Terms of reference for an environmental impact statement

Burdekin Falls Dam Raising project

March 2021

COORDINATOR-GENERAL

Queensland Government

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Department of State Development, Infrastructure, Local Government and Planning
PO Box 15517 City East Qld 4002.
1 William Street Brisbane Qld 4000 (Australia)

Phone: 13 QGOV (13 7468)
Fax: 07 3220 6465
Email: **cpdinfo@coordinatorgeneral.qld.gov.au**
Web: **www.dsdilgp.qld.gov.au/cg**

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Part A About these terms of reference

1. Introduction

1.1 This document outlines the terms of reference (TOR) for the Burdekin Falls Dam Raising project (the project) proposed by Sunwater Limited and being assessed under the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

1.2 The proposed project is to increase the storage capacity and yield of the existing Burdekin Falls Dam. The project comprises the following:

(a) raising the dam spillway by at least 2 metres (m) and possibly up to 6 m

(b) associated raises of the left and right abutments to contain the selected design flood

(c) raising of existing saddle dams to contain the selected design flood and construction of a new right bank saddle dam

(d) adjustments to dam apron and splitter piers

(e) access road realignments and upgrades

(f) associated infrastructure works.

1.3 The existing Burdekin Falls Dam was constructed in 1987 and is Queensland's largest dam. It is located on the Burdekin River approximately 160 kilometres (km) upstream from the river's mouth and approximately 210 km south of Townsville. The inundation area, known as Lake Dalrymple, is located within the local government areas of Charters Towers Regional Council and Whitsunday Regional Council. The Burdekin River, downstream of Burdekin Falls Dam, is within Burdekin Shire Council local government area.

1.4 Pipelines and other water distribution infrastructure are not included in the scope of the declared coordinated project. The Burdekin Falls Dam Improvement project and hydro-electricity generation are also not within the scope of the declared coordinated project.

2. Statutory basis

2.1 The Coordinator-General has declared the Burdekin Falls Dam Raising project to be a 'coordinated project for which an environmental impact statement (EIS) is required' under section 26(1)(a) of the SDPWO Act. This declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires a proponent to prepare an EIS for the project.

2.2 This TOR set out the matters the proponent is to address in an EIS for the project and are approved by the Coordinator-General under section 30 of the SDPWO Act.

3. Accredited EIS process for controlled actions under Commonwealth legislation

3.1 On 28 August 2020, the delegate of the Commonwealth Minister for the Environment determined the project is a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cth), due to the likely potential impacts on matters of national environmental significance (MNES) (reference number EPBC 2020/8705).

3.2 The EIS process has been accredited under the Assessment Bilateral Agreement between the Commonwealth and the State of Queensland under section 45 of the EPBC Act relating to Environmental Assessment (Bilateral Agreement). Accordingly, the EIS is to state the controlling provisions for the project and describe the particular aspects of the environment that led to the controlled action decision. The relevant MNES controlling provisions include:

(a) World heritage properties (sections 12 and 15A)

(b) National heritage places (sections 15B and 15C)

(c) Ramsar wetlands (sections 16 and 17B)

(d) Listed threatened species and communities (sections 18 and 18A)

(e) Listed migratory species (sections 20 and 20A) and

(f) Great Barrier Reef Marine Park (GBRMP) (sections 24B and 24C).

3.3 Each of the controlling provisions are to be described and illustrated in a stand-alone report (MNES section) in the EIS.

3.4 Requirements for MNES are set out in Section 16 of this TOR.

4. EIS guidelines

4.1 This TOR is to be read in conjunction with *Preparing an environmental impact statement: Guideline* for proponents (see Appendix 1), which provides guidance on the following:

(a) participants in the EIS process

(b) consultation requirements

(c) EIS format and copy requirements.

4.2 In addition, subject-specific policies and guidelines are referenced throughout this TOR and are listed in Appendix 1.

5. More information

5.1 For information about the project or the EIS process conducted under the SDPWO Act, visit **www.dsdilgp.qld.gov.au/cg**.

Part B General approach and requirements for an EIS

6. General approach

6.1 The objectives of the EIS are to:

(a) provide a detailed description of the proposed project

(b) ensure that all relevant environmental, social and economic impacts of the project are identified and assessed

(c) detail the management and mitigation measures proposed to avoid, minimise and/or mitigate any adverse impacts including proposed ongoing monitoring

(d) demonstrate that the project is based on sound environmental principles and practices.

6.2 For the purposes of the EIS process, 'environment' is defined in Schedule 2 of the SDPWO Act and includes:

(a) ecosystems and their constituent parts, including people and communities

(b) all natural and physical resources

(c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community

(d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

6.3 The detail at which the EIS deals with matters relevant to the project is to be proportional to the scale of the potential impacts on environmental values. When determining the scale of an impact, consideration is to be given to its intensity, duration, cumulative effect, irreversibility, the risk of environmental harm, the effectiveness of any proposed management strategies to avoid, minimise or at least mitigate impacts and the ability to offset any residual impacts.

6.4 The EIS must address other matters not covered in the TOR in the following circumstances where:

(a) studies reveal a matter that had not been foreseen when the TOR was finalised

(b) an issue not previously identified but is in the public interest is to be addressed

(c) the Coordinator-General directs the proponent in writing to address a matter as an information request under section 34 of the SDPWO Act

(d) new or amended legislation or policies come into effect after the TOR has been finalised, regardless of whether or not the legislation or policies have been listed in the TOR. Transitional arrangements or exemptions may apply for individual projects

(e) the proponent makes amendments to the proposed project that would result in a change in the nature, timing or location of any impacts[1].

7. Requirements of an EIS

7.1 The EIS is to:

[1] The proponent is to notify the Coordinator-General of any amendments to the proposed project as described in the project's initial advice statement.

(a) be prepared in accordance with, and meet the minimum requirements of, Schedule 1 of the State Development and Public Works Organisation Regulation 2020

(b) be prepared in accordance with relevant policies, standards and guidelines, including but not limited to those listed in Appendix 1. Application of such guidelines, standards and policies will be confirmed throughout the development of the EIS in consultation between the Coordinator-General, the proponent and advisory agencies

(c) be prepared and completed by suitably qualified and experienced professional/s, relevant to the field of expertise required for each subject matter

(d) use sufficient site-specific baseline data or other information relevant to the environmental risks of the project including seasonal and long-term variations.

(e) provide details about the quality of the information provided, in particular: the source of the information; how recent the information is; how the reliability of the information was tested, and any assumptions, exclusions and limitations

(f) present the feasible project options that were considered in selecting the preferred option including the consequences of not proceeding with the project (the 'do nothing' option). Demonstrate why the preferred option has been selected by summarising the comparative environmental, social and economic impacts of each project option, with particular regard to the principles of ecologically sustainable development

(g) provide detailed strategies regarding all matters for the protection, or enhancement (as desirable), of all relevant environmental values in terms of outcomes and possible conditions that can be measured and audited. In general, the preferred hierarchy for managing likely impacts is: (a) to avoid (b) to minimise or otherwise mitigate (c) remedy and (d) if necessary, and possible, to offset

(h) include a consolidated commitment register that lists all measures (including monitoring programs and management plans) demonstrated in the EIS assessment to avoid, minimise, or otherwise mitigate, remedy or offset project impacts and that would need to be implemented during construction and operation to meet the predicted project outcomes

(i) include environmental management plans (EMP) for both the construction and operation phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS and set specific commitments to implement best practice environmental management in order to protect the identified environmental values. The EMP is to be presented as a stand-alone document without reference to other parts of the EIS.

7.2 The contents of the EMP are to comprise:

(a) the project's commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, including progressive and final rehabilitation, performance monitoring and reporting

(b) impact prevention and control strategies to satisfy the commitments

(c) corrective actions to rectify any deviation from performance standards.

7.3 Each matter assessed in the EIS (as described in Section 15 and 16 of this TOR) is to:

(a) include a concise description of the potential impacts of the project

(b) describe the measures proposed to avoid, minimise or otherwise mitigate or remedy impacts to meet environmental standards and acceptable outcomes, and where necessary offset those impacts

(c) demonstrate how monitoring will confirm environmental outcomes, including using baseline data to track environmental outcomes.

7.4 Assess the extent to which the construction, operation and decommissioning (to the extent known) of the project meets all statutory and regulatory requirements of the State and Commonwealth and that the intended outcomes are consistent with current state legislation, policies (including passed and uncommenced legislation) and guidelines. If there is a conflict, explain how the project can be approved.

7.5 For all the relevant matters, identify and describe the environmental values that are to be protected. Environmental values are specified in the *Environmental Protection Act 1994*[2] (EP Act), the EP Regulation, environmental protection policies (EPPs), State Planning Policy 2017 (SPP) and relevant guidelines.[3]

7.6 Include, as an appendix to the EIS, a table cross-referencing where each requirement of Part C of the TOR is addressed in the EIS, to the lowest available subsection.

7.7 Describe the stakeholder consultation and associated actions that occurred during the preparation of the EIS, identify the issues raised during consultation, and explain how the responses from the community and agencies have and will be incorporated into the design and outcomes of the project.

7.8 The EIS is to be prepared and submitted on a universal serial bus (USB), inclusive of all plans and documents that form the EIS. The electronic documents submitted are to satisfy the criteria detailed in Table 1 below.

Table 1 Format requirements

Format requirements	
Document size	The EIS and accompanying appendices are to be produced on A4 size and are to be capable of being photocopied. Each PDF file should not be larger than 10 megabytes (MB) and must meet the accessibility requirements described in the *Adobe Acrobat X Pro Accessibility Guide: PDF Accessibility Overview*, available at: **www.adobe.com/accessibility/products/acrobat/training.html**
Format and style	The format and style of the document is to be appropriate for publication on the Internet.
Plans, maps, diagrams and other illustrative material	All plans, maps, diagrams and other illustrative material is to be provided at a suitable scale and must be included in a PDF format so that they are legible and easily understood.
	Plans and maps are to be located within the appropriate EIS chapter/s, as close as possible to where referenced in the text.
	Plans, maps and diagrams are to be to scale on A4 or A3 size with the scale clearly displayed on each. The plan, map or diagram is also to state the original size (e.g. A1). Each should be in colour, where possible, and have a resolution between 300 and 900 dpi.

[2] Part 3, Division 2, Subdivision 1, section 9.
[3] Examples included in Appendix 1.

Locations	All geographical coordinates throughout the EIS are to be provided in latitude and longitude against the Geocentric Datum of Australia 2020 (GDA2020).
Elevations	Elevations detailed within the EIS are to be provided to Australian Height Datum (AHD). Plans, maps and diagrams included in the EIS should have contours at suitable increments relevant to the scale, location, potential impacts and component of the project.
References	All sources must be appropriately referenced using the Harvard standard. The reference list should include the address of any Internet webpages used as data sources.
Spatial data file format requirements	
File names	File names are to be descriptive and provided in one of the following formats: ESRI file geodatabase (GDB) - preferred ESRI Shapefiles. GDB/shape
Data attributes	All data is to contain descriptive attributes or columns, including but not limited to the following: Date data was created, version number, who created the data (i.e. the company name), Datum (e.g. GDA1994 or GDA2020) and Category or Stage.
Projection	Data can be provided in any projection; however Geo-graphics is preferred. The datum shall be GDA1994 or GDA2020.
Metadata	Use standards ISO 19115:2015 ANZLIC ISO 1.1

Part C EIS content and suggested structure

8. Executive summary

8.1 The executive summary is to describe the project and convey the most important aspects and environmental management options in a concise form. It is to use plain English, avoid jargon, be written as a stand-alone document and structured to align with the EIS.

9. Introduction

9.1 The introduction is to clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. The introduction is also to include an overview of the structure of the document.

Project proponent

9.2 Describe the following:

(a) the proponent's full name, postal address and Australian Business Number, and details of any joint venture partners

(b) the nature and extent of business activities

(c) the proponent's experience in developing major projects

(d) the proponent's (including directors) environmental record in Australia, including a list of any breach of, or proceedings against the proponent under a law of the Commonwealth or State, for the protection of the environment or the conservation and sustainable use of natural resources (an environmental law), during the previous ten years

(e) the proponent's environmental, health, safety and community policies

(f) experience, qualifications and certification of all suitably qualified consultants and sub-consultants engaged by the proponent to complete the EIS.

The environmental impact assessment process

9.3 Provide an outline of the environmental impact assessment process, including the role of the EIS in the Coordinator-General's decision-making process, noting which milestones have been completed, and an estimated timeframe for completing each remaining EIS stage(s). The information in this section is required to ensure readers are informed of the process to be followed and are aware of any opportunities for input and participation.

