Great Keppel Island Biodiversity Offset Strategy

Prepared for Tower Holdings Pty Ltd

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Rev 2

Release authorisation

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Definitions and abbreviations

In this document, the following definitions and abbreviations apply:

Term/Abbreviation	Meaning
BVG	Broad Vegetation Group
CG	Co-ordinator General
DERM	Department of Environment and Resource Management (Queensland)
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia)*.
GBRMP	Great Barrier Reef Marine Park
ha	Hectare
HVR	High Value Regrowth
IBRA	Interim Biogeographic Regionalisation of Australia
km²	Square Kilometres
Land Act	*Land Act 1994* (Queensland)
Land Title Act	*Land Title Act 1994* (Queensland)
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992* (Queensland)
PMAV	Property Map of Assessable Vegetation
QGEOP	*Queensland Government Environmental Offsets Policy*
RE	Regional Ecosystem
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth of Australia)
TEC	Threatened Ecological Community
VM Act	*Vegetation Management Act 1999* (Queensland)
VMP	Vegetation Management Plan

Executive summary

Unidel Group was engaged by Tower Holdings Pty Ltd to prepare a Biodiversity Offset Strategy (the Offset Strategy) that assesses the vegetation and biodiversity offset requirements at the Commonwealth and State level for the Great Keppel Island Revitalisation Project (the Project). This Offsets Strategy has been prepared to assess the offset requirements triggered by the Project and to identify potentially suitable offset sites. Offset requirements will be determined and described by type and area based on Commonwealth and State offset policies and feedback provided during preliminary consultation with the Department of Environment and Resource Management (DERM) and Department of Employment, Economic Development and Innovation (DEEDI).

For the purposes of this Project, biodiversity offsets are defined as all offsets required under the Queensland Government Environmental Offset Policy 2008 and subordinate policies, and offsets required for matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Tower Holdings Pty Ltd (the proponent) is in the approval phase for the Project which includes the construction of a new eco-tourism development on Great Keppel Island. The Project will include the construction of approximately 750 villas, upgrade to an existing airstrip, marina and golf course development. Associated with construction of the Project will be unavoidable impacts to remnant native vegetation and biodiversity values protected under Commonwealth and State legislation for which offsets will be required.

The Project is a 'state significant project' under the *State Development and Public Works Organisation Act 1971* for which an Environmental Impact Statement (EIS) is required. The Project is also a controlled action under the EPBC Act. Tower Holdings Pty Ltd is preparing an EIS of which this Offset Strategy will form part.

An assessment has been undertaken of the environmental offset requirements of the Project under both Commonwealth and State legislation, and offset policies currently in place that are relevant to the Project including:

(i) Consultation draft: 'Environmental Offsets Policy' 2011, under the *Environment Protection and Biodiversity Conservation Act 1999*;

(ii) Queensland Government Environmental Offsets Policy 2008 and subordinate policies; and

(iii) Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss under the *Fisheries Act 1994.*

Offset analysis has identified a number of significant biodiversity values that may be adversely impacted by the Project and require offsetting. These include Great Barrier Reef World Heritage Values, marine plants and habitats, Of Concern regional ecosystems and Essential Habitat for the Beach stone curlew.

Based on the Project footprint and vegetation impact estimates, the Project requires offsets for the following biodiversity values:

- Great Barrier Reef Marine Park World Heritage Values (146.5ha);
- Essential Habitat for Beach stone curlew (36.5ha);
- Of Concern Regional Ecosystems (15ha); and
- Marine habitat (21.08ha).

Unidel has undertaken spatial analysis to determine the potential availability of suitable offset sites. This included a desktop exercise to identify and assess potential offset sites that co-locate as many offset values as possible, and provide strategic conservation outcomes.

Large areas of potential offsets containing similar vegetation communities, marine habitats and biodiversity values the Project is required to offset, have been identified within 100km of the Project within the Great Barrier Reef World Heritage Area and coastal IBRA subregions.

Based on results of desktop analysis and landholder engagement, three preferred offset sites have been identified to meet the Commonwealth and State offset requirements. Landholders have indicated their preliminary interest in providing offsets in writing. These properties are located in or directly adjacent to the Great Barrier Reef Marine Park World Heritage Area. These properties also contain significant marine habitats (including mangroves, salt couch and intertidal mud flats) and other biodiversity values that would satisfy a number of the State offset requirements.

Following release of the EIS and endorsement of the Biodiversity Offset Strategy by government regulators, the next phase is to prioritise the potential offset sites for both Commonwealth and State requirements, engage with landholders and undertake site inspections to verify the biodiversity values on the ground and the proposed offset area.

In consultation with the Coordinator-General, DERM, DEEDI and the Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) an Offset Package will then be prepared which details the proposed offset sites, how the offset sites are ecologically equivalent to the impact areas, mechanisms to secure the areas and management requirements. This Offset Strategy documents a number of potential mechanisms that can be used to secure and manage offsets, and the likely tasks and timelines for the completion of the offset program are also outlined.

1 Introduction

1.1 Scope

Unidel Group was engaged by Tower Holdings Pty Ltd to prepare a Biodiversity Offset Strategy (the Offset Strategy) that assesses the biodiversity offset requirements at the Commonwealth and State level for the Great Keppel Island Revitalisation Project (the Project). This Offsets Strategy has been prepared to assess potential offset requirements triggered by the Project, and to identify potentially suitable offset sites.

Offset requirements are described by type, and the estimated area of impact is provided for each offset requirement. The offset analysis is based on Commonwealth and State offset policies and feedback provided during consultation with DERM and DEEDI.

The Project is a 'state significant project' under the *State Development and Public Works Organisation Act 1971* for which an EIS is required. The Project is also a controlled action under the EPBC Act.

Tower Holdings Pty Ltd has prepared an EIS to address the Terms of Reference issued by the Coordinator-General of which this Offset Strategy will form part.

The analysis of offset requirements has been based on the environmental studies and impact assessment in the outlined in the EIS.

1.2 Objectives

The objectives of this Offset Strategy are:

- Identification of potential offset requirements triggered by the Project at the Commonwealth and State level;
- Analysis of offset requirements and the offset approach to be taken;
- Spatial analysis to identify the best available strategically located offset sites and demonstrate the availability of suitable offset properties;
- Identifying and describing mechanisms to secure and manage offsets;
- Describe likely tasks and timelines for the completion of the offset program; and
- Outlining mechanisms for monitoring and compliance reporting.

2 Background

2.1 Great Keppel Island revitalisation project

Great Keppel Island operated as a tourism resort up until February 2008 when it was shut down due to its run down state and subsequently purchased by Tower Holdings Pty Ltd.

Tower Holdings Pty Ltd is proposing a $592.5 million Revitalisation Plan for the Great Keppel Island Resort which will constitute the most significant new tourism investment in Queensland for over 20 years. The Project will provide for a low rise, low impact environmentally focused resort which will be fully accessible to the public. The revitalisation plan will have a major focus on ensuring that it meets high environmentally sustainable tourism guidelines and that it sets a new benchmark for environmental management practices.

Tower Holdings Pty Ltd has produced a Sustainability Statement for the Project that outlines a vision to make Great Keppel Island the 'greenest' and most talked about environmentally responsible destination in the country and a leader in global environmental tourism. The aim is to transform an old sheep farm and dilapidated resort into a sustainable eco-tourism resort. Every aspect of environmental sustainability has been taken into account in designing the Project. The project team will seek to work with government authorities, conservation groups and community members to ensure that the final design meets their expectations and protects the values of the World Heritage Area.

Key elements of the Project include:

- Approximately 545ha designated as an 'environmental protection area';
- Demolition of the old resort and construction of a new hotel including 250 suites and day spa;
- Dredging activities for construction of a new marina;
- Golf club and 18-hole golf course;
- 300 eco-tourism apartments;
- 750 eco-tourism villas; and
- Upgrade and extension to the existing airstrip.

2.2 Location and extent

Great Keppel Island is located approximately 12km off the coast of Yeppoon and is the largest of the Keppel group of islands, at approximately 1,400ha in size (refer to **Figure 1**). It is located in the Great Barrier Reef Marine Park and Great Barrier Reef World Heritage Area and contains a high diversity of flora and fauna species, unparalleled aerial vista and species of plants and animals of conservation significance. The island is located in the Central Queensland Coast bioregion and the Byfield subregion.

The location of the Project and the Regional Ecosystem (RE) mapping for Great Keppel Island are presented in **Figure 2**.

2.3 Approvals process

The Project was classed as a 'controlled action' in July 2010 by SEWPAC, requiring an EIS and full assessment against the EPBC Act. The Project is also being assessed under a parallel process between the Commonwealth and the State of Queensland (overseen by the Co-ordinator-General (CG)) under the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

The Project was declared a 'significant project' in August 2009 for which an EIS is required. Tower Holdings Pty Ltd are currently finalising the EIS in accordance with the Terms of Reference issued by the CG and SEWPAC. This Offset Strategy will form part of the EIS.

2.4 Assessment of impacts

The purpose of the EIS is to provide information on the nature and extent of potential direct and indirect environmental, social and economic impacts associated with construction and operation of the Project.

Information provided in the EIS describing the presence of particular environmental values within the Project area, and the estimated extent of unavoidable impacts to those values, has been used to inform the development of this Offset Strategy. Some of the impacts and offset calculations are preliminary and as the Project progresses, and impacts refined, the Offset Strategy will be reviewed.

Within economic and practical constraints, Tower Holdings commit to avoiding and mitigating environmental impacts to the greatest extent possible when designing and constructing the Project. Offsets are only being considered and proposed where environmental impacts are unavoidable, cannot be fully mitigated and there is a residual impact remaining. The Project has undergone several redesigns in order to achieve the best possible environmental outcome whilst maintaining economic viability. This is consistent with the offset principles detailed under both Commonwealth and State offset policies.

