover will increase the site vulnerability to water flow and erosion. If it is likely to be impacted, re-establish ground cover. After the first year of stabilisation, impacts from fire are unlikely.	Visual assessment of ground cover and expected rain events after fire
Standard Risks												
Unseasonal/ early wet season	The gully remediation works are impacted by an early wet season prior to site stabilisation being achieved.	Possible	High	Medium	Project delivery timing seeks to ensure the site is stable prior to wet season in the first year. In later years the robust design of the gully repair aims to prevent flood wash out and a maintenance program funded through the sale of Reef Credits ensures the asset is maintained. Project funding includes site maintenance. If an early wet season was forecast or occurred, site works can be postponed to the next year and still meet the offset timeframe for Ports North	Possible	High	Medium	Integrity of gully repair works	Site impacts from rain during or shortly after remediation	Ensure any required site maintenance/repair is undertaken following the wet season.	Tracking Project delivery timeline and forecast weather events to ensure delivery within the optimum time of year (July – September)
The Offset failing (regardless of cause)	Poor design leads to asset failure due to no fault of landholder	Unlikely	Critical	High	Strict design and construct guideline are adhered to. Design based on experience in a range of other gully repair projects. Gully repair works are well documented, and a number of successful projects provide the blueprint for success. This is not experimental or a novel approach and is unlikely to fail. All project construction contracts include monitoring of site works in the first year to ensure works achieve the planned outcome and any initial breaches or project failures are repaired as part of the delivery contract.	Rare	Critical	High	Quality and implementation of Gully repair design and construction	Works fail	In accordance with DAWE feedback Wording - In the event of total failure of the offset, the Department will require, and the approval holder commits to providing, a replacement offset. That replacement offset must be agreed with the Department within twenty-four months of the failure of the offset becoming apparent.	Tracking and oversight against works contract and maintenance regime
Unable to secure statutory approvals prior to construction	The gully rehabilitation works are not able to proceed without appropriate permits.	Unlikely	Major	High	Early negotiations with the relevant authorities and work with experienced delivery agents, Terrain to ensure that permits and approvals will not be a barrier for project delivery. This is completed during project feasibility. Work with consultant/delivery agent to ensure permit applications are timely and complete.	Unlikely	High	Medium	Implementation of Project Delivery Schedule	Failure to meet key project delivery milestones	Postponement of works to September 2023, which will still meet the timeline for Ports North offset requirements.	Project delivery timeline tracked

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
No rain event or failure of wet season to trigger monitoring event for fine sediment savings	No rain during a wet season which means a water quality monitoring event isn't triggered to provide evidence that sediment pollution has been reduced.	Unlikely	High	Medium	Located in the Wet Tropics, it is unlikely that this location will not experience wet season rains. The Ports North permit requires the offsets to be met by 2028, which allows sufficient years to for wet season event triggering sediment savings.	Unlikely	High	Medium	Reef Credit Methodology requirements	Insufficient water flow for measuring outcomes	Reef Credits are delivered in subsequent years within the OMP deadline of 2028.	Wet season rain events and results from water quality monitoring
Fine sediment abatement outcomes do not meet offset requirement	That the forecast abatement is not realised, and the offset cannot be achieved.	Unlikely	Moderate	Low	Modelled abatement has been undertaken against significant technical assessment. Assumptions on abatement are based on previous gully projects and projections and the Reef Credit Method for Gully Repair. All sediment savings are measured at the GBR, so location of project is not a concern for proven water quality outcome.	Rare	Moderate	Low	Quality and implementation of Gully repair design and construction	Lower than expected sediment pollution reductions	GreenCollar could source sediment Reef Credits from other projects if there was a shortfall.	Site and Water quality monitoring and
Gully Repair capital works are not maintained or protected	If the site is not well managed, sediment savings could be reversed.	Unlikely	Major	High	Reef Credit Projects are established under 25-year Project Delivery Agreement between the landholder and GreenCollar, a binding agreement that protects the gully repair asset and includes a Land Management Plan to be delivered by landholders. Site maintenance immediately following remediation works is built into construction contracts.	Rare	Major	Medium	Quality and implementation of Gully repair design and construction Reef Credit Project Delivery Agreement Compliance	Site not maintained or Reef Credit volume lower than expected	Ensure post construction monitoring maintenance is completed and then work with landholder to ensure the Land Management Plan is being implemented over the 25-year Reef Credit Project Delivery Agreement	Reef Credit Monitoring and Reporting
Unable to secure landholder agreement for project	Project unable to be completed at Innot Hot Springs site if landholder does not want project implemented.	Possible	High	Medium	Early discussions have commenced with the landholder. If agreement cannot be reached, there are alternate gully repair sites within the same Upper Herbert Catchment that can delivery sediments offsets within the 2028 timeframe	Unlikely	High	Medium	Implementation of Project Delivery Schedule and Engagement process	Lack of interest from landholder	Reef Credits provide incentive for engagement and land holder agreement in addition to the gully repair works. Alternative sites could be utilised if necessary.	Tracking against project timeline for landholder agreement
Native title negotiations impact on timeline or project delivery	Impacts on traditional owner values/sites or impacts on project timeline.	Unlikely	High	Medium	No active native title claims or determinations exist at the Reef Credit Project site. During project design, local engagement will be completed with Traditional Owners and Cultural Heritage clearances will be required for the permits and subsequent earthworks. If delays are experienced that impact project timeline – as per above, the offset timeline of 2028 can still be met.	Unlikely	High	Medium	Implementation of Project Delivery Schedule and Engagement process	Lack of engagement or information about status of Traditional Owner interests	Due diligence and early engagement with Traditional Owners undertaken very early in project planning	Track against both legal, planning and Traditional Owner engagement plan
Landholder changes during project contract	A change in landholder may impact the integrity or security of the gully rehabilitation site and the offset.	Possible	Minor	Low	Reef Credits purchased by Ports North are for sediment savings achieved which means that any future changes (after the Ports North offset has been achieved) in property management will not impact the outcome of this OMP. However, the gully repair “asset” is secured through a caveat on title or through lease arrangements and would be transferred through land holder change. This already occurs in other environmental market projects in Australia, such as the carbon market.	Possible	Minor	Low	Reef Credit Project Delivery Agreement and Caveat Compliance	Formal process resulting from caveat notifications.	Gully repair is registered on title which protects the offset site and outcomes. GreenCollar negotiates with prospective buyers. Reef Credits provide income to land holders, which provide incentive	Notification from caveat on title or lease interests in the property
Unauthorised or inappropriate grazing in offset area	Grazing or inappropriate land management impacts the rehabilitation site.	Possible	High	Medium	The 25-year Reef Credit Project Delivery Agreement includes a land management plan to ensure the integrity of the repair site and that land management actions do not impact.	Unlikely	Minor	Low	Best practice grazing land management and Reef Credit Project Delivery Agreement Compliance	During project auditing inappropriate management is detected	Landholder revenue from Reef Credits can be amended if agreed land management practices are not maintained	Reef Crediting monitoring and audit against the Land Management plan requirements