9.4 Inform the reader how and when properly made public submissions on the EIS are to be addressed and considered in the assessment and decision-making processes under the SDPWO Act, the *Planning Act 201*6 and any other relevant legislation.

9.5 Describe the assessment process under the EPBC Act, pursuant to the Bilateral Agreement between the Commonwealth government and the State of Queensland.

10. Project description

Proposed development

10.1 The EIS is to describe and illustrate the following about the project:

(a) project title

(b) existing approvals related to the dam and proposed development

(c) nature, location and scale of all project components and activities, including but not limited to:

(i) the location of survey/assessment/feasibility works, permanent infrastructure, construction areas, access requirements and boundaries of the project's footprint

(ii) the full supply level (FSL) inundation area and flood margin, including identification of the waterways upstream of the existing inundation area that will be inundated by the raised FSL (including AHD levels)

(iii) all infrastructure elements and development necessary to deliver the project

(iv) locations where waterway barrier works constitute assessable development requiring a development approval or accepted development for operational work that is constructing or raising waterway barrier works

(v) location of diversions or interception of overland flow and other water-related infrastructure, including watercourse diversion design and operation

(vi) water supply volumes on-site, including a breakdown between potable and non-potable and their respective sources, during both the construction and operational phases

(vii) proposed on-site water storage and treatment for use by the site workforce during the construction phase

(viii) proposed sewage infrastructure relevant to environmentally relevant activity (ERA) 63, including wastewater treatment and any proposed irrigation

(ix) other utility requirements including electricity, gas, telecommunications

(d) transport requirements

(e) expected capital expenditure

(f) regional and local infrastructure context of the project's footprint, including water supply infrastructure in the Burdekin Basin (with maps at suitable scales)

(g) workforce numbers to be employed by the project during its various phases, expressed as annual average full-time equivalent positions created during each phase.

(h) where personnel would be accommodated during construction and operation of the project and the likely recruitment and rostering arrangements to be adopted

(i) proposed travel arrangements of the workforce to and from work, including use of fly-in-fly-out workforce or drive-in-drive-out

(j) relationship to other major projects and/or development (of which the proponent should reasonably be aware)

(k) activities or proposals related to the project but outside the scope of this EIS process (e.g. how water is expected to be distributed to end users).

Design of infrastructure

Water storage infrastructure (dam and saddle dams)

10.2 Describe the process and criteria used to select the preferred design and construction techniques, including:

(a) FSL and details of any staging or prospects for future expansion showing site boundaries, development sequencing and timeframes

(b) maximum (final) crest height and width and spillway height and width for the proposed raising height, including height above stream bed and height and width of saddle dams

(c) details of the dam operation including minimum operating level, likely fluctuations in dam water levels and likely extraction regime, e.g. when water will be sourced and expected demands versus yield, likely release timings, volumes, frequencies and durations

(d) storage capacity, maximum depth, average depth, dead storage level, area of inundation at FSL, the extent of any buffer and management areas required, including a description of the flood margin and means of its determination, length of beds of rivers (and tributaries) inundated

(e) modelled headwater and tailwater levels at the site at different flows and extraction rates

(f) general design of any proposed changes to the outlet works including siting, capacity, off-take level, location, screening and ability to regulate flows, aquatic fauna exclusion and protection systems and location of outlet in relation to any fauna passage device

(g) spillway design including spillway gate design and operation, if relevant, spillway face finish and gradient, spillway crest design, and capacity, including gauge specification and operation

(h) details of how the designs of the spillway and dissipators or other fishway adequately provide for safe downstream passage of all species and how the designs of all

infrastructure will minimise injury and mortality to fish or other aquatic fauna, including turtles passing over the spillway during and outside spillway flows

(i) details and effectiveness and risk of fish injury and mortality of any energy dissipaters and apron at the downstream foot of the dam, including environmental requirements

(j) location and details, rationale and likely effectiveness of any provision for incorporating appropriate fauna passageways (e.g. fishway and/or turtleway or stream diversions) in the design and the effect on the viability of the proposed project[4].

(k) details of the physical form of the stream beds within 1000 metres of the downstream foot of the dam (e.g. presence of natural features likely to be impacted, deep pools, riffles and other refugia for upstream moving fauna) and the project's impacts on stream bed morphology, and bank and channel stability

(l) details of associated instream structures including any upstream or downstream permanent or temporary waterway barrier works e.g. for access, water delivery or water storage purposes

(m) estimated water yields and their associated performance/reliability (with appropriate allowances for environmental requirements)

(n) proposed system of allocation of water from the project and any proposed high and medium priority allocations to specific urban, rural or industrial users and allocations for environmental requirements

(o) details of proposed remote operation, design and location of automated component control housings in relation to flood levels and relevant environmental conditions

(p) length and width of all water storage infrastructure

(q) construction methods and materials for structures e.g. earthen/sand, concrete, rock and/or sheet pile, location, volume, tonnage and quality of natural resources required

(r) describe how water from the dam is proposed to be delivered to end users.

Ancillary infrastructure requirements

10.3 Detail the location of works to be undertaken, with concept and layout plans, requirements for new infrastructure, or the upgrading, retention, relocation and/or decommissioning of existing infrastructure to service the project. Infrastructure to be considered is to include, but is not limited to:

(a) resource extraction areas

(b) transport and utility infrastructure and corridors, including necessary access roads and tracks

(c) site construction facilities including workforce accommodation, water supply and treatment, energy supply from the grid, generators and fuels, telecommunications, solid waste disposal, wastewater treatment and disposal, and sewerage systems

(d) infrastructure for recreational and tourist purposes

(e) on-farm infrastructure (such as buildings, yards, pumps, fences, dips).

[4] Persons who are suitably qualified and experienced in biology, and fauna passage design and construction are to be engaged to advise regarding: (i) whether upstream passage of fish (including eels) is required, (ii) provision and adequacy of downstream fish passage, and (iii) oversee the design, construction and commissioning of any fauna passage.

10.4 Detail whether the infrastructure is permanent or temporary and nominate if it constitutes waterway barrier works.

10.5 Nominate the building and construction standards for the works.

10.6 Describe the timing of requirements for this infrastructure and detail the decommissioning schedule for all project-related infrastructure.

10.7 Include names of the required infrastructure service providers, together with evidence as to whether discussions have been held with these providers, regarding the capacity of existing or proposed infrastructure to accommodate/or not accommodate project requirements.

10.8 Identify any ancillary infrastructure alternatives considered and justify selected options.

Project staging

10.9 Provide a detailed description of the proposed project activities (construction and operation), including scope of works (on the project site and required infrastructure – new and upgraded), disturbance area, physical layout of the project over time, likely timing of the project including any stages and the sequencing of these stages.

Pre-construction

10.10 Identify if any land acquisition is proposed.

10.11 Describe the pre-construction activities, including the location with appropriate scaled maps, including:

(a) the consents and approvals required to access or purchase land or obtain easements

(b) licences and permits required for the construction works

(c) pre-disturbance surveys, including geotechnical, topographic, flora and fauna, water quality, hydraulics and hydrology, cultural heritage and how this information will be used in the final design and construction of the project[5]

(d) the sequencing/stage, location and extent of vegetation clearing associated with all components of the works (including firebreaks and fire management lines), including proposed retention and disposal of timber and processes for relocation of fauna

(e) interference with watercourses, waterways providing for fauna passage, wetlands and floodplains

(f) approach for reduction of water supply level in existing dam reservoir required prior to construction

(g) any required demolition, temporary augmentation or other preparatory activities on existing structures including recreational infrastructure, and upstream and downstream, instream and floodplain infrastructure

(h) any land decontamination

(i) establishment of construction site facilities and services

(j) for all components, the proposed earthworks, construction methods, associated equipment and techniques.

[5] Water quality and aquatic ecosystem health monitoring at all stages of the project to be undertaken in accordance with the Monitoring and Sampling manual (Queensland Government, 2019).

Construction

10.12 Identify the extent and nature of construction activities required for the water storage and each component of ancillary infrastructure and the dam construction ancillary area.[6]

10.13 Illustrations showing site boundaries, buffer zones, development sequencing and timeframes and the layout of construction facilities to be used.

10.14 Describe the nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw material.

10.15 Describe how the water supply level in the existing dam reservoir is to be managed throughout construction, particularly during wet seasons.

10.16 Describe any proposal to divert waterways during construction, how fauna passage would be provided through any diversions and, if applicable, proposals for the reinstatement of the waterways after construction has ceased. Reference should be made to Department of Agriculture and Fisheries (DAF's) Guidelines for Fish Salvage (e.g. if any dewatering is required).

10.17 Describe changes to watercourses, the change in hydrology upstream and downstream of the site, flooding and overland flow on or off the project site, including crossings, spillway, fishways, downstream barriers, flood levees, water off-takes and, locations of any proposed water discharge points.

10.18 The general description is to include, as appropriate to each component:

(a) the construction standards, methods and site management arrangements and the environmental and safety management procedures to apply

(b) any new electricity transmission infrastructure, routes and easements required

(c) timetable for construction, including days and hours of operation for proposed construction works, including night-time works and work rosters

(d) nature and location of workforce accommodation and means of transporting workers at shift change

(e) location of construction laydown areas

(f) the capacity of high-impact plant and equipment, their chemical and physical processes, and chemicals or hazardous materials to be used

(g) any activity that is a prescribed ERA

(h) general construction requirements including blasting, excavation, dredging, haul road establishment, bed-levelling, crushing, screening, concrete batching, fuel and chemical storage, workshop facilities, office facilities, on-site mess and ablutions facilities

(i) location and access to any new or established quarry operations, borrow pits or stream bed excavations the project may source materials from

(j) the source of materials and infrastructure for the project, their nature and mode of delivery

[6] Note that the dam construction ancillary area comprises site office, accommodation camp and associated facilities, laydown areas, material stockpiles, machinery workshop, fuel supply, parking, etc.

(k) works needed within the site and off-site to protect downstream water quality and environmental values (e.g. sediment and erosion control measures, fencing)

(l) details of handling flood and bushfire events during construction

(m) management of fauna and vegetation material generated by clearing for construction and the inundation area

(n) the number, capacity and type of vehicles, machinery, plant and equipment used for construction activities and including the method of transport of construction machinery and materials to and within the site(s). Full details of transport volumes, modes and routes are to be provided in accordance with Section 15 – Transport

(o) a water balance for the water supply requirements for each component of the works, potable, dust suppression and ablutions is to be identified and quantified. For each water requirement, the source, volume, means of access and transport, treatment processes and storage method are to be provided

(p) any take or interference with water in a watercourse, lake or spring, overland flow water, and underground water (both direct and in-direct)

(q) stormwater drainage systems and the proposed treatment, disposal and/or re-use arrangements, including any off-site services

(r) capture, containment/disposal and quantity of construction spoil. Full details of physical and chemical properties of soils and spoil are to be provided in accordance with Section 15 – Land

(s) solid and liquid waste management (full details of the waste volumes, characteristics and management strategies) are to be provided in accordance with Section 15 – Waste management

(t) public and workforce safety, medical facilities to be provided on site and provision for access to emergency services

(u) allowance for provision of power back-up in emergency and potential impact on local supplies in the area

(v) security services

(w) construction site demobilisation.

Rehabilitation

10.19 Describe the rehabilitation activities to be undertaken during and after construction, providing scaled maps where required, including:

(a) site restoration actions, closure and decommissioning works for removal of infrastructure

(b) the options, strategies, methods and management for the progressive rehabilitation of the environment disturbed by construction. A preferred rehabilitation strategy is to be developed with a view to minimising the amount of land disturbed at any one time

(c) the final topography of any quarries, borrow areas, trenches, sediment control structures, waste areas, temporary waterway barrier sites, construction areas and all other forms of landform impact is to be described and identified on maps at a suitable scale

(d) any proposals to reinstate fish, turtle or other aquatic fauna passage and waterways impacted or diverted during construction.

Operation

10.20 Describe operational activities detailing the following:

(a) the infrastructure commissioning process

(b) provision for the potential necessary structural and operating adjustments relating to fauna passage, fauna exclusion devices, approach channels, screens, etc. that will be identified during post-commissioning monitoring

(c) landscaping and the rehabilitation of affected areas after construction

(d) arrangements for administration and control of the works (dam, any fauna passage, roads, recreational facilities and all other components)

(e) operational arrangements for the project including:

(i) duration, timing and frequency of spillway overtopping (include comparison with current frequencies) and flow releases including location, timing, volume, duration and downstream extent of releases

(ii) outlet works including details of remote operation and administration

(iii) on-site staffing, access for staff during wet season events, safety requirements for staff and the public

(iv) routine maintenance

(f) proposed access points associated with the storage and dam wall for dam operations and maintenance, including infrastructure for recreational purposes

(g) use and management of surrounding land and any obligations or restrictions thereon

(h) any restrictions on access or land usage within any buffer zones, of land exposed at water levels below FSL or within the storage

(i) energy and telecommunications requirements and sources

(j) solid, liquid and gaseous waste generated and proposed methods of treatment and disposal

(k) transport needs and expected traffic

(l) the expected life of the infrastructure and any anticipated major maintenance periods

(m) demonstrate the effectiveness, operational range and frequency of any proposed fauna passageway and/or spillway providing upstream and downstream aquatic fauna passage.