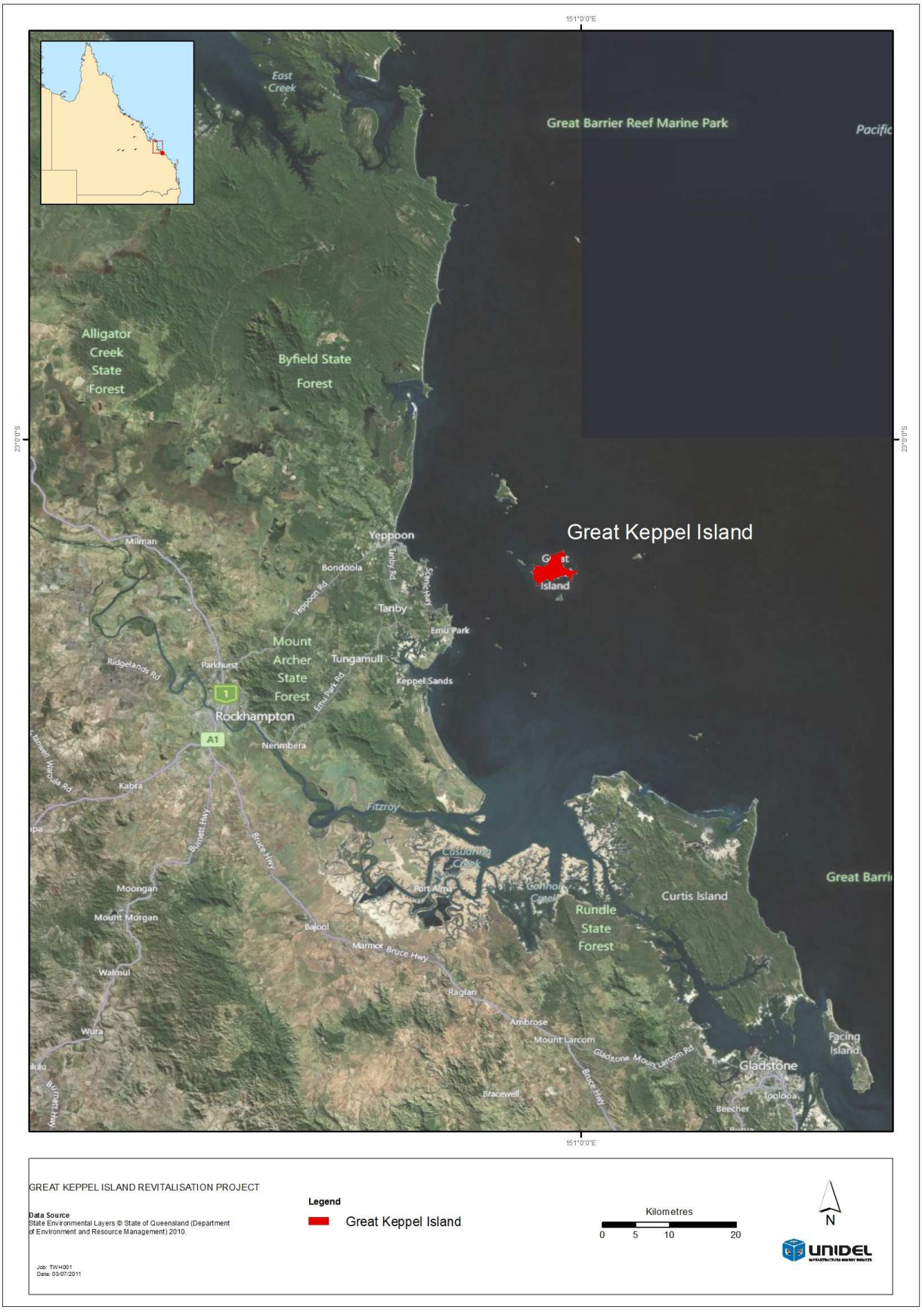

Figure 1 Location of Great Keppel Island

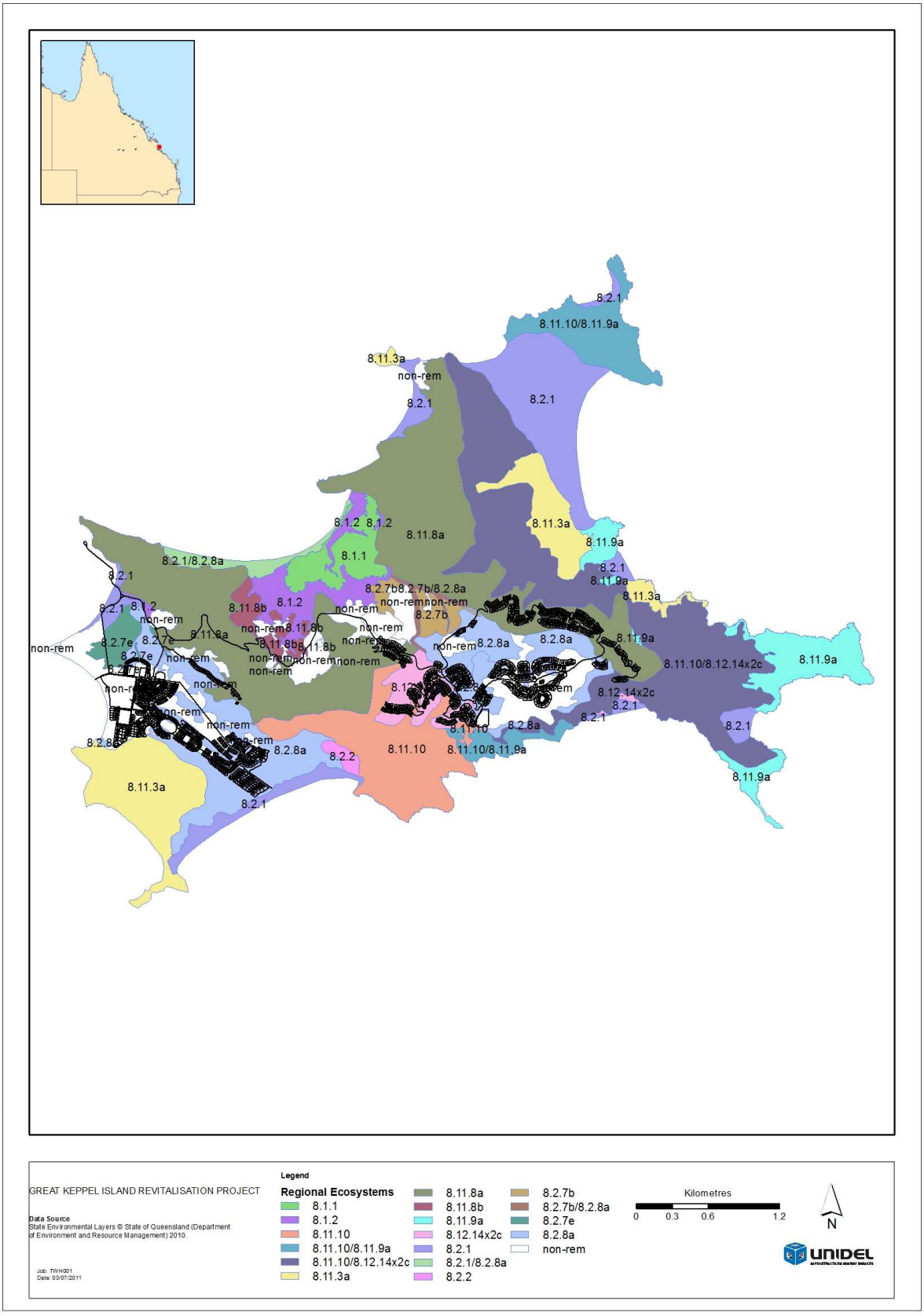

Figure 2 Outline of project footprint and the RE mapping

3 Legislative framework and proposed offsetting principles

3.1 Introduction

Proposed actions within Queensland impacting on vegetation and biodiversity have the potential to trigger requirements under Commonwealth and State legislation and policies for the provision of environmental offsets. Offsets are to compensate for any unavoidable loss experienced as a result of the action.

The environmental offsets policy framework operates on three separate levels in the State:

- The EPBC Act enables the provision of offsets to be a condition of approval under the Act for any action that has the potential to have a significant impact on Matters of National Environmental Significance (MNES);
- The *Queensland Government Environmental Offsets Policy* (QGEOP) provides an overarching framework setting the principles and requirements for delivery of offsets in Queensland, as well as development of new specific-issue offset policies. The CG may use QGEOP as a guide to requiring and conditioning biodiversity offsets for state significant projects; and
- A number of specific-issue offset policies are in effect in Queensland including the *Queensland Biodiversity Offset Policy (October 2011)* which is triggered by various state approvals, *Policy for vegetation management offsets (September 2011)* under the *Vegetation Management Act 1999* (VM Act) and Fish habitat offsets under the *Fisheries Act 1994.* Offsets may be conditioned as part of a separate approval under these Acts.

3.2 Commonwealth

The consultation draft; 'Environmental Offsets Policy', 2011 under the EPBC Act outlines the most recent position of the Commonwealth Government with respect to the use of environmental offsets under the EPBC Act. Offsets are viewed by the Commonwealth as the third strategy to reduce potential impacts to MNES – after avoidance and mitigation, which generally refers to on-site measures.

Offsets, as an approval condition, are subject to legislative requirements under Part 9 of the EPBC Act. Offsets are a type of approval condition and need to be consistent with Section 134 of the EPBC Act, which states that conditions can only be made to protect, repair or mitigate damage to MNES or the environment for actions affecting the Commonwealth.

The Consultation draft policy lists actions that can be considered as environmental offsets:

- Direct offsets:
  - Protection of existing good or better quality habitat;
  - Rehabilitation of existing vegetation in poor condition; and
  - Revegetation of environmentally degraded land.
- Indirect offsets:
  - Implementation of priority actions outlined in the relevant recovery plans;
  - Enhancing habitat quality or reducing threats to the protected matter on a site that is not part of the direct offset, for example by removing invasive species; and
  - Contributions to relevant research or education programs.

Direct offsets are to consist of at least 75% of the total offset requirement, and indirect offsets can supplement up to 25%. Offsets should be consistent with the principles of ecologically sustainable development (ESD) (section 3A) and should aim to maintain or enhance the environment and aid the recovery of listed threatened species and ecological communities.

Direct offsets must be legally secured in perpetuity and be managed for an agreed period of time to maintain and improve the environmental values and MNES features of that area.

The Consultation draft Environmental Offsets Policy lists seven principles for offsets:

1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environmental law and affected by the proposed development;
2. Be efficient, effective, transparent, proportionate, scientifically robust and reasonable;
3. Be built around direct offsets but may include indirect offsets;
4. Be of a size and scale proportionate to the impacts being offset;
5. Be in proportion to the level of statutory protection that applies to the affected species or community;
6. Effectively manage the risks of the offset not succeeding; and
7. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

For the purposes of this Offset Strategy the draft EPBC Offset Policy, 2011 will form the guiding principles for identifying acceptable offsets at the Commonwealth level. This policy will apply to all aspects of the Project that impact upon MNES.

3.3 State

The QGEOP guides the appropriate use of environmental offsets across terrestrial and aquatic ecosystems within Queensland. The CG may require offsets as part of approvals under the SDPWO Act, and use QGEOP as a guide to determining the extent and type of offsets required.

QGEOP describes offsets as an action taken “to counterbalance unavoidable, negative environmental impacts that result from an activity or a development.”

The scope of the QGEOP is limited to projects where a State Government agency is the decision maker, or is involved as a concurrence agency. At present, there are four specific-issue offset policies in operation within the QGEOP framework, concerning:

- State Significant Biodiversity Values;
- Clearing of Native Vegetation;
- Koala Habitat; and
- Marine Fish Habitat.

There are seven policy principles that direct offset development under the QGEOP:

1. Offsets will not replace or undermine existing environmental standards or regulatory requirements;
2. Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact;
3. Offsets must achieve an equivalent or better environmental outcome;
4. Offsets must provide environmental values as similar as possible to those being lost;

5. Offset provision should minimise the time-lag between the impact and delivery of the offset;
6. Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values; and
7. Offsets must be legally secured for the duration of the offset requirement.

For the purposes of this Offset Strategy the above seven offset principles will form the guiding principles for developing an acceptable approach to the application of offsets for the Project at the State level. This policy will apply to all aspects of the Project that impact on state significant biodiversity values.

3.3.1 Policy for Vegetation Management Offsets

The Policy for Vegetation Management Offsets, Version 3 was released on 30 September 2011. The purpose of this offset policy is to set the requirements for an offset as a condition of a development approval that the chief executive considers is necessary or desirable in achieving the purpose of the VM Act. Key goals of the VM Act is to conserve the extent of remnant vegetation, ensure clearing does not cause land degradation, prevent the loss of biodiversity and maintain ecological processes.

Offsets are triggered as a means to meet a performance requirement in an applicable VM Act regional vegetation management code. Offsets may be an acceptable solution for impacts to particular remnant vegetation such as Endangered and Of Concern REs, Essential Habitat, wetlands or watercourse vegetation.

Two primary options are provided for offset delivery. These are land-based offsets or offset payments. Land-based offsets must constitute 90% of the total offset requirement, with indirect offset measures being able to make up the remaining 10%. Direct offsets must achieve 'ecological equivalence' to the impact area. Demonstrating 'ecological equivalence' requires an assessment of both the impact area and proposed offset area. Further detail is provided in DEHP's Ecological Equivalence Methodology.

Direct offsets must be legally secured until the regrowth vegetation reaches 'remnant' status and is then mapped as such under the VM Act. Direct offsets must be actively managed to improve the ecological condition of the vegetation and ensure it reaches 'remnant'. Acceptable indirect offsets may include funding towards research and monitoring programs detailed in Recovery Plans for a particular threatened species being impacted by the Project, habitat mapping/modelling for priority threatened species or addressing a threatening process.