Decommissioning

10.21 It is recognised that project components are anticipated to have a long operational life spanning many decades and there is less expectation of detailed decommissioning strategies in the EIS for this project than for other types of projects. This section is to present general strategies and methods for decommissioning and rehabilitation of the project should it ever be required.

11. Site description

11.1 Provide all property descriptions for land impacted by the project area, and adjacent properties. Provide details of proposed tenure arrangements for all properties impacted by the project. Include details of any easements, roads and railways (existing and/or proposed, public and private), leases, reserves, Native Title land (claims under consideration and decided) and cultural practice areas, approved indigenous land use agreements, permits to occupy, mining tenures, stock routes, conservation tenures, state forest, native forest and timber reserves, and approved state and/or biodiversity offset strategies.

11.2 Describe and illustrate with suitably scaled maps all transport corridors, private roads, local and state-controlled roads, pipelines, private and government owned corporation energy infrastructure, rail, air services[7], maritime and other infrastructure or services in the region relevant to or impacted by the project, including its construction and operation activities.

11.3 Describe and illustrate the topography of the project area and surroundings on maps and highlight any significant features. Include and name rivers and creeks.

11.4 Map the location and boundaries of the project's footprint, including inundation areas and all infrastructure elements and development necessary for the project. Show all key aspects including excavations, stockpiles, areas of fill, subsidence areas, services infrastructure, plant locations, water storages, buildings, bridges and culvert, haul and access roads, causeways, stockpile areas, loading facilities and any areas of dredging for waterway management. Include discussion of any environmental design features of these facilities, including bunding of storage facilities.

11.5 Describe and illustrate specific information about the project including the precise location of the project area and construction activities in relation to any waterbodies, waterways providing for fish passage, and protected areas such as conservation parks, nature refuges, forest reserves, state forests, National Parks, matters of national and state significance, the location of any proposed buffers surrounding the working areas, lands identified for conservation, either through retention in their current natural state or to be rehabilitated and Traditional Owner land and cultural practice areas. Include maps at a catchment scale illustrating the relationship between the project location and upstream and downstream riverine, estuarine and coastal ecosystems.

11.6 Describe and map in plan and cross-sections the geology and landforms, including the boundaries of water catchment areas, of the project area and surrounds. Show geological structures, such as aquifers, faults and economic resources (such as agricultural and mining projects) that could have an influence on, or be influenced by, the project and its construction and operational activities.

11.7 Describe, map and illustrate soil types and profiles of the project area including added fill and/or exposed ground surface at appropriate scales and in accordance with relevant guidelines. Identify soils that would require specific management due to wetness, erodibility, depth, acidity, salinity or other features.

11.8 Describe the findings of the agricultural land audit and any land identified as strategic cropping land, priority agricultural area, priority living area or strategic environmental area for the project area.

[7] As defined in the State Development Assessment Provisions.

Climate

11.9 Describe the existing climate characteristics that are relevant to the environmental assessment, with particular regard to discharges to water and air, the water related effects of climate change on water availability. Climate information is to be presented in a statistical form including long-term averages and extreme values reflecting extreme weather events (e.g. droughts, floods and bushfires), as necessary.

11.10 Describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, evaporation, wind (direction and speed) and any other special factors (e.g. temperature inversions) and subsequent effects on runoff, irrigation demand and water availability that may affect management or viability of the project under climate change.

11.11 Describe the extremes of climate (e.g. droughts, floods and bushfires) relevant to the project area including under climate change scenarios.

12. Project rationale and alternatives

12.1 Demonstrate the need for the project including in a regional, state and national context. The demonstrated need should also take into account existing water entitlement holders and other major water infrastructure projects proposed for the region.

12.2 Describe the objectives and rationale for the project, including strategic, economic, environmental and social implications, technical feasibility and commercial drivers.[8]

12.3 Present feasible alternatives of the project's configuration including conceptual, technological, scale and locality that may improve environmental outcomes. Detail the criteria used to determine the alternatives. Provide sufficient detail to provide an understanding for preferred option/s.

12.4 Describe how the selected project configuration results in best-case outcomes for each impact to the most important environmental values over alternative project configurations.

12.5 Present alternatives to development of the project, including consideration of water efficiency measures for existing users. Describe how these alternatives have been considered and why the project is the preferred option.

12.6 Justify the preferred option. Identify and describe interdependencies of the project components, particularly in regard to how infrastructure requirements relate to the viability of the project.

12.7 Discuss the consequences of not proceeding with the project.

13. Planning and legislative requirements

13.1 Identify all government approvals required for the project and detail all approvals for which conditions are being sought through this EIS process. Sufficient information and assessment is required for conditions of approval to be drafted and for the administering authority to decide whether an approval is to be granted. Explain how the EIS process (and the EIS itself) informs the issue of leases/licences/permits/consents required for the project.

13.2 Provide an assessment against the relevant planning schemes, regional plans, state policies and government priorities for the project area and the region. Consider the provisions relative to the project and address where required, providing evidence where provisions do not apply.

[8] Note that approvals required for irrigated agriculture are the responsibility of entities developing those projects.

13.3 Consider the provisions of the *Regional Planning Interests Act 2014* (RPI Act) and whether a regulated activity development application is required pursuant to the RPI Act

13.4 Describe any approvals or entitlements required under the *Water Act 2000* and *Water Plan (Burdekin Basin) 2007* (Water Plan)[9] and address relevant legislative requirements and water volume limitations.

13.5 The SPP and State Development Assessment Provisions (SDAP) prescribed in the Planning Regulation 2017 (Planning Regulation) set out the matters of interest to the State for development assessment. The EIS is to:

(a) identify the SPP and SDAP codes relevant to the project

(b) assess the project against the relevant SPP

(c) demonstrate the project satisfies the information requirements by providing an assessment against the most up-to-date version of the relevant SDAP state codes. Further information on SDAP requirements can be accessed from: **https://planning.dsdmip.qld.gov.au/planning/better-development/the-development-assessment-process/the-states-role/state-development-assessment-provisions**

13.6 The EIS is to provide, where relevant, the information required under section 125 of the EP Act in support of the project's application for any required ERAs. Any ERA to be conducted as part of the project should be listed separately with the appropriate ERA number, activity name and required threshold (see EP Regulation, Schedule 2 for a list of ERAs). Relevant ERAs may include (but not limited to) ERA 63, ERA 16, ERA 8, ERA 57. The assessment and supporting information, where relevant, is to be sufficient for the administering authority to decide whether an approval should be granted.[10] Environmental values, information and approval requirements are specified in the EP Act, the EP Regulation, EPP and relevant guidelines.

13.7 Describe the assessment process under the Assessment Bilateral Agreement between the Australian Government and the State of Queensland.

13.8 Describe the approvals process under the EPBC Act.

13.9 Identify the names of the local governments and planning scheme areas traversed by the project, any material changes of use, operational works assessment benchmarks for all activities associated with this project under each of those schemes during pre-construction, construction and operation of the project.

14. Stakeholder consultation

14.1 In preparing the EIS, consult with directly affected landholders, relevant local, state and Commonwealth government agencies, potentially affected communities[11], Traditional Owners and other indirectly affected key stakeholders.[12]

14.2 Describe in a stakeholder engagement report, the stakeholder engagement activities that have occurred during the preparation of the EIS, identify the issues raised during the

[9] Refers to the Water Plan (Burdekin Basin) 2007, currently under review.
[10] For technical information requirements see **https://www.business.qld.gov.au/running-business/environment/licences-permits/applying/technical**
[11] Potentially affected communities are those local and/or regional communities that may be directly or indirectly affected by the project, whether negatively or positively.
[12] Refer to Appendix 1 of the Coordinator-General's social impact assessment guideline for a list of key stakeholders.

consultation, and explain how the responses from stakeholders have been incorporated into the design and outcomes of the project.

15. Assessment of project specific matters

15.1 This section sets out the scope of project specific matters that are to be given detailed treatment in the EIS. Assessment of each matter is to consider the potential direct and indirect impacts of the project at the local and/or regional scale.

15.2 The EIS is to assess the potential catchment-wide impacts, including upstream and downstream, where relevant.

15.3 The proponent is to engage with the Office of the Coordinator-General throughout the development of the EIS to clarify the scope of assessment of each project specific matter.

Water resources

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse impacts to water resources and Indigenous water resources

(b) use water resources and riverine quarry material in an equitable, sustainable and efficient manner

(c) ensure equitable, sustainable and efficient use of water resources

(d) maintain statutory environmental flows, water quality objectives, in-stream habitat diversity, and naturally occurring inputs from riparian zones to support aquatic biotic communities

(e) protect or enhance the condition, environmental values and natural functions of waterways, watercourses, lakes, springs, aquifers and other natural water systems and watercourses—including the stability of beds and banks of waterways and watercourses

(f) protect the volumes and quality of water resources so that current lawful users of water (such as entitlement holders and stock and domestic users) and other beneficial uses of water (such as spring flows, wetlands and groundwater-dependent ecosystems) are not adversely impacted by the development.

Surface water

Existing environment

15.4 Provide maps of existing waterways or water features as shown on the Watercourse Identification Map. Identify:

(a) waterways providing for fish passage, drainage channels, wetlands, flood-prone or low-lying land within and adjacent to the project area

(b) the existing dam and associated infrastructure

(c) existing water supply schemes within and adjacent to the project area

(d) waterways and water features including any waterway barriers

(e) the Burdekin drainage basin and its sub-basins and associated sub-catchments.

15.5 Describe the pre-development (without current water resource development), current and full entitlement flow characteristics including seasonal flow patterns, flow volumes and duration using relevant indicators from the Water Plan and others such as sediment loads, bed and bank stability and ecological impacts as appropriate to this project after consultation with fluvial geomorphologists and ecologists. Graphical representations at a range of nodes are to be included.

15.6 Describe the existing hydrologic regime of the Burdekin River and its tributaries, and the Burdekin Basin. Include a description of the hydrologic regimes of any waterways providing for fish passage, creeks and streams within the project area and external to the project area impacted by the project.

15.7 Describe existing surface drainage patterns and flows in major streams including seasonal variations using suitable locations between identified stream nodes.

15.8 Discuss the history of flooding including extent, levels and frequency (upstream and downstream).

15.9 Describe the current operation and management of the water storage and distribution system, including yield, operating strategy, supply reliability, allocation and use of water supplies, water use efficiency and the environmental flow regime. Include a description of the existing Water Plan, the resource operations plan(s), water allocation security objectives and environmental flow objectives.

15.10 Describe the relevant existing environmental values defined in section 9 of the EP Act and water quality objectives identified in the EPP (Water and Wetland Biodiversity) 2019.

15.11 Describe any existing town water supply arrangements from the Burdekin Falls Dam.

Impact assessment and mitigation measures

15.12 Discuss the changes in the stream flows and eco-hydraulic indicators from pre-development to current conditions, and the corresponding changes that may be anticipated or have occurred in:

(a) in-stream and off-stream wetland inundation frequency, timing and duration, including instream pools as dry season refugia

(b) sediment/nutrient/energy processes in the catchments, including delivery to the coastal and near shore environment.

15.13 Provide modelling outputs including hydrographs of predicted changes in flow regime and potential impacts to environmental flows at a range of locations representative of key habitats and biota under the current and full entitlement scenarios.

15.14 Address and include clear descriptions of the following:

(a) a level of service analysis (based on the severity, frequency and duration of restriction)

(b) the effects of drainage or dewatering works, excavation, placement of fill, clearing or any other alterations to existing topography and landform on the hydrology of works sites including any alteration to drainage patterns, fluvial processes, and the water table and secondary influence on flooding. If levee banks or stream diversion constructions are proposed, the effects on neighbouring landholders are to be considered

(c) proposed drainage structures for all aspects of the project, including supporting infrastructure such as access roads

(d) timing of the construction works relative to likely period of flooding and proposals to minimise the risk of flood damage

(e) changes in flood regimes including frequency and duration of floodplain/wetland inundation, and potential impacts on flood levels upstream and downstream of the storage area and at any new crossing of watercourses. The extent of flood modelling will be to the points at which no significant impact occurs. Flood studies are to include a range of annual exceedance probabilities. Use hydrographs to represent flood levels at different locations

(f) changes to sediment transport, potential erosion/scouring, changes in deposition upstream and downstream, bank and channel morphology, instream habitats and stability of riparian vegetation

(g) any potential implications of climate change as determined in Section 15 – Hazards, health and safety.

15.15 Describe the following with regard to operational impacts:

(a) the effect of environmental flow requirements on dam reliability and water availability for consumptive use

(b) how will the project conform to the Water Plan and how will impacts be mitigated. Use hydrological modelling to inform the assessment of impacts on:

(i) the general, specific and ecological outcomes of the Plan

(ii) strategies to meet the outcomes

(iii) unallocated water rules

(iv) processes and volumes

(v) downstream users and environment

(vi) overland flow provisions

(vii) plan implementation (i.e. water management protocol)

(c) impacts of the project on flow regime indicators (water allocation security objectives and environmental flow objectives in accordance with the Water Plan and stipulation of the assumptions made (e.g. extraction patterns, release patterns, release capacity, consumptive uses)

(d) the effect of water storages, water harvesting (losses) and dam operational releases on environmental flow requirements, dam reliability and water availability for consumptive use

(e) changes in the reliability of supply to current water entitlement holders and any impacts on the operation of existing water extraction

(f) changes in flow patterns including changes in the magnitude of flow events, flow frequency and timing of flows, volumes and duration, connectivity, and changes in flows reaching estuarine waters, when compared at a meaningful scale with pre-development and current flows in the system

(g) natural recharge via flooding or elevated flow events

(h) natural recharge via environmental flow events

(i) changes in the reliabilty of water supply and changes in flow patterns and aquifers which are upstream and downstream from the project.

15.16 Provide information on the project's water usage, including details about the source, quality and quantity of all water required for the project and its construction activities.

15.17 For each source of water supply (surface and groundwater) for the project address the quality and quantity, security of supply and resource availability.

15.18 Determine the potable water demand for the project, including the temporary demands during the construction period. Include details of any existing town water supply to meet such requirements. Detail should also be provided to describe any proposed on-site water storage and treatment for use by the site workforce during the construction phase.

15.19 Provide detailed designs for all infrastructure utilised in the treatment of onsite water including how any onsite water supplies are to be treated, contaminated water is to be disposed of and any decommissioning requirements and timing of temporary water supply/treatment.

15.20 Identify the quantity, quality and location of all potential discharges of water and contaminants by project, including treated wastewater and sewage. Describe whether the discharges would be from point sources (whether uncontrolled and controlled discharges) or diffuse sources (such as irrigation to land of treated wastewater/sewage effluent), and describe the receiving environment (such as land or surface waters).

15.21 Provide details on the proposed sewage collection and treatment infrastructure and the reuse and/or disposal of treated wastewater and sewage wastes generated.

15.22 Describe and map any diversions or interception of overland flow. Detail the relevant impacts of any proposed watercourse diversions and describe watercourse diversion design, operation, monitoring regime, and measures to be implemented to avoid impacts on local wetlands, streams, groundwater dependent ecosystems and waterways.

Groundwater

Existing environment

15.23 Describe the historic and existing environment for hydrogeology resources that may be affected by the project (including the Lower Burdekin delta, Bowling Green Bay (BGB) and the Great Barrier Reef (GBR) lagoon) and the possible significance of the project to groundwater depletion or recharge, or potential saltwater intrusion of existing aquifers. The review is to include a survey of existing groundwater supply facilities (i.e. bores, wells or excavations) within the project area and adjacent to the project area. Describe:

(a) the proximity of groundwater facilities to the project and value of these facilities for rural, industrial and/or domestic use

(b) the quality, quantity and significance of groundwater in the project area and any surrounding area potentially affected by the project's activities

(c) the current use and volume of groundwater for irrigated agriculture within any potential area of impact

(d) the known nature of the aquifers at and near the sites, geology/stratigraphy, aquifer type, depth to and thickness of the aquifer, hydrogeology of the aquifers, depth to water level and seasonal changes in levels, groundwater flow directions

(e) interaction with surface water in each sub-catchment and possible sources and volumes of recharge

(f) basic water quality of the aquifer and its vulnerability to pollution

(g) groundwater resources proposed to be used by the project, including a description of the quality, quantity, usage rate and required location of those resources

(h) the characteristics of target aquifers, including seasonal variability, value as water supply sources, capacity to provide the required volumes of water at the expected usage rate, recharge potential and profile of existing extraction.

Impact assessment and mitigation measures

15.24 Matters to be addressed are to include clear descriptions of the following:

(a) an assessment of the potential impacts on the objectives and requirements of any underground water management area or Water Plan regulating underground water

(b) the inputs, movements, exchanges and outputs of surface water and groundwater that would or may be affected by the project

(c) the project's impacts at the local scale and in a regional context including:

  (i) changes in flow regimes from diversions, water take and discharges

  (ii) groundwater draw-down and recharge

  (iii) alterations to riparian vegetation and bank and channel morphology

  (iv) direct and indirect impacts arising from the development

(d) the impacts of the project on groundwater dependent ecosystems, including impacts on stygofauna and proposed mitigation measures

(e) effect of temporarily lowering the water level in the water storage area

(f) effect of dam wall raising construction and grouting on the availability and quality of groundwater resources downstream

(g) impacts of vegetation clearing, sedimentation, salinity and depth below natural surface level of local groundwater resources

(h) extent of the area within which groundwater resources are likely to be affected by the proposed operations, including effects of water storage, presence of the dam wall and downstream flow releases

(i) impacts of the project on the outcomes of the Water Plan including how the project will conform to the Plan and how any impacts will be mitigated. In the assessment of impacts, hydrogeological modelling is to be used to inform the assessment, the general, specific and ecological outcomes of the Plan, indicators and objectives, strategies to meet the outcomes, unallocated water rules, processes and volumes, downstream users and environment, overland flow provisions and Plan implementation (i.e. water management protocol)

(j) impacts of any required extraction of groundwater resources and proposed mitigation measures to reduce the impact of the project on groundwater quality including the potential for interconnection between the target and underlying aquifers

(k) decommissioning of any temporary groundwater bores.

Indigenous water resources

Existing environment

15.25 Describe the Indigenous social, economic, cultural, spiritual, and environmental values, uses and aspirations of water resources relevant to the project.

15.26 Discuss the importance of local Indigenous cultural values and uses of water including information regarding economic development opportunities and methods proposed to protect these values.

Impact assessment and mitigation measures

15.27 Detail the potential impacts on the Indigenous social, economic, cultural, spiritual, and environmental values, uses and aspirations of water resources.

15.28 Detail how the Indigenous social, economic, cultural, spiritual, and environmental values, uses and aspirations of water resources relevant to the project will be protected and/or promoted through water allocation and management strategies.

15.29 Where country may be affected by existing or future water infrastructure projects in the area, assess the cumulative impacts of these projects on the Indigenous cultural, spiritual, environmental, social and economic values, uses and aspirations linked to water.

Water quality

Objective

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse impacts to water quality

(b) protect environmental values of Queensland waters and maintain or enhance water quality to achieve water quality objectives

(c) protect the environmental values of groundwater and any associated surface ecological systems

(d) protect the environmental values of receiving marine waters and wetlands.

Existing environment

15.30 Describe the existing water quality (surface and ground water) of the local and regional water catchment that may be affected by the project.

15.31 With reference to the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019 and* section 9 the EP Act, identify the current water quality environmental values and water quality objectives of surface and ground waters within the project area and surrounds, and immediately downstream that may be affected by the project activities, including any human uses and cultural values of water.

15.32 Describe historic and existing surface water and groundwater quality in terms of physical, chemical and biological characteristics within the existing water storage area, upstream and downstream of the area, including consideration of seasonal or flow variations where applicable. Off-stream water bodies and existing water storage areas are to be included where relevant.

15.33 The basis for this assessment is to include a literature review supplemented by a suitable sampling program supported by sufficient site-specific baseline data. The following matters are to be discussed:

(a) the relationship between water quality and flow, using local catchment examples

(b) water quality issues (such as stratification, eutrophication and deoxygenation) within and downstream from the existing storage

(c) the confirmed or likely causes of present water quality impacts

(d) the suitability of existing raw water quality for proposed on-site uses and any treatment required

(e) current water quality issues related to specific uses of water as related to the project (e.g. potable supply, agricultural water)

(f) correlate groundwater quality results with surface water data to define interactions

(g) identify any water quality variations along the length of any alluvium upstream and downstream of the dam or other infrastructure

(h) water quality samples must include as a minimum, electrical conductivity, pH, dissolved oxygen and major anion and cations.

Impact assessment and mitigation measures

15.34 Describe the quantity, quality, location, duration and timing of all potential and/or proposed releases of contaminants to water. Releases may include controlled water discharges to surface water streams, uncontrolled discharges when the design capacity of storages is exceeded, spills of products during loading or transportation, contaminated run-off from construction, operational decommissioning areas of the project and surround, or run-off from disturbed acid sulfate, sodic or dispersive soils.

15.35 Demonstrate how existing water allocations and the relevant water quality guidelines or final objectives (as outlined in water quality information sources in Appendix 1 will be met and how relevant environmental values are to be protected during construction, operation and decommissioning.

15.36 Describe the impacts of the project on upstream and downstream water quality, environmental values and the water quality objectives of the Burdekin Regional Water *Quality Improvement Plan* and the *Reef 2050 Water Quality Improvement Plan*, policies and guidelines outlined in Appendix 1. Information is to be supported with references to relevant legislation, policies and guidelines.

15.37 Where the use of water is proposed for irrigation projects, complete a risk assessment for salinity following the protocols of the *Salinity Management Manual* and the *Salinity Risk Assessment Guidelines for Queensland (in press)* (Appendix 1).

15.38 Matters to be addressed are to include clear descriptions of the following:

(a) the possible sources of water contamination or other changes in water quality during specific construction activities including but not limited to sand and gravel extraction, site clearing, excavation, dewatering of foundations, temporary or permanent road construction and related drainage, wastewater from concrete batching plants, vehicle and equipment wash down activities, sewage or grey water treatment and disposal, use of chemicals in cleaning, grouting or testing and accidents or spillage

(b) the likely quality of water leaving construction sites taking into account the management and mitigation measures proposed

(c) the quality of water within the water storage area during first filling above the original FSL and for the period of the subsequent decomposition of drowned vegetation

(d) the quality of water within the water storage area under projected operating conditions including annual seasonal variation, extended wet or dry period, the effects of inundated soil types and wind driven re-suspension, impacts of surrounding or upstream land uses

(e) the effects of depth and holding time within the water storage area (particularly on turbidity, conductivity, stratification, temperature, dissolved oxygen) and the quality of operational water releases

(f) potential for stratification and 'turn-over' of the water storage (including potential for blue-green algae blooms) and implications for water quality management, supply and use (including for stock and domestic users, industrial users, urban potable use or recreational use of the storage)

(g) the potential effect of algae and macrophytes on water quality and vice versa

(h) the effects on downstream water quality under varying scenarios of flow release including potential impacts on instream pools (dry season refugia), estuarine and near shore environments

(i) the management of nutrients and oxygen levels from decomposition of drowned vegetation within the water storage area in any discharge or releases from the dam.

15.39 Describe and include in the EMP avoidance and mitigation strategies and contingency plans for:

(a) potential accidental discharges of contaminants, nutrients and sediments during construction and operation

(b) stormwater run-off, erosion and sedimentation from the construction of the project with reference to the International Erosion Control Association's *Best Practice Erosion and Sediment Control* and the former Department of Environment and Resource Management's *Urban Stormwater Quality Planning Guidelines 2010* (see Appendix 1)

(c) flooding of relevant river systems, the effects of tropical cyclones and other extreme events

(d) management of acid sulfate, sodic and dispersive soils

(e) impacts to other properties and the environment during flood events

(f) the treatment and disposal processes for all wastewater produced as a result of the project, including construction activities

(g) the management of nutrients and oxygen levels from decomposition or drowned vegetation within the impounded waters in any discharges or releases from the dam.

15.40 Describe how monitoring will be used to demonstrate that objectives will be met. For example, provide measurable criteria, standards and/or indicators that will be used to assess the condition of the ecological values and health of surface water environments. Propose corrective actions to be used if objectives are not likely to be met.