The policy provides criteria as to what constitutes an acceptable offset for each particular offset requirement. This includes requirements such as the offset being located in the same bioregion as the impact, remnant vegetation and certain high value regrowth cannot be used (unless it is Category X) and the ability to use broad vegetation groups (BVGs).

3.3.2 Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss – Operational Policy (2002)

The requirement to provide marine fish habitat offsets are triggered by fisheries development approvals assessed under the provisions of the *Fisheries Act 1994* and *Integrated Planning Act 1997*.

Offsets will be required for marine fish habitat loss, including of protected marine plants protected marine plants and lands within declare and lands within declared Fish Habitat Areas, may be a permanent or temporary loss, or modification, causing loss of fisheries resources fisheries production.

Offsets for marine fish habitat offsets are applicable when impacts cannot be avoided, minimised or mitigated and only after the proposed marine fish habitat loss is determined as justifiable, unavoidable and acceptable under legislation and policy.

Offset measures for marine fish habitats seek to:

- Maintain fisheries values, including fish habitat values;
- Match ecosystem costs associated with fish habitat losses with offsets appropriate to the loss;
- Promote the importance of fish habitats during implementation;
- Recognise the natural capital of fish habitats; and
- Create public awareness of the value of fish habitats.

Queensland Primary Industries and Fisheries (QPIF) assess offset proposals on a case by case basis with the proponent. Direct and / or indirect offsets are acceptable under the policy and there is an offsets calculator which can be used to assess the financial offset contribution for project impacts.

3.4 Offset principles and approach adopted by Tower Holdings

The following sections summarise the proposed approach to identifying appropriate offsets for the Project. The principal objective is to identify the total offsets requirements of the Project, and then identify potential offset sites that will meet both SEWPAC (Commonwealth) and CG (State) requirements.

It is intended that offsets will have a strategic biodiversity benefit, such as; enhancing landscape connectivity and biodiversity corridors; expanding existing protected areas; being located within the Great Barrier Reef World Heritage Area; and being located as close as practical to the area of impact.

Offset opportunities have been identified on Great Keppel Island outside the proposed development footprint. These areas were given priority and assessed for suitability to be included within an offset package for the Project. The balance offset area will be located in the best available strategic sites, as identified through spatial analysis.

The following figure provides an outline of the intended approach to offsetting, approval framework and steps to finalise the offset package.

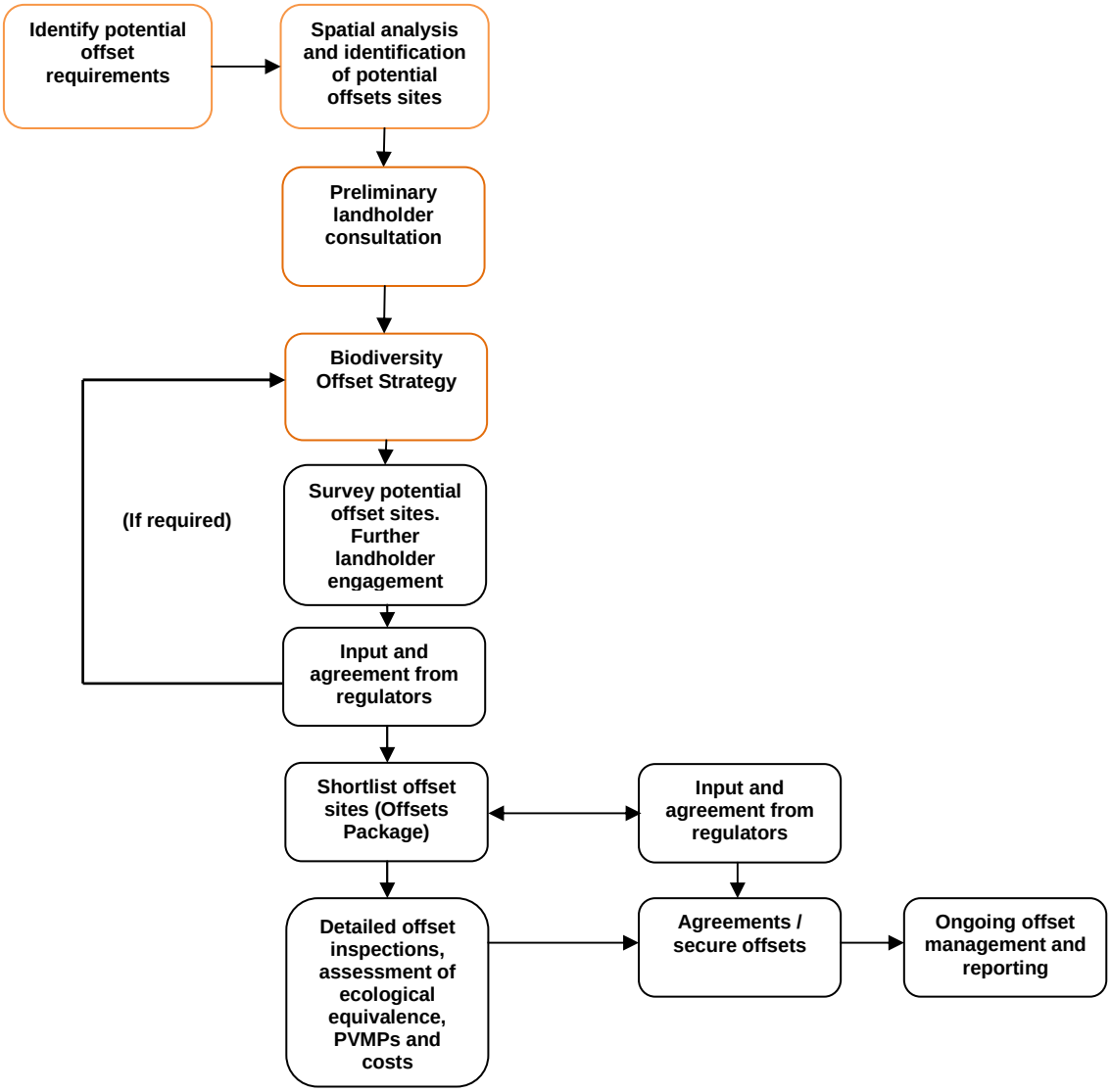

Figure 3 Outline of the intended approach to offsetting

4 Offset requirements of project

4.1 Determination of impacts

Environmental studies undertaken for the EIS have assessed key flora and fauna values of the Project area and described the potential impacts associated with both the construction and operation of the Project. The Project used a constraints based approach to project planning, risk assessments and mitigation measures to avoid or reduce potential impacts.

A summary of the key environmental impacts are detailed below. Further detail of the investigations of the terrestrial and marine environments of the Island is provided within the relevant section of the EIS.

Matters of National Environmental Significance

Potential impacts to MNES from the Project include World Heritage Areas and National Heritage Places, wetlands of national importance, listed threatened flora and fauna communities, and listed migratory and marine species. The controlling provisions for the Project under the EPBC Act are listed in **Table 1**, along with a discussion on which MNES are likely to incur residual impacts from the Project.

Table 1 Controlling provisions and expected Project impacts

Controlling provisions under the EPBC Act	Expected Impacts of Project
World Heritage properties	*The Project is expected to have an impact on the Great Barrier Reef World Heritage area*.
National Heritage places	The Project will not impact on any National Heritage Places.
The Great Barrier Reef Marine Park	*The Project is expected to have an impact on the Great Barrier Reef Marine Park.*
Listed threatened species and ecological communities	No Threatened Ecological Communities occur on site and therefore will not be impacted by the Project. No threatened species were identified as known or likely to occur on the Island.
Listed migratory and marine species	Migratory and marine species preferred habitat was identified as present in the Project area. The significance of impact is considered to be low.
Commonwealth marine areas	The Project will not impact on a Commonwealth Marine Area.

Great Keppel Island is a 1,308 hectare continental island within the Great Barrier Reef World Heritage Area (GBRWHA), and many of the matters of national environmental significance are associated with its World Heritage status. The World Heritage values include the scenery of the Island and surrounding waters, fringing coral reefs and associated reef-building processes, habitat for migratory species (birds and marine fauna), and flora and fauna typical of continental islands which add to the biodiversity of the GBRWHA. Most of these features are outside the Project area, or associated with the waters and landwater interface.

The main impacts of the Revitalisation Plan on the Island's geomorphology will arise from construction of the airstrip and marina, and to a lesser extent the land clearing and earthworks required for the development precincts. However, these activities will not result in impacts on significant geomorphic or physiographic features that contribute to the GBRWHA values.

Detailed flora surveys and vegetation mapping confirmed the presence of the Commonwealth listed 'Littoral Rainforest and Coastal Vine Thickets of Eastern Australia'. The areas of Littoral Rainforest and Coastal Vine Thickets are outside areas affected by the Project.

No flora species scheduled under the EPBC Act were identified as known or likely to occur on the Island. A number of locally significant species were recorded, but all of these species are abundant on the island and design considerations will ensure their persistence.

Detailed fauna assessments undertaken in wet and dry seasons in addition to wader studies and targeted surveys for nesting Beach Stone Curlew (*Esacus neglectus*) were undertaken. A total of 104 terrestrial fauna species were recorded, including 17 species of Commonwealth or State significance and four pest species.

No fauna species scheduled under the EPBC Act were identified as known or likely to occur on the Island. Fourteen species are regarded as migratory terrestrial, wetland or marine bird for the purpose of the EPBC Act were considered to use habitat on the Island. Eleven marine species listed as 'migratory' are considered moderately or highly likely to use habitats in the Project area.

Studies confirmed that Leeke's Estuary (outside the Project area) provides habitat for a diversity of fauna including migratory and threatened bird species. The terrestrial environments support habitat for mostly common species and whilst some migratory species utilise these habitats it is not regarded as highly significant for these species. The Project will not result in the direct loss of habitat of threatened fauna (refer to the EIS; Appendix AB).

In addition to avoiding, minimising and offsetting impacts, the Proponent has committed to several mitigation measures, such as integration of landscaping predominated by plants indigenous to the Island, and a monitoring program that will enable ongoing adaptive management of vegetation communities and reduce indirect impacts on significant fauna species and their habitat.

Remnant vegetation

The extent and types of Regional Ecosystems (REs) impacted by the Project are described in **Table 2** below. The design of the Project has not been completely finalised (e.g. the golf course design) therefore a likely minimum and maximum impact area is presented for each RE. No REs are Endangered or critically limited as listed in DERM's Policy for vegetation management offsets (Version 2.4, 2009).

Table 2 REs impacted by the Project

Regional Ecosystems	Total minimum area (ha)	Total maximum area (ha)	Biodiversity Status	Vegetation Management Act Status
8.2.1	**0.58**	**0.58**	Of concern	**Of concern**
8.2.7b	**0.82**	**0.82**	Endangered	**Of concern**
8.2.7e	**5.06**	**5.46**	Endangered	**Of concern**
8.2.8a	46.48	74.2	No concern at present	Least concern
8.11.3a	0.04	0.1	Of concern	Least concern
8.11.8a	26.47	44.2	No concern at present	Least concern

Regional Ecosystems	Total minimum area (ha)	Total maximum area (ha)	Biodiversity Status	Vegetation Management Act Status
8.11.9a	**0.3**	**0.3**	Of concern	**Of concern**
8.11.10	**6.1**	**8.4**	Of concern	**Of concern**
8.12.14 (2xC)	4.12	12.4	No concern at present	Least concern
TOTAL	**89.95**	**146.5**		

Marine ecosystems

The Project proposes to construct a marina as part of the development and this activity will impact on marine plants (seagrass) and fish habitats. Impacts[1] associated with the construction of the marina include:

- Permanent loss of 0.964ha of seagrass beds;
- 0.04ha of mangroves which may or may not be permanent; and
- Temporary impact of 20.08ha of bare substrate.