Coastal processes

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse impacts on the Lower Burdekin delta, Burdekin-Haughton floodplain, Cape Bowling Green and BGB

(b) ensure coastal processes along the eastern Lower Burdekin delta are maintained including flood dominated delivery of coarse sediment, beach replenishment, foreshore progradation and northward longshore drift of sediment

(c) align with the outcomes sought by the Reef 2050 Water Quality Improvement Plan, particularly the target to decrease end-of-catchment fine sediment loads

(d) ensure the replenishment of the Lower Burdekin delta groundwater resource is not compromised by the operation of the project.

Existing environment

15.41 Describe the environmental values of the Lower Burdekin delta, Cape Bowling Green and BGB.

15.42 Describe the coastal zone of the Lower Burdekin delta in terms of the morphology, physical features and integrity, condition and historical context of landforms created or modified by coastal processes (e.g. tides, rivers, floods, coastal currents, major storms, rocky headlands or islands). Discuss the degree of reliance of these processes on flood dominated delivery of coarse sediment.

15.43 Describe historic and existing sediment transport dynamics across the catchment and sub-catchment, including sediment budgets (inputs and yields) for fine and coarse sediment, the role of existing water storages in sediment capture and the importance of flood flows in the delivery of sediment to the coastal zone.

Impact assessment and mitigation measures

15.44 Assess and describe the potential impacts of the project on sediment discharge in the Burdekin River catchment under a range of flow scenarios relevant to the operation of the proposed dam. Develop sediment rating curves for the proposed reservoir and estimate downstream sediment discharge with and without the project.

15.45 Assess and describe any potential impacts of the project and project infrastructure upon existing coastal processes within the catchment, including impacts to the Lower Burdekin delta, Burdekin-Haughton floodplain, BGB and Cape Bowling Green. The assessment must address the:

(a) potential impacts of the project on sediment discharge within the Burdekin River catchment and downstream impacts on sediment delivery to the coast

(b) potential impacts of the project on the capacity of natural and assisted recharge of the Lower Burdekin delta aquifer/s

(c) potential for the project to influence long term sediment transport and coastal processes downstream of the Burdekin River estuary, including on Cape Bowling Green and within BGB.

15.46 Describe measures proposed to avoid, minimise and/or mitigate potential impacts on environmental values and coastal processes on the Lower Burdekin delta, Burdekin-Haughton floodplain, Cape Bowling Green and BGB.

15.47 Describe how operation of the dam and associated infrastructure would be optimised to maintain flood flows and downstream sediment discharge.

15.48 Develop and describe suitable indicators to monitor the effectiveness of mitigation and management measures.

Land

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate any serious environmental harm on areas sensitive land uses and sensitive receptors

(b) minimise changes to land tenure

(c) avoid or minimise reduction of priority agricultural areas and strategic cropping land

(d) protect the environmental values of land including soils, subsoils, landforms and associated flora and fauna.

Land use and tenure

Existing environment

15.49 Describe the following:

(a) the landscape and existing and proposed land uses, including numbers of private properties, Traditional Owner land and cultural practice areas, State land, and Reserves potentially directly or indirectly impacted by the project

(b) identify townships and urban areas located near the project area

(c) any tenures, including conservation parks, nature refuges, national parks, stock routes, overlying and adjacent to the project area

(d) any known or potential sources of contaminated land, including any area which has been or is being used for a 'Notifiable Activity' as listed in Schedule 3 of the EP Act, is potentially contaminated, or is on the Environmental Management Register or Contaminated Land Register.

15.50 Describe and map the extent of any known agriculture, horticulture, petroleum, mining and exploration activities or quarries of commercial significance, including, but not limited to:

(a) petroleum pipeline infrastructure

(b) registered exploration permits and applications for exploration permits

(c) mineral development licences and applications for mineral development licences

(d) mining leases and applications for mining leases, including access arrangements

(e) known economic resources and their future availability

(f) active, disused, or abandoned mine workings within the project area and surrounds

(g) findings of the Agricultural Land Audit and AgTrends Spatial web mapping app.[13]

Impact assessment and mitigation measures

15.51 Identify all state and regional planning interests (e.g. priority agricultural areas, Key Resource Areas, strategic cropping areas and strategic environmental areas) potentially impacted by the project, and the source of mapping to identify those interests. Where mapping is not available, identify the methodology followed to prepare the maping and its scale.

15.52 Detail how the construction and operation phases of the project will change existing and potential land uses of the project site(s) and adjacent areas.

15.53 Present using map/s any proposed lot consolidation.

15.54 Demonstrate that the project can meet the environmental objectives and performance outcomes relevant to land in Schedule 8 of the EP Regulation.

15.55 Describe potential impacts of the proposed land uses, taking into consideration the proposed measures that would be used to avoid or minimise potential impacts.

15.56 Address impacts on any identified agriculture, horticulture, petroleum, mining and exploration activities, including any consultation undertaken with tenement holders, with respect to accessing land, impact assessment and mitigation measures.

15.57 If relevant, describe the proposed procedures intended to change the conditions of a state lease to include agricultural activities.

15.58 If relevant, describe any proposed tenure to be applied for as part of this project.

15.59 Identify any historical mine workings within or adjacent to the project area. Demonstrate how historical mine workings have been avoided where possible. If relevant, describe how the project is to incorporate safety measures to mitigate hazards with abandoned mines and ensure the safety of personnel.

15.60 Describe how any proposed land use may result in land becoming contaminated. Describe the actions to be undertaken to avoid, identify, remediate, manage land that is contaminated or becomes contaminated.

15.61 Detail proposed measures taken during the construction and maintenance of the project to avoid and minimise land degradation. Land degradation includes but is not limited to soil erosion, the expression of salinity, waterlogging, and mass movement by gravity of soil or rock.

15.62 Identify existing and potential Native Title rights and interests impacted by the project and the potential for managing those impacts by Indigenous Land Use Agreements or other measures.

15.63 Describe the proposed land acquisition approach, stakeholders and agencies involved, and anticipated timeline that will be undertaken to secure tenure for the project.

15.64 Identify any infrastructure or access tracks associated with the project to be located within, or which may have impacts on, the stock route network managed under the *Stock Route Management Act 2002.* This includes any Reserves which form part of the network (i.e. for water, camping purposes). Demonstrate how the project will maintain the ongoing functionality and connectivity of the stock route network.

[13] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/agribusiness/agtrends-spatial

15.65 Describe, using graphics and figures, temporary and permanent changes to the landscape and the visual impacts of the project on communities, particularly those living in townships. Describe the proposed mitigation measures to avoid or minimise visual impacts.

15.66 Include a detailed assessment of the likely potential impacts to agricultural interests, including:

(a) agricultural land of SPP significance to the agriculture state interest. This assessment is to demonstrate how the project is consistent (or otherwise) with protecting Agricultural Land Classification Class A and Class B land for sustainable agricultural use, in accordance with state interest – agriculture 2 (a)-(c).

(b) how any adverse impacts will be mitigated to ensure there is no net loss in the availability and utility of that land for an agricultural use. This would include land directly impacted by and adjacent to project activities.

Topography, geology and soils

Existing environment

15.67 Describe, including maps and figures, the geology of the project area.

15.68 Identify and investigate the soil toposequences associated with water movement, salinity, sodicity and cracking clay soils, as well as areas of potential and actual acid sulfate soils.

15.69 Provide details, including maps, existing soil conservation works (contour banks, waterway discharge points etc.) and existing erosion control works, in particular, those approved as project plans or property plans approved under the provisions of the *Soil Conservation Act 1986*.

Impact assessment and mitigation measures

15.70 Where significant earthworks are proposed, assess the variability of soils and landscapes and demonstrate how this variation affects land use, land management, agricultural land suitability, and associated land degradation risks. This assessment should be undertaken in accordance with the latest versions of:

(a) Guideline for coordinated projects involving clearing for agriculture (land suitability requirement), *Guidelines for Surveying Soil and Land Resources*, *Australian Soil and Land Survey Field Handbook*, *Guidelines for Agricultural Land Evaluation in Queensland*, the Department of Environment and Science (DES) *EIS Information Guideline – Land*

(b) where linear features are proposed, *Guidelines for Soil Survey along Linear Features*

(c) if any quarry material is needed for construction, the *DES EIS information guideline—Quarry material* (see Appendix 1).

15.71 Investigate the risks to the soil and landscape associated with land degradation. This is to include a salinity risk assessment to predict, manage and mitigate salinity risk in accordance with *A risk framework for preventing salinity* (see Appendix 1).

15.72 Investigate land degradation in the form of erosive soil loss associated with increased run-off, clearing or other changes to hydrology in accordance with *Soil Conservation Guidelines for Queensland* and *Best Practice Erosion and Sediment Control* (see Appendix 1).

15.73 Where potential and actual acid sulfate soils have been identified, prepare an acid sulfate soil (ASS) management plan in accordance with accepted industry guidelines and the

requirements of the *SPP – State interest guideline emissions and hazardous activities*, that appropriately manages the disturbance of ASS to avoid or minimise the mobilisation and release of acid, iron, or other contaminants.

15.74 Identify activities or operations likely to impact on existing erosion control works and any soil conservation works.

15.75 Demonstrate how landforms, during and after disturbance, will meet any requirements of project or property plans approved under the *Soil Conservation Act 1986.*

15.76 Describe proposed mitigation measures to avoid or minimise project impacts related to land use, soil values, existing conservation works and sediment and erosion control works (e.g. artificial wetlands).

Flora and fauna

Objective

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse impacts to flora and fauna

(b) identify and appropriately safeguard matters of state environmental significance to support healthy and resilient ecosystems

(c) ensure the sustainable, long-term conservation of biodiversity

(d) protect all environmental values relevant to adjacent and receiving environmentally sensitive areas

(e) provide for the conservation of the marine environment, particularly the GBRMP and other marine conservation areas

(f) ensure waterway barrier works in fish habitats are constructed to maintain connectivity, habitat values and fish passage.

Existing environment

15.77 Identify and describe matters of state environmental significance (MSES)[14], State and regionally significant biodiversity, and natural environmental values of the terrestrial and aquatic ecosystems likely to be impacted by the project. Where MSES have been addressed in the section on MNES, cross referencing is appropriate.

15.78 The location of flora and fauna of cultural and state environmental significance in the project area, and in surrounding areas, are to be shown on maps in relation to their habitat and connectivity in the landscape. Include maps, upstream and downstream of the project, showing areas of:

(a) regulated vegetation maps showing regional ecosystems, essential habitat, wetlands, watercourses and drainage features (over the project and adjoining areas)

(b) protected habitat

(c) wetlands of high ecological significance

[14] MSES are a component of the biodiversity state interest that is defined under the SPP and defined under the Environmental Offsets Regulation 2014 (Offset Regulation). MSES includes certain environmental values that are protected under Queensland legislation.

(d) waterways providing for fish passage

(e) conservation areas.

15.79 Provide evidence of the height of the tallest vegetation adjacent to new buildings, access tracks, fence lines, and permanent structures proposed by the project.

15.80 Describe, using relevant literature and the results of surveys, the natural and existing upstream and downstream movement and habitat requirements of all aquatic and terrestrial flora and fauna in the project area. Identify sensitivity to change of aquatic and terrestrial flora and fauna groups and of significant species.

15.81 Describe all flow dependent ecological assets and their critical links to stream flow, including their relevant ecological thresholds.

15.82 Describe how the features of the annual flow underpins the structure and function of the aquatic ecosystem including peak wet season flows and their variability; the draw period of flows and flood residence times during wet and dry season transition; low and disconnected flows during the dry season; the initial flushing flows during the dry to wet season transition.

Impact assessment and mitigation measures

15.83 Using maps at suitable scales, illustrate the context of the project in relation to surrounding MSES. This includes the location of:

(a) existing infrastructure

(b) proposed infrastructure

(c) proposed buffers (including firebreak and safety buffers)

(d) access tracks (including existing) required for construction and maintenance, and

(e) any other areas of disturbance required to undertake the project.

15.84 Describe the methodology for dam water level lowering during construction (through modelling or any other appropriate method) and demonstrate how the chosen method minimises and mitigates potential impacts on aquatic and riparian habitat and include plans to protect the health and welfare of native fish species through fish salvage operations in accordance with Department of Agriculture and Fisheries' *Guidelines for Fish Salvage* (Appendix 1).

15.85 Demonstrate how the proposal avoids native vegetation clearing, or where avoidance is not reasonably possible, minimises clearing to conserve vegetation, avoid land degradation and maintain ecological processes.

15.86 Assess the potential direct and indirect impacts of construction and operation on the biodiversity and natural environmental values. Describe proposed avoidance and/or mitigation measures. The assessment is to include, but not be limited to, the following:

(a) all significant flora and fauna species (e.g. the endangered northern gastric-brooding frog (*Rheobatrachus vitellinus*), and special least concern platypus (*Ornithorhynchus anatinus*)) and ecological communities in both terrestrial and aquatic environments and in sensitive areas, biodiversity values, connectivity and supporting ecological processes, including MSES and MNES

(b) data deficient flora and fauna species known to occur in the project area including Irwin's turtle (*Elseya irwini*) and species endemic to the Burdekin Basin such as the

neosilurid catfish (*Neosilurus mollespiculum*) and small-headed grunter (*Scortum parviceps*)

(c) environmental flow requirements for each species (i.e. ecohydrological requirements) and the potential changes to flow regimes, water levels and associated factors upstream and downstream and resultant changes to habitat (in-river and off-stream) and consequential ecological changes (including floristic).

(d) natural (pre-existing dam) and current levels of upstream and downstream fish passage. This will inform the movement requirements for the species at the site and the associated fish passage provisions to be incorporated into the project design

(e) address sensitivity of aquatic flora and fauna groups and significant species to change

(f) the potential impacts of water temperature and oxygen levels on fauna within the impoundment and below the spillway

(g) flora and fauna of cultural significance to Aboriginal and Torres Strait Islander Peoples

(h) terrestrial and aquatic ecosystems (including groundwater-dependent ecosystems) and their interaction

(i) alterations to riparian vegetation, habitat availability, connectivity and bank and channel morphology

(j) waterways providing for fish and fauna passage (including temporary and permanent impacts), including an assessment against SDAP State code 18

(k) the existing integrity of ecological processes, including habitats of threatened, near-threatened or special least-concern species

(l) the quantity and quality of water required to sustain and manage the ecological health of riparian and aquatic ecosystem functions

(m) direct and indirect impacts of edge effects of cleared vegetation and access to food resources

(n) actions of the project that require an authority under the *Nature Conservation Act 1992* and *Water Act 2000* (e.g. riverine protection permit), assessable development under the *Planning Act 2016, Vegetation Management Act 1999* (VM Act) and *Fisheries Act 1994*, and an authority and/or permit under the EP Act

(o) biological diversity including listed flora and fauna species and regional ecosystems

(p) strategic environmental areas identified in the regional planning interest's framework

(q) conservation, national park tenures, biodiversity offset areas approved by the state or commonwealth governments

(r) impacts on native fauna during construction and operation of the project due to their proximity to the project area (e.g. lighting, noise, waste)

(s) provide a detailed salvage and relocation plan for impacted species including MSES.

15.87 Identify and discuss where proposed vegetation clearing is exempt or considered accepted development for the project under the Planning Regulation. Assess proposed vegetation clearing against SDAP State code 16, addressing the relevant assessment benchmarks for a coordinated project for all other purposes.

15.88 Assess the need for safety fire breaks and the need for buffer zones and the retention, rehabilitation or construction of fauna movement corridors, including the role of buffer zones

in maintaining and enhancing riparian vegetation and wetlands to promote bank stability, enhance habitat connectivity and provide habitat.

15.89 For any infrastructure that constitutes waterway barrier works, provide cross-sections of the waterway that show the barrier in relation to the bed and banks and long-sections that show the barrier in relation to the bed upstream and downstream of the structure. Describe how the barrier and hydrological conditions provide for fish passage.

15.90 Demonstrate that the project will avoid the need for waterway barriers or propose measures to mitigate impacts on affected waterways, drainage features and wetlands. Include mitigation strategies for construction and operation stages of the project.

15.91 Describe potential disruption to flows in waterways and tributaries during construction and any proposals to divert waterways and/or flows (including coffer dams, temporary diversions and cut-off drains). Reference is to be made to DAF's *Guidelines for Fish Salvage*, for example if any dewatering is required. The description is to include:

(a) proposed fauna passage through any diversions

(b) proposals for the reinstatement of the waterways after construction has ceased, if applicable.

15.92 Describe, illustrate, and demonstrate how the proposed dam provides safe and adequate upstream and downstream aquatic fauna passage.

15.93 Set out a process for the design, construction, and monitoring of any fauna passage device(s) to provide maximum transparency and safe passage at the dam and relevant waterway barriers impacted or installed as a result of the project.

15.94 Propose rehabilitation criteria and objectives to be used to measure progressive rehabilitation of disturbed areas. Describe how the achievement of the objectives will be monitored and audited, and how corrective actions will be managed. Proposals for rehabilitation of disturbed areas are to incorporate suitable terrestrial and aquatic habitat as appropriate.

15.95 Propose practical measures (based on demonstrated successful methodologies) to avoid, minimise, mitigate and/or offset direct or indirect impacts on ecological environmental values, including measures for protecting or enhancing natural values and assess how the nominated quantitative indicators and standards may be achieved for nature conservation management. In particular, address measures to protect or preserve any listed threatened, near threatened or special least concern species.

15.96 Describe how the achievement of the subject matter's objectives is to be monitored and audited, and how corrective actions are to be managed.

15.97 After demonstrating that all reasonable on-site avoidance and mitigation measures have been applied, identify whether the project will result in a significant residual impact (SRI) on MSES, requiring an offset with reference to the *Queensland Environmental Offsets Policy* and *Significant Residual Impact Guideline 2014* (see Appendix 1) and the *Queensland Environmental Offsets framework*.

15.98 Address both State and Commonwealth offset obligations, and clearly identify where there are overlaps across jurisdictions. Identify, describe and illustrate the extent (such as in a map and table) of any SRI overlap between MNES and MSES.

15.99 Describe and quantify any SRI and demonstrate any proposed offset sites and their capacity and habitats, or alternative offsets, are consistent with the latest version of the *Queensland environmental offsets policy* (Appendix 1).

15.100 For staged offsets, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the SRI test.

15.101 Provide as an appendix to the EIS an offset proposal which outlines the proposed offset delivery approach to address the project's SRI on MSES. The offset delivery approach is to include an assessment of the vulnerability of any proposed offset site/s under climate change scenarios (e.g. reduced water availability, increased bushfire risk).

15.102 Describe any active restoration actions that would be undertaken to improve, enhance and manage native vegetation or threatened species habitat on a proposed offset site (note: applying high intensity management to low condition sites is most relevant to habitat reconstruction).

Biosecurity

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate the spread of terrestrial and aquatic weeds, terrestrial and aquatic pest animals, disease, pathogens and contaminants

(b) control and manage existing terrestrial and aquatic weeds, terrestrial and aquatic pest animals and diseases

(c) comply with relevant provisions of the *Biosecurity Act 2014*, Commonwealth animal and pest strategies, biosecurity plans, Weeds of National Significance and designated pests under the *Public Health Act 2005*.

Existing environment

15.103 Survey terrestrial and aquatic pest animals and weeds in areas identified as containing listed flora, fauna and ecological communities of MNES or MSES.

15.104 Describe the current distribution and abundance of terrestrial and aquatic pest animals and weeds in the project area and surrounds. This includes restricted matters listed in the *Biosecurity Act 2014* and Biosecurity Regulation 2016, Weeds of National Significance, designated pests under the *Public Health Act 2005.*

Impact assessment and mitigation measures

15.105 Describe the project's construction and operational impacts on the spread of terrestrial and aquatic pest animals, terrestrial and aquatic weed species and disease within the project area, construction access routes and into adjoining properties (where relevant).

15.106 Propose detailed measures using best practice to control and limit the spread of pests, weeds and diseases surrounding the project area and adjacent areas. Detail any relevant local government areas Biosecurity Plans.

15.107 All proposed measures are to be in accordance with any relevant biosecurity surveillance or prevention measures authorised under the *Biosecurity Act 2014* and any requirements under the VM Act/*Planning Act 2016*.

Hazards, health and safety

Objectives

The design, construction and operation of the project are to:

(a) avoid, minimise and/or mitigate the risk of, and adverse impacts from, natural and human-made hazards to protect human life and property

(b) enhance the community's resilience to natural hazards.

Existing environment

15.108 Describe the likelihood and severity of hazards, health and safety risks in the vicinity of the project including, but not limited to cyclone, flooding, bushfire, earthquakes, landslide, heatwave.

15.109 Identify current hazard, risk and health and safety management measures for operation of the existing dam, with reference the current Emergency Action Plan.[15]

15.110 Identify current emergency response and communication measures for operation of the existing dam, particularly related to interactions with landholders and emergency responders.

Impact assessment and mitigation measures

General

15.111 Describe the potential risks to people, property, waterways, flora and fauna that may be associated with the project in the form of a preliminary risk assessment for all components of the project and in accordance with relevant standards. The assessment is to include:

(a) potential hazards, accidents, spillages, fire and abnormal events that may occur during all stages of the project, including estimated probabilities of occurrence

(b) the identification of all hazardous substances (including hazardous waste) and any explosives to be used, transported, stored, processed or produced and the rate of usage

(c) potential hazards posed by wildlife interactions, natural events (for example, cyclone, flooding, bushfire, earthquakes[16], landslide, heatwave[17]) and implications related to climate change. Identify the cumulative impact of a number of natural hazards occurring at the one time. Describe possible adaptation strategies (preferred and alternative) based on climate change projections for the proposed project site

(d) how the project may potentially affect hazards away from the project site (for example, changing flooding characteristics, bushfire, landslide).

15.112 Detail measures required to ensure that the proposed project avoids the release of hazardous materials as a result of a natural hazard event(s).

15.113 Assess the vulnerability of the area to natural and induced hazards, including drought, floods, thunderstorms, bushfires and cyclones. Consider the relative frequency and magnitude of

[15] Emergency Action Plan – Burdekin Falls Dam: **http://data.dnrm.qld.gov.au/eap/burdekin-falls-eap.pdf**
[16] The State Earthquake Risk Assessment includes probabilities of major seismic events for all local government areas and is to be used to inform risk consideration and management.
[17] Use State Heatwave Risk.

these events together with the risk they pose to the construction, operation and decommissioning of the proposed project, as well as the rehabilitation of the site. Describe measures that will be taken to minimise the risks of these events.

15.114 Assess the proposed project's vulnerabilities to projected climate change (e.g. changing patterns of temperature, rainfall, hydrology, and extreme weather events). The assessment of climate hazards and risks should reference relevant climate projection data (e.g. the Queensland Future Climate high-resolution climate projection data[18]) and employ appropriate climate risk assessment methodologies. Describe the adaptation strategies and/or activities designed to minimise climate change impacts to the proposed project, subsequent land uses on that site (e.g. rehabilitation projects) and surrounding land uses. Adaptation activities are to be designed to avoid perverse outcomes, such as increased emissions of greenhouse gases or maladaptive outcomes for surrounding land uses.

15.115 Assess potential wildlife hazards, including development of a mosquito management plan if necessary, in accordance with Queensland Health guidelines, natural events (e.g. cyclone, flooding, earthquake, bushfire) and implications related to climate change and adaptation.

15.116 Provide details on the safeguards that will reduce the likelihood and severity of hazards, consequences and risks to persons, waterways, flora and fauna within and adjacent to the project area(s), including any need for safety fire breaks and buffer zones in consideration of fauna movement, riparian and wetland corridors. Identify the residual risk following application of mitigation measures. Present an assessment of the overall acceptability of the impacts of the project in light of the residual uncertainties and risk profile.

15.117 Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required) for the range of situations identified in the risk assessment developed in this section.

15.118 Detail any consultation undertaken with the relevant state, district and local emergency response authorities and organisations, including the Local Disaster Management Group.

Flooding

15.119 Provide a hydraulic and hydrological analysis (flood impact assessment) demonstrating the design flood peak discharges for the site and surrounding area which exist in the pre- and post-development scenarios for all flood and stormwater events up to a 1% Annual Exceedance Probability (AEP). This should include at least the following flood and stormwater events: 86%, 63.2%, 50%, 20%, 10%, 5%, 2%, 1% and 0.1% AEP, Probable Maximum Flood and dam failure scenario.

15.120 Assess how the project may change flooding characteristics upstream and downstream of the dam. Take into consideration potential sea-level rise scenarios. The flood model needs to adequately encompass existing and future state-controlled transport corridors. Mapping (afflux, water level/depth and velocity) should be provided to clearly illustrate the pre-development scenario, and the post development impacts for all relevant design events. Include a discussion on historical events.

15.121 The assessment is to consider all infrastructure associated with the project including levees, roads and linear infrastructure and all proposed measures to avoid or minimise risks to people, property (including damage to other properties), flora and fauna and the environment during flood events. Where the development is increasing impervious area, provide a peak

[18] Available from **https://longpaddock.qld.gov.au/qld-future-climate/dashboard/**

discharge analysis with adequate details of the pre and post development impervious area of the site and give adequate consideration to the detention basin requirements of the *Queensland Urban Drainage Manual, Fourth Edition* (see Appendix 1).