4.2 Determination of offset requirements

4.2.1 Commonwealth

The Project's impacts to MNES have been addressed in the EIS (Section 3.4). Potential impacts to MNES have been addressed by detailed investigation of the terrestrial and marine environments of the Island, by a constraints based approach to project planning, risk assessment and mitigation measures to avoid or reduce potential impacts. Information is presented on the estimated extent of impact, the value or species habitat in the Project area, and offset considerations. It should be noted that potential areas of disturbance identified below are preliminary at this stage of the Project.

Table 3 below outlines the estimated residual Project impacts to MNES under their relevant controlling provisions. Offsets have been identified that directly address the MNES values impacted by the Project.

[1] Impacts will be offset by a gain of approximately 2.02ha of marina wall and approximately 0.55ha associated with walkways and pontoons of 'bare' substrate (frc environmental, 2011).

Table 3 Offsets under the EPBC Act

Controlling provision	MNES	Estimated Area of Impact (ha)	Discussion
World Heritage properties	Great Barrier Reef World Heritage Values - native vegetation	146.5	The Project will impact 146.5ha of native vegetation in the Great Barrier Reef World Heritage area.
World Heritage properties	Great Barrier Reef World Heritage Values – Exceptional natural beauty and aesthetic importance		Vegetation clearing, earthworks and development within the precinct footprints, and indirect effects of project development and operation, will cause some visual impacts on the Island and views from adjacent waters, as indicated in the Visual Assessment report. Impacts to scenic features and values includes: • Views to the island from offshore – impacts visible from limited areas; • Contrast and diversity of shoreline and water's edge – impacts limited to marina site and minor increase in built form visible from Fisherman's Beach; • Diversity of coastal form including mountains, headlands, sand dunes, mangroves, beaches and fringing reefs – limited to removal of small hill needed for the new runway and clearance zones (limited visibility); • Aerial vista over island and reef systems - moderate visual impacts, in that views from the air will reveal a more extensive area of buildings and golf course than at present. However the aerial vista will also reveal the large proportion of the Island maintained in natural condition, the pattern of islands in the Keppel Group and (under suitable weather conditions) the fringing reef in Clam Bay.
The Great Barrier Reef Marine Park	Marine habitat	21.08	The Project will impact 21.08ha of marine habitat in the Great Barrier Reef Marine Park for the construction of the marina (frc environmental, 2011).

4.2.2 State

The Project is currently being assessed as a state significant project under the SDPWO Act. For the purposes of this Offset Strategy Tower Holdings have given consideration to the offset principles within QGEOP and the individual specific-issue offset policies underneath it. The Project will result in the clearing of assessable vegetation and require a permit under the *Vegetation Management Act 1999* subsequent to the EIS. Therefore, the Policy for Vegetation Management Offsets (Version 3 – 30 September 2011) has been used to assess the potential impacts to State significant biodiversity values that are currently required to be offset. The other relevant specific-issue offset policy which has been assessed in this Offset Strategy is the Marine Fish Habitat – Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss under the *Fisheries Act 1994*.

The EIS for the Project outlines the potential environmental impact as a result of the Project and **Table 4** below outlines the biodiversity values at the State level that are likely to occur in the Project footprint, will incur some level of unavoidable impact, and for which offsets are proposed. Information is presented on the estimated extent of impact, the value or species habitat in the Project area, and offset considerations. It should be noted that potential areas of disturbance identified below are preliminary at this stage of the Project.

Table 4 Offsets required at the State level

Biodiversity Value	Estimated Area of Impact (ha)	Discussion
Of Concern REs (listed under VM Act)	15.56	Four Of Concern REs will be impacted by the Project. The REs affected include 8.2.7b, 8.2.7e, 8.11.10 and 8.11.9. The four Of Concern REs that will be impacted all have a high representation in existing Protected Area Estates (**Appendix A**). The percentage impact on individual REs in the GBRMP is less than 0.05% up to a maximum of 5.4% for another. It is likely that this impact will be revised down following design of the golf course and the incorporation of watercourse buffers into planning and design.
Essential Habitat - Beach stone curlew	36.8	Beach stone curlew essential habitat is mapped on the island and 36.8 ha of this mapped area will be impacted by the Project. DERM define the essential habitat as all regional ecosystems along the beach ecotone. Whilst the impact on Beach stone curlew is not entirely predictable, it is likely to be minor given the Marina occupies 2% of the total coastline of GKI and the Putney Creek marine vegetation community occupies only 2.8% of this total habitat type on the island. Although there may be some impact on the species, within the context of available habitat on the GKI and throughout its range it is considered to be minor.
Marine Fish Habitat	21.08	The Project proposes to construct a marina which will result in the permanent loss of approximately 0.964ha of seagrass beds, the loss of 0.04ha of mangroves which may or may not be permanent, the temporary loss of approximately 20.08ha of bare marine substrate and the gain of 2.02ha of marina wall and 0.55ha associated with walkways and pontoons (frc environmental, 2011). A permit under the Fisheries Act 1994 is required for

Biodiversity Value	Estimated Area of Impact (ha)	Discussion
		these marine impacts that will include the provision of offsets. Potential offset solutions involve the protection, restoration and management of land that contains marine plants and habitats (such as mangroves, salt couch and tidal mud flats) under threat, the expansion of existing declared Fish Habitat Areas, restoration of degraded marine habitats and/or financial contributions to DEEDI that will contribute to fisheries research or other marine conservation projects. Tower Holdings Pty Ltd is currently proposing to take a direct offset approach for marine offsets and seeking to co-locate the marine offset with the Commonwealth World Heritage Area offset site to the extent that values align. In addition to the direct offsets Tower Holdings Pty Ltd propose indirect offsets in the form of a specialised Research Centre in the Keppel Island Group on Great Keppel Island and a biodiversity conservation fund to provide significant and ongoing funding for the Research Centre.

4.2.3 Overall offset liability

The estimated total offset liability of the Project is detailed in **Table 5**. The multipliers used to calculate the preliminary offset liability were selected to be consistent with the relevant policies, reflect the scale of impacts and strategic conservation outcomes that will be delivered through selected offset sites. Indicative offset areas are provided and the final offset areas will be determined following 'ecological equivalence' assessments. It is noted that **Table 5** does not take into account the co-location of offset values and therefore the total area to be provided for offsets will be less than the sum of this table.

Table 5 Offset liability of the Great Keppel Island revitalisation project

Biodiversity value/type	Listing under legislation	Impact Area (ha)	Proposed State Ratio	State Offset Area (ha)	Commonwealth Requirement	Proposed C'mwth Ratio	Commonwealth Offset Area (ha)	Proposed Total Offset Area (ha)
Offsets administered by the Coordinator-General and DERM								
Vegetation Management Act 1999								
Endangered REs								
None to be disturbed								
Of Concern REs								
8.2.1	Of Concern	0.58	n/a	0.58	No			0.58
8.2.7b	Of Concern	0.8	n/a	0.8	No			0.8
8.2.7e	Of Concern	5.5	n/a	5.5	No			5.5
8.11.9a	Of Concern	0.3	n/a	0.3	No			0.3
8.11.10	Of Concern	8.4	n/a	8.4	No			8.4
	TOTAL			**15.58**			**TOTAL**	**15.58**
Essential Habitat								
Esacus magnirostris Beach Stone-curlew	Vulnerable	36.8	n/a	36.8	No		**TOTAL**	**36.8**
Wetlands								
None to be disturbed								
Watercourses								
No watercourses to be impacted								
Connectivity								
The Revitalisation Plan will not result in the significant loss or fragmentation of habitat.								

Biodiversity value/type	Listing under legislation	Impact Area (ha)	Proposed State Ratio	State Offset Area (ha)	Commonwealth Requirement	Proposed C'mwth Ratio	Commonwealth Offset Area (ha)	Proposed Total Offset Area (ha)
Conservation Status Critically Limited Regional Ecosystems								
None to be disturbed	-							
Conservation Status Threshold Regional Ecosystems								
None to be disturbed	-							
Fisheries Act 1994								
Marine Plants								
Sea grass beds		0.964	5	4.82	No			**4.82**
Mangroves		0.04	5	0.2	No			**0.2**
							TOTAL	**5.02**
Marine ecosystems								
Bare marine substrate		20.08	5	100.4			**TOTAL**	**100.4**
Declared Fish Habitat Areas								
None to be disturbed								
Offsets administered by DSEWPAC under the EPBC Act								
World Heritage properties								
Great Barrier Reef WHA		146.5			Yes	4	**TOTAL**	**586**
Exceptional natural beauty and aesthetic importance								
Great Barrier Reef Marine Park								
Marine Habitat		21.08			Yes	4	**TOTAL**	**84.3**
Migratory Species								

Biodiversity value/type	Listing under legislation	Impact Area (ha)	Proposed State Ratio	State Offset Area (ha)	Commonwealth Requirement	Proposed C'mwth Ratio	Commonwealth Offset Area (ha)	Proposed Total Offset Area (ha)
No significant impacts								
Threatened Ecological Communities-								
None to be disturbed								
Threatened Fauna Species								
None to be disturbed								
Threatened Flora Species								
None to be disturbed								

5 Spatial analysis and offset site identification methodology

Potential offset sites were identified using desktop spatial analysis. These sites were further refined through a preliminary process of landholder engagement described in subsequent sections. While the spatial analysis methodology for the identification of shortlisted sites with Commonwealth and State ecological values are generally the same, there are some differences in the process. For example the study areas are different (refer to the sections below) and the spatial analysis for the Commonwealth offset requirements examines availability of World Heritage Area values using regrowth and remnant vegetation, while State offset requirements focuses on regrowth vegetation.

5.1 Project study area

5.1.1 Commonwealth study area

Potential offset properties for the Commonwealth were limited to those in or directly adjacent to the Great Barrier Reef World Heritage area within 100km of Great Keppel Island. Refer to **Figure 4** for a map of the Commonwealth study area.

5.1.2 State study area

The study area for State offsets considered the Project's island location, coastal communities and proximity to three different Queensland IBRA bioregions. Based on these contributing factors the State study area for the potential identification of offset properties was defined using IBRA subregions with similar vegetation communities / provenances and includes those subregions presented in **Table 6** and mapped in **Figure 5**.

Table 6 State study area and corresponding IBRA subregions

IBRA Region	IBRA Subregion
Brigalow Belt North	• Marlborough Plains
Brigalow Belt South	• Mount Morgan Ranges
Central Mackay Coast	• Whitsunday
	• Proserpine – Sarina Lowlands
	• Clarke – Connors Ranges
	• Manifold
	• Debella
	• Byfield
South Eastern Queensland	• Burnett – Curtis Hills and Ranges

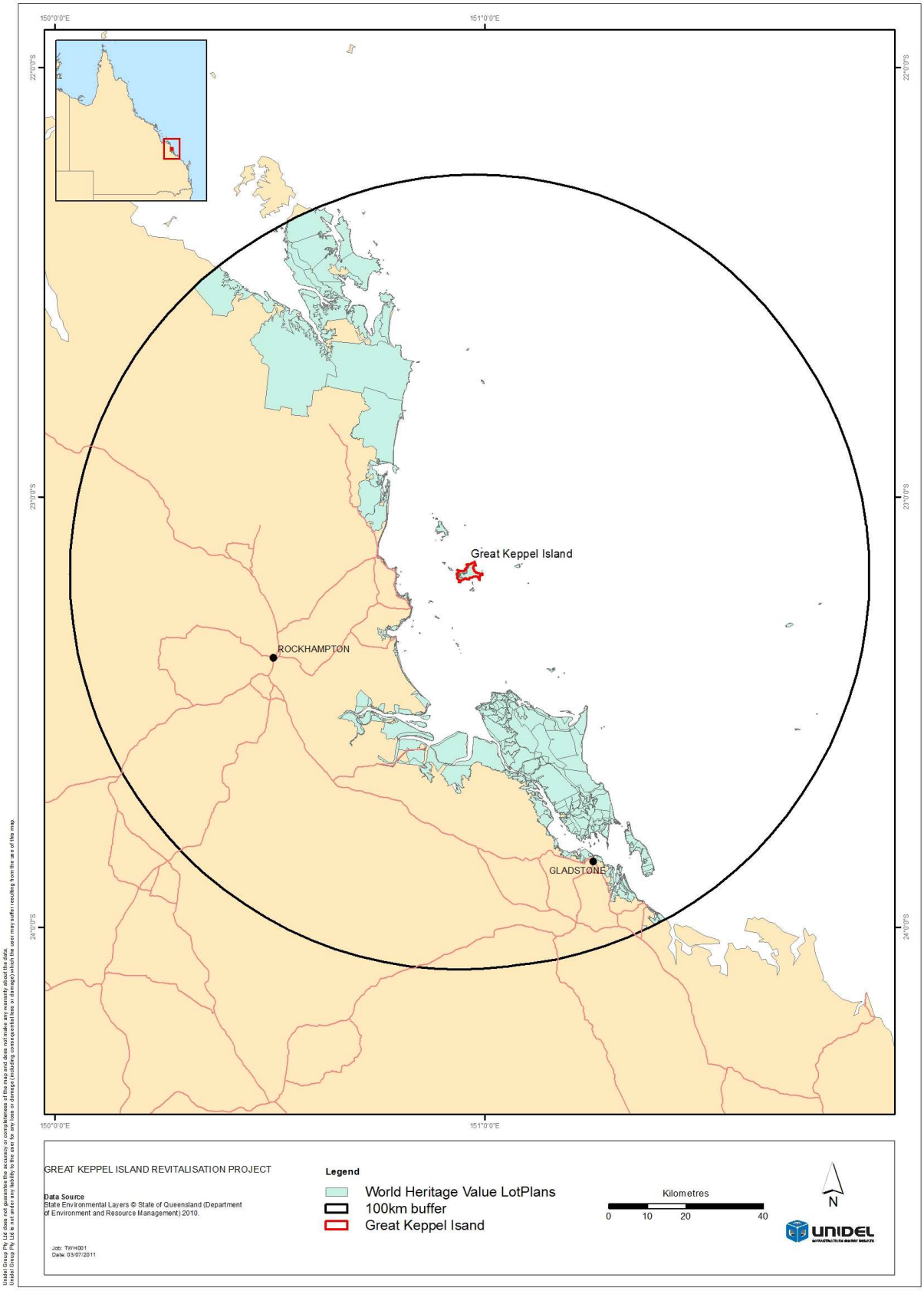

Figure 4 Commonwealth study area (World Heritage Properties within 100km of GKI)

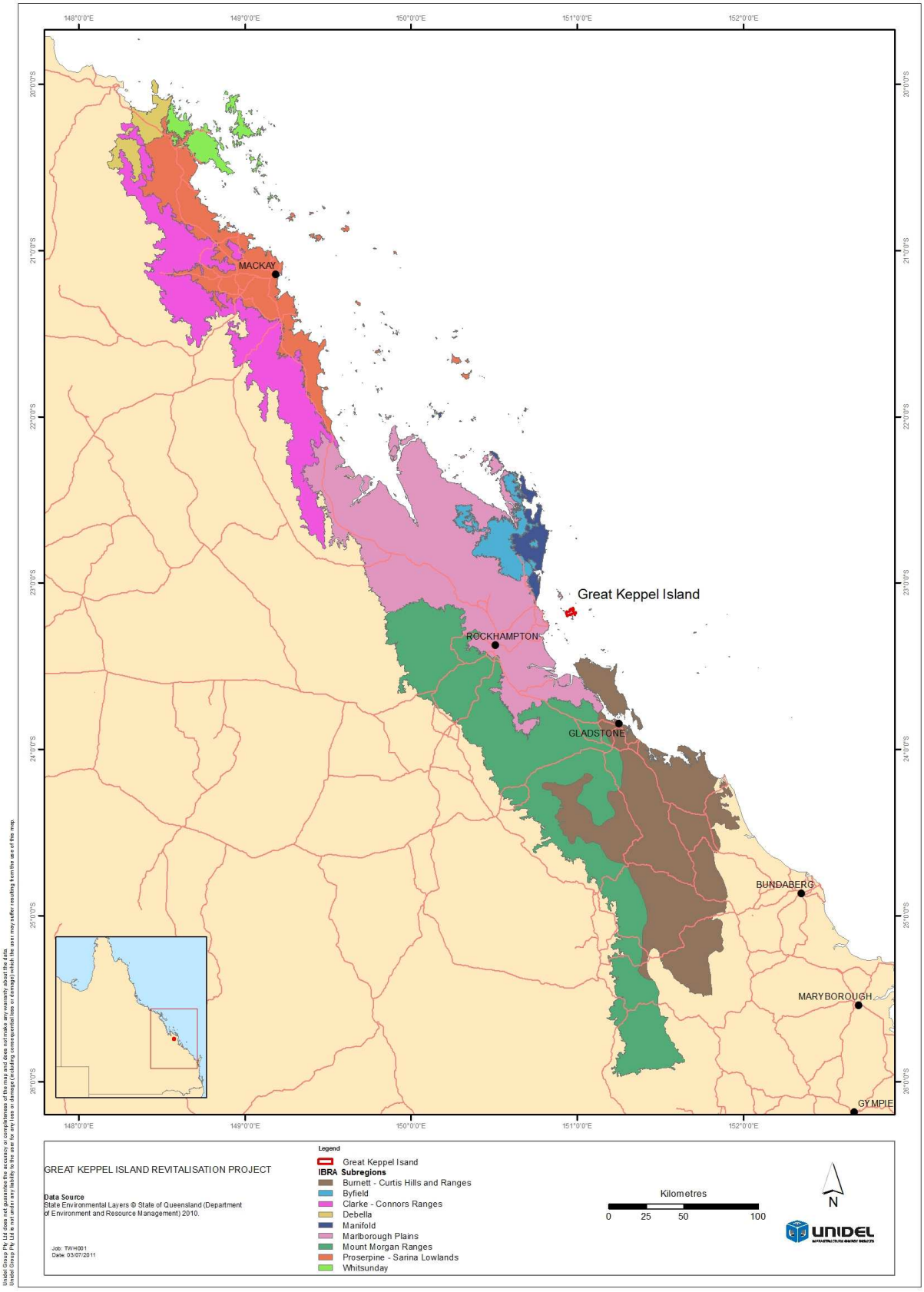

Figure 5 State study area and IBRA subregions

5.2 Broad spatial analysis

Spatial analysis for the identification of biodiversity values involves using a range of data to assess a potential offset site including vegetation characteristics, site condition, landscape connectivity, habitat values and land tenure. The broad spatial analysis steps are outlined below.

5.2.1 Vegetation assessment

Vegetation assessment was undertaken using a combination of RE VM Act Status and Broad Vegetation Groups (BVGs) for the broad spatial analysis.

The REs that were Of Concern (VM Act Status) were extracted from the pre-clearing vegetation layer. Pre-clearing vegetation mapping units that contained REs with the same BVG at the 1:1,000,000 scale (BVG1M) as those that occur on the development site were also extracted from RE mapping.

These separated pre-clearing datasets were geo-processed to produce coverages of non-remnant areas that previously supported the REs and vegetation communities that are required to be offset by the Project (based on the BVG1M and VM Act Status). **Table 7** below provides a description of the broad vegetation groups utilised in the analysis and their associated REs.

The non-remnant coverage was clipped to meet the extent of the relevant study area (as defined in **Section 5.1**).

Table 7 Summary of Project Broad Vegetation Groups

Impacted REs	BVG1M	REs	Broad Vegetation Group Description
8.11.3a, 8.12.14 2xC	9c	11.12.10, 3.11.5, 3.12.7, 8.11.3, 8.11.5, 8.12.12, 8.12.14, 8.12.25, 8.12.26, 8.12.27, 8.12.32, 8.12.9	Open-forests of *Corymbia clarksoniana* (or *C. intermedia* or *C. novoguinensis*), *C. tessellaris* ± *Eucalyptus tereticornis* predominantly on coastal ranges, Other frequent tree species include *Eucalyptus drepanophylla, E. pellita, E. brassiana* and *Lophostemon suaveolens*. (Can occur on land zones 2, 3, 5, 8, 11, 12) (BRB, CQC, CYP, WET)
8.2.8a	9e	10.3.12, 11.3.35, 11.3.7, 11.3.9, 11.5.12, 8.2.13, 8.2.6, 8.2.8, 8.3.5, 8.3.6, 8.5.1, 8.5.5	Open-forests, woodlands and open-woodlands dominated by *Corymbia clarksoniana* (or *C. novoguinensis* or *C. intermedia* or *C. polycarpa*) frequently with *Erythrophleum chlorostachyus* or *Eucalyptus platyphylla* predominantly on coastal sandplains and alluvia. (land zones 2, 3, 5) (BRB, CQC, CYP, DEU, EIU, GUP, WET)
8.11.8a	10b	12.11.5, 12.11.6, 12.12.3, 12.12.5, 12.5.1, 12.5.7, 12.8.24, 12.9-10.2, 8.11.8, 8.12.7	Moist open-forests to woodlands dominated by *Corymbia citriodora*. Can occur on land zones 5, 10, 11, 12. (CQC, EIU, NET, SEQ)
8.2.7b, 8.2.7e	22b, 22a	8.1.5, 8.2.11, 8.2.7, 8.3.11, 8.3.13	Open-forests and low open-forests dominated by *Melaleuca* spp. (*M. saligna, M. leucadendra, M. clarksonii* or *M. arcana*) in seasonally inundated swamps. (land zones 2, 3) (CQC, CYP, GUP, WET)
8.11.10	28e	8.10.1, 8.11.10, 8.12.10, 8.12.29	Low open-forest to woodlands dominated by *Lophostemon suaveolens* (or *L. confertus*) or *Syncarpia glomulifera* frequently with *Allocasuarina* spp. On rocky hill slopes. (land

Impacted REs	BVG1M	REs	Broad Vegetation Group Description
			zones 3, 5, 11, 12) (CQC, CYP, SEQ, WET)
8.11.9, 8.11.9a	32b	11.8.10, 12.8.15, 3.12.29, , 8.11.9, 8.12.13	Closed-tussock grasslands and open-woodlands on undulating clay plains and upland areas. Dominant species include *Heteropogon triticeus* or *Themeda arguens* or *Sarga plumosum* or *Imperata ylindrical* or *Mnesithea rottboellioides/ Arundinella setosa*. With areas of open-woodland dominated by tree species such as *Corymbia papuana / Terminalia* spp. / *Acacia ditricha/ Piliostigma malabaricum*. (land zones 3, 5, 8, 9, 12) (CYP, EIU, GUP)
8.2.1	35b	11.1.1, 11.1.2, 12.1.2, 8.1.2, 8.1.3	Bare saltpans ± areas of *Halosarcia* spp. Sparse-forbland and/or *Xerochloa imberbis* or *Sporobolus virginicus* tussock grassland. (land zone 1) (BRB, CQC, CYP, GUP, SEQ, WET)

(Source: DERM, 2009)

5.2.2 Regrowth assessment

The developed non-remnant coverage was assessed against the 2006 Time Series Foliar Projected Data and processed into three classes, each based on the extent of woody vegetation cover and pre-clearing grassland extent. All non-remnant vegetation units that occur on areas that show no woody vegetation cover have been removed from the data set. This is to produce coverage of non-remnant regrowth vegetation and pre-clearing grassland reflecting the BVG1M of the REs that are required to be offset by the Project. The non-remnant coverage was assessed against the High Value Regrowth (HVR) Data Set (version 2) to identify areas that may be otherwise protected.