15.122 Detail how design and management of all stages of the project will mitigate potential impacts on level of flood risk, both upstream and downstream of the dam. Demonstrate that flood storage capacity is maintained for the dam (following completion of construction). The development design will need to address any concentration of flows, potential for back-up/ponding and scour/erosion which may undermine existing and future state-controlled transport corridors.

Economic

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse economic impacts arising from the project

(b) capitalise on opportunities available for local businesses and communities

(c) create a net economic benefit to the region and State.

Existing environment

15.123 Describe the existing economic environment consistent with the Coordinator-General's *Economic Impact Assessment Guideline* (April 2017) (see Appendix 1). The analysis is to describe the local and regional economies likely to be impacted by the project and identify the relevant stakeholders, and include:

(a) map(s) illustrating the local and regional economies

(b) population of relevant local government areas

(c) the regional economy's key industries and their contribution to regional output

(d) relevant economic indicators (e.g. agriculture, aquaculture, fishing, mining, water prices)

(e) existing and proposed water infrastructure in the region.

Impact assessment and mitigation measures

15.124 Identify the net economic impacts of the project and scenarios of water usage on the local and regional area and the state ensuring the analysis is consistent with the Coordinator-General's *Economic Impact Assessment Guideline* (April 2017).

15.125 The economic impact assessment is to address matters including, but not limited to:

(a) labour demand, including the ability for labour (including specialists) to be drawn from the existing local, regional and state workforce, and the potential effects this may have on local and regional businesses

(b) raw input demand, including the ability for existing local, regional and state suppliers to provide relevant raw and manufactured inputs

(c) anticipated impacts the project will have on water prices, grazing, fishing, agriculture, wages, economic growth, renewable energy projects

(d) the anticipated value of offsets required for the project.

15.126 Provide a demand analysis for current and additional water supply that would be made available as a result of the project as justification for the scale and scope of the project, with emphasis on the following:

(a) demand for water by urban, industrial and agricultural users

(b) timeframe for uptake of each demand type

(c) water demand profile

(d) capacity and willingness to pay for both initial allocation purchase and ongoing water charges for urban, industrial and irrigation users under a range of possible future supply scenarios.

15.127 Describe the water pricing mechanisms under consideration for the project including the fixed and variable components of water pricing, the expected availability of high and medium priority water and the conversion ratio between the two, and the expected period of cost recovery for the project. Provide a comparison to existing arrangements for current water users in the region.

15.128 Quantify the employment and value-added contribution of the project to the local, regional and state economies in a regional impact assessment using computable general equilibrium modelling. The assessment is to estimate the changes in key indicators including:

(a) gross regional product

(b) gross state product

(c) employment by industry

(d) water prices for residential, mining, agricultural and industrial users

(e) gross value added by industry.

15.129 Undertake a cost-benefit analysis (CBA) which identifies the structure of the project and the relevant direct costs and benefits from the project.

(a) The CBA is to consider:

(i) key construction inputs and milestones

(ii) the project timeline

(iii) relevant renewal costs related to the project (including projected repair/replacement of infrastructure)

(iv) operational costs, including all input costs of production

(v) benefits, including revenue projections (and stipulating unit/price assumptions)

(vi) expected project life and any residual value over the assessment period

(vii) costs associated with environmental management, mitigation, monitoring, and offsets associated with the project.

(b) The CBA should also consider all direct private, indirect, and external social costs and benefits. These would include:

(i) external net benefits (such as third parties who are providing inputs of water, agriculture and energy) to the project

(ii) external net costs (to third parties, community, local and State Government) as a direct result of the project

(iii) all beneficiaries (e.g. individuals, the community, local and State Government) of the project. If there are specific issues related to the cost of water, these are to be identified as external costs and benefits.

Social

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse social impacts arising from the project

(b) enhance benefits for potentially affected communities, including Aboriginal and Torres Strait Islander peoples.

Existing environment

15.130 Identify and describe people, communities, and key stakeholders[19] directly or indirectly affected by the project.

15.131 Include a social baseline study of the project's potentially affected communities[20] in accordance with the Coordinator-General's *Social Impact Assessment Guideline* (March 2018) (see Appendix 1).

15.132 Use the latest qualitative and quantitative data in the social baseline study and supplement it through stakeholder engagement processes. Identify and reference relevant data contained in local and state government publications, reports, plans, and documentation, including regional and community plans.

Impact assessment and mitigation measures

15.133 Prepare a social impact assessment (SIA) for the project that is informed by a consultative and inclusive stakeholder engagement program[21] in accordance with Section 14 – Stakeholder consultation, and consistent with the relevant requirements of the Coordinator-General's SIA Guideline, having regard to the requirements of Building Queensland's *Social Impact Evaluation Guide* (Appendix 1).

15.134 Describe the outcomes of consultation with people, communities and key stakeholders directly affected including but not limited to landholders, Aboriginal and Torres Strait Islander peoples, local governments, state agencies, local and regional commerce and community development groups, social and public service providers (e.g. Queensland Health, Queensland Emergency Services and Department of Education).

15.135 Describe the project's potential social impacts (both beneficial and adverse) on potentially affected people, communities, and key stakeholders.

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[19] Refer to Appendix 1 of the SIA Guideline for a list of key stakeholders.
[20] Potentially affected communities are those local and/or regional communities that may be directly or indirectly affected by the project, whether negatively or positively.
[21] It is recommended that the proponent is to commence engaging at the earliest possible stage with all potentially affected stakeholders to discuss and explain the project and to identify and respond to issues and concerns identified as social impacts.

15.136 Describe any potential impacts on the use of and access for recreational, natural and culturally important areas, waterways and landscapes (Aboriginal and non-Aboriginal) affected by the project.

15.137 Identify the percentage of workers likely to be sourced from potentially affected communities, including Aboriginal and Torres Strait Islander peoples, for the construction and operational phases and the proposed methodologies for workforce recruitment.

15.138 Describe the housing strategy to accommodate construction and operational workers.

15.139 Describe the workforce management strategy for a pandemic scenario.

15.140 Include a social impact management plan that describes management measures developed in consultation with potentially affected people, communities and key stakeholders to avoid and mitigate the project's potential adverse impacts and enhance the potential benefits.

15.141 Describe the framework to monitor the effectiveness of proposed management measures, including timeframes and key performance indicators for implementing these measures. The framework must identify roles and responsibilities, and relevant stakeholders.

Cultural heritage

Objective

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse impacts on Aboriginal and Torres Strait Islander People's cultural heritage

(b) avoid, minimise and/or mitigate adverse impacts on the cultural heritage significance of a heritage place or heritage area.

Existing environment

15.142 Identify the existing and historic Traditional Owners of the land within the project area.

15.143 Undertake a study and describe the existing Indigenous cultural heritage values that may be affected by the project and the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

15.144 For aspects of non-Indigenous historical heritage identified through the *Queensland Heritage Act 1992*, undertake a study of, and describe, the known and potential historical, cultural, archaeological and landscape heritage values of the area potentially affected by the project in accordance with the *Non-Indigenous cultural heritage – EIS information guideline* (Appendix 1). Identify values at local and State thresholds and assess the significance of identified values using recognised criteria.

Impact assessment and mitigation measures

15.145 Unless section 86 of the *Aboriginal Cultural Heritage Act 2003* (ACH Act) applies, the proponent is to develop a Cultural Heritage Management Plan (CHMP) or plans in accordance with the requirements of Part 7 of the ACH Act and any associated agreements that have been reached. The CHMP must be informed by the results of a cultural heritage study.

15.146 Provide strategies to mitigate and manage all impact on Indigenous and non-Indigenous cultural heritage values and have in place a strategy to address unexpected archaeological

discoveries and cultural places in accordance with the relevant part of the non-indigenous cultural heritage guideline in Appendix 1.

Noise and vibration

Objective

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate potential adverse noise and vibration impacts to sensitive receivers

(b) protect the environmental values of the acoustic environment

(c) avoid, minimise and/or mitigate structural damage to buildings or other infrastructure as a result of construction vibration.

Existing environment

15.147 Describe and illustrate the locations of any sensitive receptors that are listed in Schedule 1 of the *Environmental Protection (Noise) Policy 2019* (EPP (Noise)). Also describe any other environmental values that could be potentially impacted by emissions from the proposed project

15.148 Describe the existing noise and vibration sources within the project area.

Impact assessment and mitigation measures

15.149 Describe the characteristics of noise and vibration sources that would be emitted by the project (point source, fugitive emissions and general emissions) during construction and operational phases.

15.150 Describe the project's noise and vibration impacts on sensitive receptors in accordance with Schedule 1 of the EPP (Noise) and detail the proposed mitigation measures that demonstrate the acoustic quality objectives of Schedule 1 of the EPP (Noise) are achieved during construction and operational phases.

15.151 Describe how the project will be managed and how the acoustic quality objectives will be monitored and audited and how corrective actions will be managed in accordance with best practice environmental management.

Air

Objective

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate adverse air impacts to sensitive receivers

(b) protect the environmental values of the airshed.

Existing environment

15.152 Describe the existing air quality that may be affected by the project in the context of environmental values.

Impact assessment and mitigation measures

15.153 Describe the characteristics of any contaminants or materials that may be released from the project. Emissions (point source and fugitive) during construction, operations and upset conditions are to be described.

15.154 Predict the potential impacts of the releases to air from project activities on environmental values of the receiving environment using established and accepted methods and in accordance with the EP Regulation, *Environmental Protection (Air) Policy 2019* (EPP (Air)) and the latest version of the DES's *Air—EIS information guideline* (DES 2020) and *Applications for activities with impacts to air* (ESR/2015/1840). The description of impacts is to take into consideration the sensitivity and assimilative capacity of the receiving environment and the practices and procedures that would be used to avoid or minimise impacts.

15.155 Describe the proposed mitigation measures and how the proposed project activities will be consistent with EP Regulation, EPP (Air) and the latest version of the DES's *Air—EIS information guideline* (DES 2020) and *Applications for activities with impacts to air* (ESR/2015/1840). Where a government plan is relevant to the project activities or site where an activity is proposed, describe the activity's consistency with that plan.

15.156 Address the compatibility of the proposed project's air emissions with existing or potential land uses in surrounding areas.

15.157 Describe how the achievement of this section's objective is to be monitored, audited and reported, and how corrective actions are to be managed.

15.158 Provide a Greenhouse Gas Management Plan and Carbon Dioxide (CO_2) abatement plan and an inventory of project annual emissions for the life of the project for each relevant greenhouse gas, with total emissions expressed in 'CO_2 equivalent' terms for scope 1[22] and scope 2[23] emissions as per the National Greenhouse and Energy Reporting scheme.

15.159 The Greenhouse Gas Management Plan and CO_2 abatement plan is to include:

(a) a description of the proposed preferred and alternative measures to avoid and/or minimise greenhouse gas emissions and an assessment of how the preferred measures minimise and/or avoid emissions, and achieve energy efficiency

(b) a comparison of the preferred measures for emission controls and energy consumption with best practice environmental management in the relevant industry sector

(c) a description of any proposed plan to purchase carbon credits (e.g. Australian Carbon Credit Units), planned timeframes for purchase and acquittal of the credits

(d) a description of any identified opportunities and proposed plans for further offsetting of greenhouse gas emissions through indirect means

(e) a description of any annual energy and emissions reporting processes and methodologies, including assurance processes, as well as any commitments to make such reports publicly available.

[22] 'Scope 1' means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities (including emission from vegetation clearing).
[23] 'Scope 2' means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility.

Transport

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate potential adverse impacts to the condition and operation of existing and planned transport infrastructure

(b) maintain the safety, efficiency and operational integrity of all affected transport modes for the project workforce and other transport system

(c) ensure impact mitigation works are compatible with transport infrastructure planning.

Existing environment

15.160 Include a description of the existing and future (as planned by State or local government) transport network and corridors including detailed maps to appropriate scales showing relevant:

(a) construction laydown areas

(b) road and railway corridors

(c) road and rail infrastructure

(d) airports, airstrips

(e) sea ports.

Impact assessment and mitigation measures

15.161 Provide a detailed description of the total transport activities associated with all stages of the project, (from pre-construction through operation) background traffic growth, and existing traffic data. The information is to include but not be limited to trips associated with the expected workforce, number and classification of heavy vehicles, haulage of construction equipment and construction materials (material type, volumes and origin and destination). Identify, describe and map the haul routes for equipment, component parts and materials.

15.162 Identify any project site access points to/from public roads including their suitability for the proposed use and required upgrades in accordance with relevant local and/or state policies, standards and manuals.