5.2.3 Land use and tenure assessment

The remaining coverage of non-remnant regrowth vegetation was assessed against the 2009 version of the Digital Cadastral Database for tenure. Vegetation units that occurred on land with tenures compatible to a conservation outcome were maintained within the data set and classed in accordance with their level of suitability. Areas under existing conservation constraints or subject to unsuitable tenures, as discussed below, were removed from the data set.

An area of the 2003 Land Use of Queensland (Qld) (version 3) was extracted to match the coverage of the remaining non-remnant vegetation cover. The non-remnant regrowth coverage was assessed for compatible land uses. Mapping units that occurred in conjunction with unsuitable or prohibitive land uses were removed from the data set. These included units that occurred within urban land use areas or mining leases.

5.2.4 Connectivity and strategic location

The mapping units of non-remnant regrowth vegetation were assessed for connectivity to major tracts of remnant vegetation, the coastline, protected areas (such as the GBRMP) and bioregional wildlife corridors. Version 6b of the RE Mapping was combined with the Qld Protected Area Estate Data Set and Biodiversity Assessment Mapping (bioregional wildlife corridors) to rank the mapping units. The non-remnant regrowth areas were classified according to connectivity. As such, sites that linked directly to protected areas were ranked the highest, while isolated areas were ranked lowest.

5.3 Refined spatial analysis

To prioritise and develop an initial set of shortlisted offset sites, consideration was given to the following:

- Presence of World Heritage Values;
- Located within or adjacent to the Great Barrier Reef Marine Park;
- VM Act Status vegetation Of Concern or Endangered;
- BVG components impacted by the Project;
- Connectivity;
- Presence of essential habitat;
- Sites large enough to meet the entire offset requirement for the Project; and
- Condition of the site based on aerial imagery.

6 Spatial analysis results and shortlisted offset sites

6.1 Commonwealth analysis

6.1.1 Commonwealth spatial analysis results

The Commonwealth requires offsets for the Project impact's on World Heritage Values and the Great Barrier Reef Marine Park. The same BVGs within 100 km of the Project, in the Great Barrier Reef World Heritage Area and adjacent to the Great Barrier Reef Marine Park, were used in the broad spatial analysis.

The purple areas in **Figure 6** show the regrowth and remnant vegetation areas with the same BVGs that will be impacted by the Project that occur in the Great Barrier Reef World Heritage Area. The total area is over 250,000ha, with just over 70,000ha having the same BVG regrowth or remnant vegetation as those impacted. Approximately 25,000ha of this BVG vegetation is located on islands off the coast (**Table 8**).

Table 8 Characteristics of WHA properties

Total area (ha)	Same BVG regrowth and remnant vegetation (ha)	Same BVG regrowth and remnant vegetation on islands (ha)
251,450	70,907	26,830

6.1.2 Commonwealth shortlisted offset sites

Approximately 26 offset sites (Lot Plans) have been shortlisted for further investigation and landholder liaison. These sites represent the best available offset options as assessed through spatial analysis aligning to impacted ecological values. The shortlisted sites contain a minimum of 50 times the area required to be offset for World Heritage and Great Barrier Reef Marine Park Values (based on a 4:1 ratio). **Table 9** provides a summary of results for the 26 shortlisted offset sites.

Table 9 Summary of vegetation within shortlisted offset sites

Ecological values	Total area (ha)	Impact area (ha)	BVG non-remnant vegetation (ha)	BVG remnant vegetation (ha)
World Heritage Values	42,278	13,235	2,358	39,920

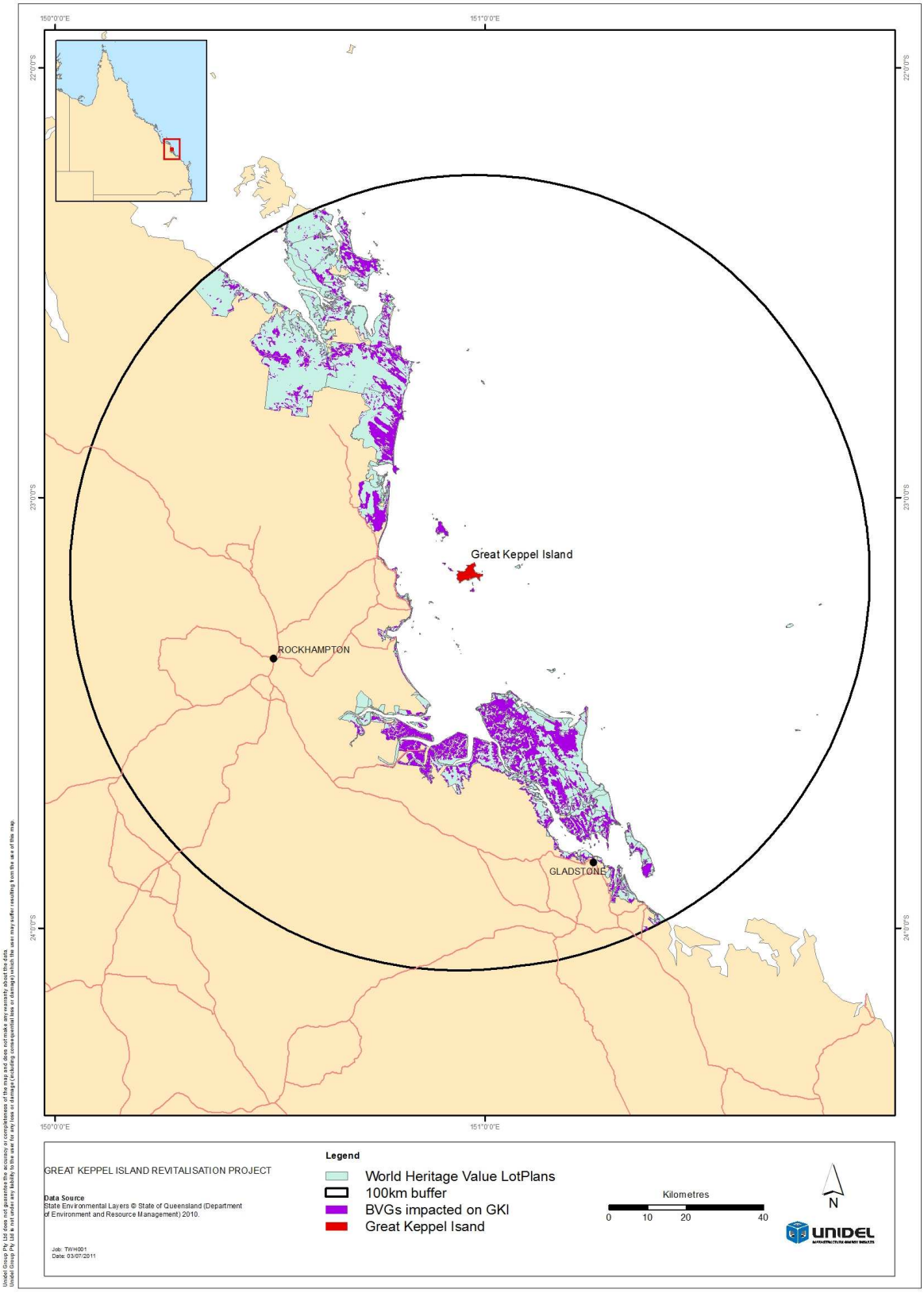

Figure 6 Areas with the same BVGs that are proposed to be impacted

6.2 Commonwealth preferred sites

Landholders associated with the 26 shortlisted sites were contacted and introduced to the concept of environmental offsets. As a result of discussions the owners of three properties have provided written confirmation that they have an 'in-principle' interest in providing certain areas within their land holdings as offset sites.

The results of the landholder engagement process provides only a snapshot of the available offset opportunities within the study area; further sites may be added to the list of potential offsets during field inspections. A summary of the potential offset area available is presented in **Table 10**. These potential offset properties in addition to World Heritage and Great Barrier Reef Marine Park Values also contain significant areas of marine habitat to meet the State offset requirements.

The preferred Commonwealth offset sites are identified in **Figure 7**.

Preferred sites have been listed on the basis of proximity to the impacted area, ecological values and strategic location. These sites have been identified by DERM as of high biodiversity value suitable for protected area status. The sites offer the opportunity for co-investment with other proponents for more strategic environmental outcomes.

Values at each of the sites include extensive marine areas greater than 1,000ha, habitat for migratory birds, proximity to protected areas and high biodiversity benefits. One of the sites occur within the Great Barrier Reef World Heritage area whilst the other properties are adjacent. This later property includes extensive wetland areas and additional MNES values including disturbed areas of Coastal Vine Thicket.

The World Heritage aesthetic values these preferred offset sites offer includes:

- Protecting coastal views from the World Heritage area to the mainland;
- Provide for a diversity of coastal landforms including mountains, headlands, sand dunes, mangroves and beaches characteristic of the Great Barrier Reef Word Heritage area;
- Protecting aerial vistas through land use security over foreshore areas; and
- Assistance with maintaining the contrast and diversity of shoreline and water's edge landscapes.

Table 10 Summary available offset area

Offset type	Number of properties	Available offset (ha)	Required offset (ha)
World Heritage and Great Barrier Reef Marine Park Values	3	19,186	670.3

Figure 7 Preferred Commonwealth offset sites

6.3 State spatial analysis results

The proposed State offsets are for Project impacts to Of Concern REs and Essential Habitat for the beach stone curlew. Non-remnant regrowth was identified for REs that were Of Concern or Endangered (VM Act Status) in the pre-clearing vegetation layer.

The total area mapped as non-remnant (including PMAV Category X) within the State offset study area is 2,364,452ha. Of this 1,398,980ha has a pre-clearing VM Act Status of Of Concern or Endangered (**Table 11**). There was a total of 219,194ha of potential good quality regrowth with Of Concern or Endangered status within the State offset study area.

Table 11 Summary of spatial analysis results

VM Act status	Pre-clearing non-remnant (ha)	Area supporting regrowth[2] (ha)	Project vegetation impact area (ha)
Of Concern	843,728	130,617	15.58
Endangered	555,252	88,577	0
Total	**1,398,980**	**219,194**	N/A

Figure 8 below provides a graphical representation of the regrowth non-remnant and PMAV Of Concern and Endangered REs.

No specific spatial analysis was undertaken to identify suitable marine habitat offset sites. Suitable areas were considered in the analysis and identification of the Commonwealth potential offset sites. As described in **Section 6.2** there are sufficient marine areas to satisfy the likely marine habitat offset requirements.

[2] Estimates for total areas supporting regrowth vegetation are based on Queensland Government Foliar Projective Cover Dataset.

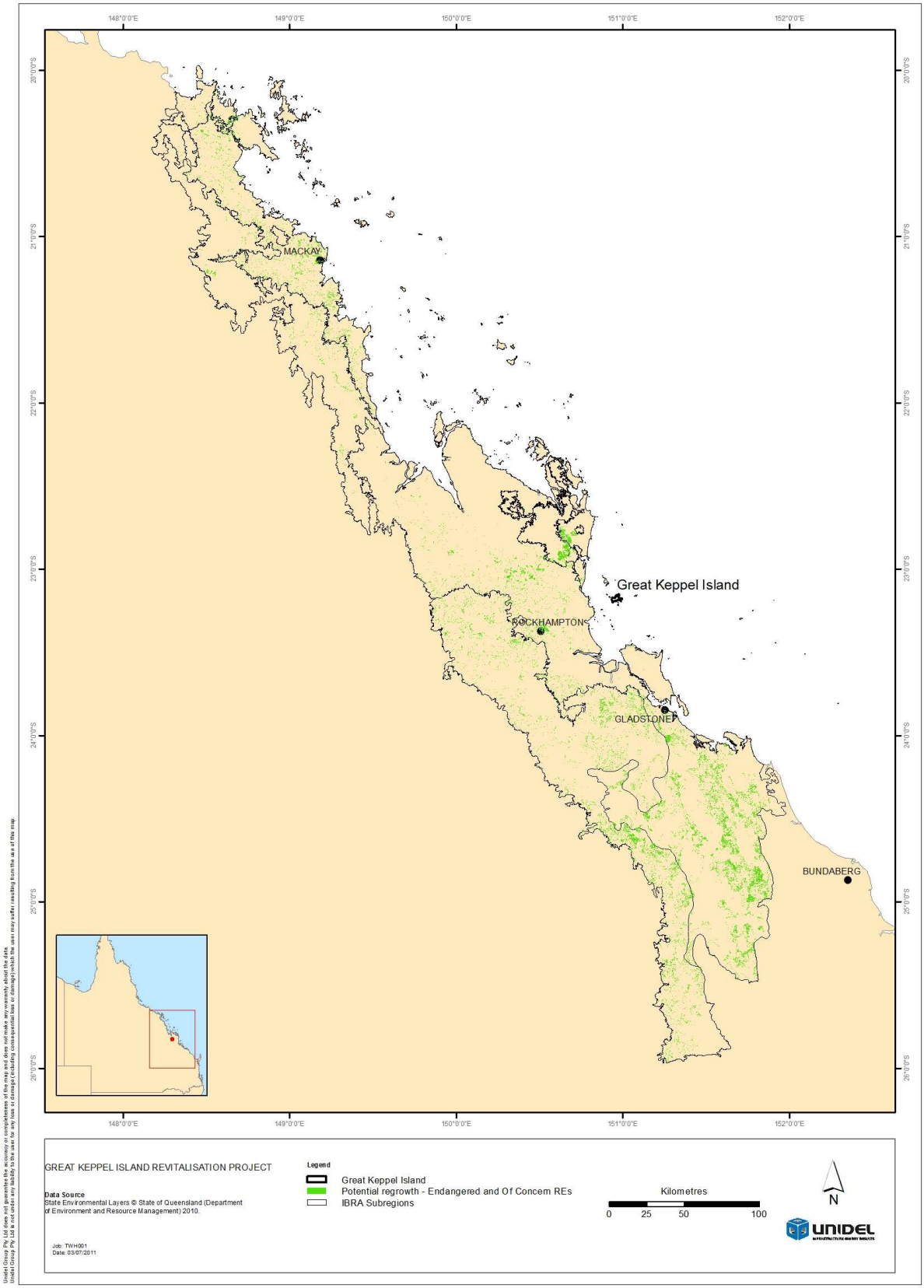

Figure 8 Endangered and Of Concern regrowth vegetation

6.3.1 State shortlisted offset sites

RE mapping of the Of Concern and Endangered status regrowth vegetation, with the same BVGs that were impacted by the Project, and strategically located, were used as selection criteria for shortlisting potential offset sites.

A total of 16 potential offset sites were shortlisted for further investigation, landholder liaison and preliminary site inspection. **Table 12** provides a summary of results for the 16 shortlisted offset sites.

Table 12 Summary of vegetation within shortlisted offset sites

VM Act Status	Regrowth vegetation (ha)	Remnant vegetation (ha)	Project vegetation impact area (ha)
Endangered / Of Concern	1,038	9,346 (26,919)[3]	15.58

6.4 State preferred sites

The State shortlisted offset sites have not been subject to landholder liaison or preliminary site inspections to establish ecological equivalence at this stage. There are many sites available to meet the offset requirements for the project and further sites may be added to the list of potential offset sites following landholder liaison or preliminary site inspections.

6.5 Availability of direct offsets

Following spatial analysis and preliminary discussions with landholders for the Commonwealth preferred sites there are three strategic offset properties with preliminary landholder approval. While not all of these sites will be used, the total offset areas available significantly exceed the Commonwealth terrestrial offset requirements of the Project and are likely to provide sufficient marine area to meet the State's offset requirements for impacts to marine habitats.

Following spatial analysis for State offsets, 16 strategic offset sites have been identified. While not all of these sites will be used, the total offset areas available significantly exceed the State terrestrial offset requirements of the Project.

Table 13 presents a summary of the total available offset area (based on desktop analysis, preliminary site inspections and early landholder engagement process).

Table 13 Summary available offset area

Offset type	Number of properties / sites	Available offset area	Required offset (ha)
World Heritage and Great Barrier Reef Marine Park Values	3	19,186	670.3
Of Concern vegetation	16	1,038	15.58
Essential habitat – Beach stone curlew	3	To be determined	36.5
Marine habitats	>3	To be determined	105.42

[3] Total area of remnant within shortlisted offset sites including vegetation not with relevant BVG's.

The proposed offsetting approach is to co-locate as many offset values as practical. It is likely that a number of the Project offset requirements at the Commonwealth and State level can be co-located to reduce the number of offset sites and achieve more strategic environmental outcomes.

It is currently proposed the World Heritage and Great Barrier Reef Marine Park Values, marine habitats and Beach stone curlew habitat will be found on one strategic offset site. Additional, smaller offsets may be required to compensate for the loss of Of Concern REs.

6.6 Indirect offsets

In addition to the direct offsets identified in **Section 6.5** Tower Holdings Pty Ltd propose indirect offsets in the form of a specialised Research Centre in the Keppel Island Group on Great Keppel Island and a biodiversity conservation fund to provide significant and ongoing funding for the Research Centre. Further details will be provided at a later date. The indirect offsets will supplement the direct offsets being provided.

6.7 Next steps

The preliminary preferred sites identified in the spatial analysis, from a desktop perspective, demonstrate there are suitable sites available to offset the unavoidable Project impacts. The next stage involves contacting the landholders associated with the shortlisted sites and undertaking preliminary site inspections to confirm their suitability. Preliminary site inspections have been conducted on the three preferred sites proposed as potential offsets for World Heritage and Great Barrier Reef Marine Park Values.

Preliminary site inspections will involve the visual assessment of a range of attributes that relate to their condition, habitat values and a comparison with the RE's impacted by the Project. Potential offset areas will be assessed for the following attributes:

- Distance from original impact;
- Regional Ecosystems;
- Vegetation type and condition;
- Underlying geology;
- Species diversity;
- Structure;
- Time to remnant status;
- Habitat quality;
- Potential management requirements; and
- Landholder attitude/expectations.

The ecological equivalence methodology (Ecological Equivalence Methodology Guideline – Version 1. 3 October 2011) will be used to demonstrate ecological equivalence between the offset area and the proposed impact site.

The next stage also involves input from government regulators and working towards an agreed position on the offsets required and the initial list of shortlisted sites.

7 Methods proposed for the establishment and management of offsets

The following sections provide a summary of the proposed approach to the protection and ongoing management of offset sites. Mechanisms are outlined for ongoing reporting, and approval compliance and timelines are provided for each of the major elements.

7.1 Legal instruments of protection

In accordance with the *Draft Policy Statement: Use of environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999,* the proposed offsets are required to be legally secured in perpetuity to ensure that all project related environmental impacts are adequately compensated over the long term. Typical legal mechanisms that can be used to secure offsets, include, but are not restricted to:

- Voluntary Declarations under the *Vegetation Management Act 1999*;
- Nature Refuge Agreements under the *Nature Conservation Act 1992*;
- Statutory Covenants under the *Land Title Act 1994* (Land Title Act) or *Land Act 1994* (Land Act); and
- Conservation tenures e.g. Nature Refuge, Conservation/National Park.

The preferred instrument of protection will be dependent on the tenure and ownership of the particular land parcel.

7.1.1 Voluntary declaration

The voluntary declaration process is a relatively simplistic and cost effective approach provided for a landholder to voluntarily protect native vegetation on their property. The voluntary declaration is a mechanism under the *Vegetation Management Act 1999*.

The voluntary declaration is generally accompanied with a management plan which sets out the activities to be undertaken to achieve the management intent and outcomes of the agreement. This management plan is legally binding on all present and future owners of the property. This plan will only cease to bind landholders once the intent and desired outcomes of the plan have been achieved.

A voluntary declaration must be signed by all parties that have an interest in the land. This may include mortgagees, easement holders or Native Title claimants.

7.1.2 Nature refuge agreements

A nature refuge is a voluntary agreement between a landholder and the Queensland Government under the *Nature Conservation Act 1992* that allows for the management and preservation of conservation significant land while allowing compatible and sustainable land uses to continue. These agreements attach to land title and are therefore binding on both present and future owners of the property.

Landholders with a nature refuge continue to own and manage their land to generate an income and in keeping with their lifestyle. They also have a supporting conservation agreement (a type of management plan) written for the areas subject to the nature refuge which is administered and enforced by DERM.

A nature refuge is recognised as a type of ‘protected area’ in Queensland. Nature refuges comprise the second largest expanse of Queensland’s protected areas estate, and actually out number national parks. Mining or petroleum leases may be granted over nature refuge areas, although the presence of a nature refuge may lead to additional State imposed conditions on the mining or petroleum proponent. In all other situations a nature refuge

agreement will only be terminated in exceptional circumstances. It is the highest level of protection that can be afforded to a freehold or leasehold property in Queensland.

7.1.3 Statutory covenant

A statutory covenant is a written agreement that can bring about positive environmental outcomes by ensuring that ecological values are not diminished in the future. A covenant over freehold land is registered under the Land Title Act and a covenant over lease hold land is registered under the Land Act.

A statutory covenant may not restrict other registered interests over the title. A registered interest holder may apply to have the covenant removed under Section 181 of the *Property Law Act 1958.* Section 97D of the Land Title Act and Section 373D of the Land Act allows a landholder to be released from a statutory covenant.

7.2 Mechanisms for the management of offset sites

Each legally secured offset will be supported by a Vegetation Management Plan (VMP) that outlines practical measures to ensure the effective re-establishment and ongoing management of the offset.

The VMP will include restoration requirements as well as monitoring and compliance specifications. Onsite management strategies described in each VMP will depend upon the specific characteristic of each offset site and the ecological value being protected, these may include:

- Weed and pest management;
- Fire risk abatement measures; and
- Grazing practices (where appropriate).

The VMP will be prepared through an iterative process involving consultation with landholders, government agencies and suitably qualified ecologists. The VMP will identify who is responsible for any actions including field restoration works and compliance monitoring and reporting.

All restoration and management activities will be undertaken with the supervision of a suitably qualified ecologist in accordance with the conditions described in the VMP.

The VMP will include specific monitoring and record keeping requirements for each offset and the proponent will likely be required to prepare and submit an annual report, addressing compliance with the Approval, the Strategy and any VMP's that have been approved by the Minister. Site works will be audited annually by a suitably qualified person. The Minister will be notified in the event of any non-compliance.

7.3 Approval and timeframe for securing offsets

Offset sites will be prioritised to meet the Commonwealth and State offset requirements, and detailed site inspections will be conducted at each offset site. Results will be presented in an Offset Package to SEWPAC and State government regulators for approval. Where the sites are acceptable those sites will be secured for use as offset sites.

Tower Holdings Pty Ltd may seek to purchase suitable sites or they may enter into agreements with existing landholders depending on the most suitable and practical method for each site. The timeline for finalising these contractual arrangements will be six months from receiving approval of the Offset Package by the Commonwealth and State government agencies.

7.4 Site establishment and primary restoration of offset

Restoration works on the approved offset sites will commence within six months of securing the sites. Overall timeframes for restoration works will be dependent on the site and the ecological values to be protected. Restoration activities may include fence construction, weed and pest animal control and establishing fire breaks.

It is expected that the primary restoration works will be completed within the first 12 months of the site being secured as an offset.

7.5 Ongoing management and reporting

Active management of the offset site is expected to continue for a number of years depending on the condition of the offset. The VMP for each site will specify ecological criteria that determine when ongoing management will be complete.

Ongoing management of the offset site is likely to include weed and pest management and fire management strategies. The regularity and scale of the management strategies are likely to depend on the nature of the offset site and the ecological values to be protected.

Established offsets are required to be audited on an annual basis. Records taken from these audits will be summarised in an annual report to be submitted to the relevant government agencies. The annual reporting requirement will continue until the government agencies are satisfied that the management plan objectives and conditions of the Approval have been met.

7.6 Revision of the offset strategy

Where it is necessary to carry out an activity other than in accordance with this Offset Strategy (once approved by the Minister), a request must be submitted to the Minister for approval to revise the Offset Strategy.

8 Conclusion

This Offset Strategy has assessed the potential offset requirements triggered by the Project at the Commonwealth and State level.

Based on an assessment of the biodiversity values identified within the Project footprint and the estimated disturbance areas, it has been determined that offsets are available to meet project requirements. At the Commonwealth level the Project requires offsets for impacts on World Heritage Values which is currently estimated at 146.5ha and impacts to marine habitat in the Great Barrier Reef Marine Park of 21.08ha. At the State level offsets are proposed for unavoidable impact to mapped Essential Habitat (36.5ha), five Of Concern Regional Ecosystems (15.58ha) and marine plants and habitats (21.08ha).

Spatial analysis was conducted to identify the best available strategically located offset sites and demonstrate the availability of suitable offset properties.

For the Commonwealth offset requirements the spatial analysis and landholder liaison undertaken as part of this Offset Strategy has identified three preferred properties (with written confirmation of 'in-principle' interest from the landowners) that are located within or adjacent to the World Heritage area and the Great Barrier Reef Marine Park and contain similar Word Heritage values, vegetation communities and biodiversity values to those lost.

The area within these Commonwealth preferred sites is significantly larger than the total Project offset requirements. These sites also contain additional biodiversity values, including those that require offsets at the State level. Therefore the preferred Commonwealth offset sites provide an opportunity to co-locate State offset requirements and deliver strategic conservation benefits. In addition to these three preferred offset sites, additional offset options are available.

For State offset requirements the spatial analysis has identified 16 shortlisted sites that contain the vegetation and habitat values required to be offset. The area within these shortlisted sites is significantly larger than the State offset requirements and additional offset options are available.

The next phase, following the release of the EIS and endorsement of the Offset Strategy by government regulators, is to prioritise the potential offset areas for both Commonwealth and State requirements, engage with landholders and undertake site inspections to verify the biodiversity values on the ground, determine 'ecological equivalence' and delineate proposed offset areas.

In consultation with the Coordinator-General, DERM, DEEDI and SEWPAC an Offset Package will then be prepared which details the proposed offset sites, how they meet the policy requirements, mechanisms to secure the areas and management requirements. This Offset Package will also outline timelines for the delivery of these tasks.

9 References

In this document, the following documents are referenced:

Title
Great Keppel Island Revitalisation Environmental Impact Statement
Digital Cadastral Data Base (DCDB) (2008) (Department of Environment and Resource Management)
Eyre, T.J., Kelly, A.L, and Neldner, V.J. (2008). BioCondition: A Terrestrial Vegetation Condition Assessment Tool for Biodiversity in Queensland. Field Assessment Manual. Version 1.6. Department of Environment and Resource Management (DERM), Biodiversity Sciences unit, Brisbane.
frc environmental (2011) Great Keppel Island Resort Revitalisation EIS – Aquatic Ecology. Prepared for: Tower Holding Pty Ltd.
High Value Regrowth vegetation-version 2, Nov (2009). The State of Queensland, (Department of Environment and Resource Management)
Queensland Herbarium (2009) Survey and Mapping of 2006b Vegetation Communities and Regional Ecosystems of Queensland, Version 6.0b (November 2009) (Department of Environment and Resource Management: Brisbane).
Sattler, P.S. and Williams, R.D. (Eds) (1999). The Conservation Status of Queensland's Bioregional Ecosystems. Published by the Department of Environment and Resource Management, Brisbane.
Pre-clearing RE Mapping Version 6.0b (DERM)
2006 Time Series Foliar Projected Data (DERM)
2009 Digital Cadastral Database for Tenure (DERM)
2003 Land Use of Queensland (version 3) (DERM)
Queensland Protected Area Estate Data Set (DERM)
Biodiversity Assessment Mapping (DERM)

Appendix A – Analysis of Great Keppel Island Regional Ecosystems and their representation

Regional Ecosystem	Regional Ecosystem Conservation VM Status	Broad Vegetation Group (BVG)	BVG Description (DERM, 2011)	Area (ha) GKI (as mapped by CEPLA)	Extent of RE within Protected Estate (in Qld) (DERM,2009)	Remnant representation within State *	Remnant representation in Bioregion (regional) Central Queensland Coast *	Remnant representation within Subregion (local) Byfield *	Representation in Great Barrier Reef Marine Park Islands *	EPBC Communities (National) (Threatened Species Scientific Committee, 2008afi)	Estimated Impact Lower Range (percentage of impact on GBRMP)**	Estimated Impact Higher Range (percentage of impact on GBRMP)**
8.2.2	Of Concern	3b	Evergreen to semi-deciduous, notophyll to microphyll vine forest/ thicket on beach ridges and coastal dunes, occasionally Araucaria cunninghamii microphyll vine forest on dunes. Pisonia grandis on coral cays. (land zone 2)	3.94	Medium	51,483.35; (0.008%)	2,087.38; (0.19%)	34.05; (11.57%)	1,402.08; (0.3%)	3.94ha on GKI compared with total area in QLD 16,135ha & Total area Australia of 18,000ha.	vegetation type not impacted	vegetation type not impacted
8.11.3a	Least Concern	9d	Moist to dry open-forest to woodland dominated by *Eucalyptus portuensis, Corymbia intermedia or E. reducta +/- Syncarpia glomulifera +/- E. cloeziana* on ranges. (Can occur on land zones 2, 3, 8, 11, and 12)	101.49	Medium	51,8432.27; (0.02%)	191,028; (0.05%)	64,404.65; (0.16%)	1,434.07; (7.1%)	N/A	0.04 (<0.01%)	0.11 (<0.001%)
8.12.14x2c	Least Concern	9c	Open-forests of *Corymbia clarksoniana* (or *C. intermedia or C. novoguinensis*), *C. tessellaris* ± *Eucalyptus tereticornis* predominantly on coastal ranges, Other frequent tree species include *Eucalyptus drepanophylla, E. pellita, E. brassiana* and *Lophostemon suaveolens*. (Can occur on land zones 2, 3, 5, 8, 11 and 12).	84.69	High	294,650.9; (0.03%)	65,829.62; (0.13%)	9,807.08; (0.86%)	11,602.52; (0.73%)	A small portion (0.86ha) of the 8.12.14x2c could be regarded as the EPBC community	4.12 (0.04%)	12.37 (0.11%)
8.2.8a	Least Concern	9e	Open-forests, woodlands and open-woodlands dominated by *Corymbia clarksoniana* (or *C. novoguinensis or C. intermedia or C. polycarpa*) frequently with *Erythrophleum chlorostachys* or *Eucalyptus platyphylla* predominantly on coastal sandplains and alluvia. (land zones 2, 3, 5)	145.33	High	1,280,075.21; (0.01%)	66,880.55; (0.22%)	13,169.2; (10.6%)	1,400.33; (10.4%)	N/A	46.48 (3.32%)	74.21 (5.3%)
8.11.8a	Least Concern	10b	Moist open-forests to woodlands dominated by *Corymbia citriodora*. Can occur on land zones 5, 10, 11, and 12.	423.34	Low	1108218.72; (0.04%)	195,137.9; (0.22%)	12603.98; (3.36%)	616.02; (68.72%)	N/A	26.47 (4.3%)	44.24 (7.2%)
8.11.8b	Least Concern	13d	Woodlands dominated by *Eucalyptus moluccana* (or *E. microcarpa*) on a range of substrates. (land zone 3, 11, 12)	14.03	Low	272,778.47; (0.005%)	4,515.26; (0.31%)	1,255.74; (1.12%)	14.03; (100%)	N/A	vegetation type not impacted	vegetation type not impacted
8.2.7b	**Of Concern**	22b	Open-forests and low open-forests dominated by *Melaleuca spp.* (*M. saligna, M. leucadendra, M. clarksonii or M. arcana*) in seasonally inundated swamps. (land zones 2, 3)	14.98	High	240,327.13; (0.01%)	5,255.93; (0.29%)	761.81; (2%)	42.43; (35.31%)	N/A	0.82 (1.93%)	0.82 (1.93%)
8.2.7e	**Of Concern**	22a	Open-forests and woodlands dominated by *Melaleuca quinquenervia* in seasonally inundated lowland coastal areas and swamps. (land zones 2, 3)	11.7	High	80,592.91; (0.01%)	3,152.33; (0.37%)	173.41; (6.75%)	101.77; (11.5%)	N/A	5.06 (4.97%)	5.46 (5.37%)
8.2.1	Least Concern	28a	Complex of open-shrubland to closed-shrubland, grassland, low woodland and open-forest, on strand and foredunes. Includes pure stands of *Casuarina equisetifolia.* (land zone 2)	117.89	High	182,931.56; (0.06%)	771.15; (15.29%)	237.57; (49.6%)	1,465.77; (8%)	N/A	0.58 (0.04%)	0.58 (0.04%)
8.11.10	**Of Concern**	28e	Low open-forest to woodlands dominated by *Lophostemon suaveolens* (or *L. confertus*) or *Syncarpia glomulifera* frequently with *Allocasuarina spp.* on rocky hill slopes. (land zones 3, 5, 11, 12)	258.69	High	105,594.34; (0.24%)	51,819.15; (0.5%)	2,023.51; (12.78%)	16,477.6; (1.6%)	N/A	6.05 (0.04%)	8.44 (0.05%)
8.11.9a	**Of Concern**	32b	Closed-tussock grasslands and open-woodlands on undulating clay plains and upland areas. Dominant species include *Heteropogon triticeus* or *Themeda arguens* or *Sarga plumosum* or *Imperata cylindrica* or *Mnesithea rottboellioides/ Arundinella setosa*. With areas of open-woodland dominated by tree species such as *Corymbia papuana / Terminalia spp. / Acacia ditricha/ Piliostigma malabaricum*. (land zones 3, 5, 8, 9, 12)	71.32	High	54,646.62; (0.13%)	5,224.75; (1.37%)	584.40; (12.2%)	5,308.41; (1.3%)	N/A	0.3 (<0.01%)	0.3 (<0.01%)
8.1.1	Least Concern	35a	Closed-forests and low closed-forests dominated by mangroves. (land zone 1)	26.75	High	476,403.03; (0.006%)	41,113.76; (0.07%)	78.71; (34%)	4,011.83; (0.7%)	N/A	vegetation type not impacted	vegetation type not impacted
8.1.2	Least Concern	35b	Bare saltpans ± areas of Halosarcia spp. sparse-forbland and/or *Xerochloa imberbis* or *Sporobolus virginicus* tussock grassland. (land zone 1)	32.02	High	651,233.99; (0.005%)	14,523.21; (0.22%)	38.02; (84.21%)	661.16; (4.8%)	N/A	vegetation type not impacted	vegetation type not impacted
										TOTAL IMPACT	89.92 ha remnant vegetation impacted	146.53 ha remnant vegetation impacted

All areas calculated for the State, Bioregion, subregion are based on the State's regional ecosystem version 6 (DERM, 2009). Calculations for GBRMP are based partially on RE v 6 but uses the areas as mapped by CEPLA for GKI.
* Figures presented include: Area in hectares of the dominant broad vegetation group; (The percentage of the BVG represented on Great Keppel Island).
** percentages calculated give the impact on a GBR scale (i.e. area impacted / area present in GBRMP)
Source: CEPLA 2011.