15.163 Present the transport assessment in separate sections for each project-affected mode (road, rail, air services, port and maritime) as appropriate for each phase of the project.

15.164 Provide a detailed assessment by a registered professional engineer Queensland engineering consultant of how the existing and future safety, condition and performance of transport infrastructure will be impacted by the project's pre-construction, construction and operational phases.

15.165 Include details of the adopted assessment methodology for impacts on roads within the road impact assessment report in accordance with the latest Queensland Department of Transport and Main Roads (DTMR) *Guide to Traffic Impact Assessment* (GTIA) for state-controlled roads, and the three local government impact assessment methodologies for local government roads. For state-controlled roads, this assessment should ensure that all impact types (road safety, access and frontage, intersection delay, road link capacity, pavement,

and transport infrastructure (including bridges, culverts and grids) and wayfinding and road signs as detailed in the GTIA are considered and mitigated. Particular emphasis should also be placed on the following sections of the GTIA:

(a) section 8.4.2 Heavy vehicle routes

(b) section 9 Road safety

(c) section 13 Pavement.

15.166 Demonstrate that any necessary transport impact mitigation works will not compromise existing and future transport infrastructure, corridors, planning and works, with reference to the latest version of DTMR's Queensland Transport and Roads Investment Program and the Development Assessment Mapping System.

15.167 Identify, assess and address any project's potential impacts on existing and future railway corridors, particularly railway level crossings and any development interfacing or interfering with existing and future railway corridors in accordance with relevant standards and requirements such as the SDAP, the Guide for Development in a Transport Environment: Rail, the Manual of Uniform Traffic Control Devices, Part 7: Railways and railway manager standards. This is to include the construction and operation impacts of the project. Traffic data should be provided for development generated traffic during construction and operation, background traffic growth and timelines for development staging, construction and delivery.

15.168 Demonstrate how project impacts will be mitigated. Mitigation measures are to be prepared in consultation with relevant transport authorities (e.g. local governments, DTMR, Civil Aviation Safety Authority, Maritime Safety Queensland, Aurizon and Queensland Rail).

Waste management

Objectives

The construction and operation of the project are to:

(a) avoid, minimise and/or mitigate potential adverse impacts of hazardous contaminants and waste generated by the project

(b) manage any waste transported, generated, or received as part of carrying out the activity in a way that protects all environmental values

(c) ensure upgrades to waste infrastructure are funded by the proponent.

Existing environment

15.169 Describe existing waste infrastructure including location, capacity and accepted waste streams relevant to the project.

Impact assessment and mitigation measures

15.170 For wastes other than wastewater, describe all the expected waste streams, including hazardous contaminants, generated by project activities during the construction, rehabilitation and operation.

15.171 Describe the quantity (to the extent reasonably practicable), and physical and chemical characteristics of each significant waste, any attributes that may affect dispersal in the environment, and its associated risk of causing environmental harm.

15.172 Conduct the impact assessment in accordance with the latest version of DES's *Waste—EIS information guidelines* and *Applications for activities with waste impacts (ESR/2015/1836)* (Appendix 1). Demonstrate that the proposed project can meet the environmental objectives and performance outcomes in Schedule 8 of the EP Regulation.

15.173 Define and describe objectives for protecting or enhancing environmental values from impacts from wastes.

15.174 Detail the geochemistry of all waste rock, including spoil and rejects. Assess the potential risks associated with this waste stream and describe the management of progressive placement and any disposal strategy to minimise any potential impacts on environmental values of the proposed project area. Detail how high risk waste material will be managed in the rehabilitation plan.

15.175 Detail waste management planning for the project especially how these plans are to be applied to prevent or minimise environmental impacts from waste for each stage of the project, including pre-construction. Waste management planning is to include details of all identified waste types, waste volumes and proposed locations for waste disposal.

15.176 Describe and assess the proposed management measures against the preferred waste management hierarchy, namely: avoid waste generation; cleaner production; recycle; reuse; reprocess and reclaim; waste to energy; treatment; disposal. This includes the generation and storage of waste.

15.177 If the production of hazardous contaminants and waste is unavoidable, describe proposed treatment and/or storage of hazardous contaminants until they can be disposed at an approved facility.

15.178 Describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives would be monitored, audited and managed.

Cumulative impacts

Objectives

The design, construction and operation of the project are to:

(a) avoid, minimise and/or mitigate potential adverse impacts arising from the combined effects of past, present and reasonably foreseeable projects on the environmental, social, economic, and cultural values of the Burdekin Basin and the Great Barrier Reef

(b) ensure that the general and specific ecological outcomes, environmental flow objectives and water allocation security objectives of the *Water Plan (Burdekin Basin) 2007* or any draft water plan are met by the project when acting in combination with past, present and reasonably foreseeable projects in the region.

General requirements

15.179 Potential cumulative environmental, social, economic, and cultural impacts are to be considered for the design, construction, and operational phases of the project.

15.180 The cumulative impact assessment is to consider the combined effect of potential impacts of different components of the project on the same value (intra-project cumulative impacts) and

the impacts of other relevant projects acting in combination on the same value (inter-project cumulative impacts).

15.181 The assessment should describe the potential cumulative effects, reversible and irreversible impacts, the risk of environmental harm, management strategies and the ability to offset the impacts of existing and future development projects.

15.182 Values that are to be considered in the intra-project cumulative impact assessment include (but are not limited to):

(a) terrestrial habitat values, considering the potential impacts of vegetation clearing, edge/barrier effects, fragmentation, weed and pest incursion

(b) environmental values that are MSES potentially impacted by the project

(c) aquatic habitat values, considering the potential impacts of inundation, water storage operation, algal blooms, water quality within and downstream of the storage (including temperature), water releases

(d) terrestrial and aquatic fauna values, considering the potential impacts of habitat loss, noise and vibration (including use of explosives), lighting (especially for night works during construction), waterway diversions and fish passage and pest plant and animal incursions

(e) surface water values, considering the potential impacts of changes to stream flows and overland flow, flooding regimes and sediment transport

(f) water quality values, considering the potential impacts of release of contaminants and sediment transport

(g) groundwater values, considering the potential impacts of pressure from water storage

(h) landform and land values, considering the potential impacts of earthworks, erosion, contamination, and waste storage and disposal.

(i) human health and wellbeing and community amenity environmental values in the context of the air and acoustic environments

(j) cultural heritage values where multiple sites are impacted by the project

(k) community values, communities' physical safety, quality of life, access to infrastructure and services, physical and mental health, and social, economic and cultural wellbeing

(l) Indigenous cultural, environmental, social, and economic values, uses and aspirations linked to water.

15.183 The inter-project cumulative impact assessment is to consider the potential impacts of current and proposed projects acting in combination on:

(a) hydrological processes supporting aquatic, riparian floodplain, estuarine and coastal ecosystems and processes, primary industries and other anthropogenic water uses in the catchment

(b) water quality in the Burdekin Basin including sediment, nutrient and pollutant loads

(c) water quality in the GBR

(d) fluvial processes supporting and influencing riparian, floodplain, estuarine and coastal ecosystems and processes

(e) Indigenous cultural, environmental, social, and economic values, uses and aspirations linked to water.

Temporal and spatial extent

15.184 The spatial extent of the cumulative impact assessment should extend as far as the potential impacts from the project/s and include:

(a) the proposed impoundment and surrounding areas, upstream to FSL, impoundment shorelines and riparian zone, as well as the downstream river system, including the river channel, riverbanks, floodplains, and the Burdekin coastal region

(b) the direct and indirect impacts of any other ancillary works and infrastructure required for the project.

15.185 The cumulative impact assessment must consider impacts during construction and operational impacts for the life of the project (as long as the barrier is in place). Note that all references to construction includes dam filling.

Intra-project cumulative impact assessment

Consideration of incremental impacts throughout the EIS

15.186 The combined incremental impacts of the project should generally be considered throughout the EIS, rather than in a specific cumulative impact assessment. For example, the combined effect of the construction dust, noise and blasting of the project on should be considered in the relevant project specific matter sections of the EIS.

15.187 The combined incremental impacts of the project may relate to:

(a) multiple forms of impact at one location (e.g. the nearest sensitive receiver may be impacted by noise and vibration, dust, air quality, traffic, land acquisition)

(b) a form of impact occurring at several locations (e.g. noise and vibration impacts will occur at a number of construction sites and along transport routes or e.g. use of water for the purpose of agriculture at multiple locations within the catchment)

(c) an environmental, social or cultural value being impacted at several locations or by a number of forms of impact (e.g. water quality will be impacted by construction activities at a number of locations, by habitat change and by operational activities such as downstream flow regime change and by use of water in the dam, in particular for agriculture)

(d) the potentially counter-active effects of negative and positive impacts (e.g. loss of income to the local region from loss of agricultural land may be offset by enhanced agricultural productivity elsewhere, or locally by economic benefits derived from construction phase expenditure).

Cumulative impact assessment – dam construction and operation

15.188 The cumulative impacts associated with the construction (dam raising and filling) and operation (flow manipulation) of the project are to be considered in a specific cumulative impact assessment section of the EIS. The assessment is to consider the proposed impoundment and surrounding areas, tailwater upstream to FSL, impoundment shorelines and riparian zone, as well as the downstream river system, including the river channel.

15.189 Potential impact pathways should be presented using cause-effect diagrams (identifying root causes, cause–effect relationships and cumulative environmental effects) are to be

presented which illustrate schematically how the initial filling of the raised dam and flow manipulation associated with the dam may generate physical, chemical, and biological effects of increasing order through multiple and parallel pathways. Impact pathways generally involving multiple root causes and lower and higher order effects, interlinked by cause–effect relationships.

15.190 The term 'cause–effect relationship' refers to the connection between an event and its consequence, e.g. an initial activity (root cause) leading to a first order effect, or multiple lower order effects leading to a higher order effect.

15.191 Using cause-effect diagrams describe the impact pathways associated with raising of the dam (focussing on dam filling). These are likely to include (but will not be limited to) the following:

(a) the existing integrity and connectivity of ecological processes

(b) cumulative impacts on aquatic and riparian biodiversity within and adjacent to the impoundment arising from the loss of riparian habitats, change from a riverine to lacustrine environment and creation of new riparian habitats around the impoundment because of land inundation

(c) cumulative impacts on aquatic and riparian biodiversity in downstream river reaches and on the Lower Burdekin delta associated with reduced sediment and bedload content downstream of the dam, and changes to downstream channel morphology

(d) cumulative impacts on the surface water and groundwater interaction regime including impacts on groundwater dependant ecosystems

(e) cumulative impacts on biological biodiversity, including habitat of endangered, vulnerable and near threatened species, special least concern and regional ecosystems.

15.192 Using cause-effect diagrams describe the impact pathways associated with dam operation (excluding use of water). These are likely to include (but will not be limited to) the following:

(a) cumulative impacts on aquatic, riparian and terrestrial biodiversity downstream of the project associated with flow regulation including reduced groundwater recharge, changed salinity balance on the floodplain, changed channel morphology and other downstream impacts

(b) deposition of bedload and suspended sediment in the impoundment and subsequent impacts on downstream sediment discharge impacting biodiversity in the river channel and on the Burdekin River floodplain, delta and coastal habitats.

15.193 Using cause-effect diagrams describe the impact pathways associated with dam operation (including use of water). These are likely to include (but will not be limited to) the following:

(a) cumulative impacts on water quality (including sediment loads and particulate nutrients) within the Burdekin Basin and in the GBR lagoon associated with new agricultural development

(b) cumulative impacts on hydrology and hydraulics including impacts on flow regimes and associated impacts on aquatic, riparian, floodplain, estuarine and coastal ecosystems

(c) cumulative impacts on groundwater levels, groundwater quality (including salinity).

Inter-project cumulative impact assessment

Scope

15.194 The inter-project cumulative assessment is to be presented in a specific cumulative impact assessment section of the EIS.

15.195 Describe the following as part of the inter-project cumulative impact assessment:

(a) known current and proposed projects (under assessment, approved or under construction) proposing the interference of water within the Burdekin Basin (including projects that include the take or distribution of water)

(b) existing water users within the Burdekin and Broken River catchments

(c) existing water storages within the Burdekin Basin

(d) existing water allocations and changes to pre-development flows

(e) current and future projects potentially involving the provision of additional agricultural and energy development, approved or under consideration, within the Burdekin Basin, including below the Clare Weir

(f) other projects within the region with approved offsets in respect of MSES and/or MNES

Cumulative impacts on hydrology

15.196 Within six months of the finalisation of the TOR, submit the environmental, operational and infrastructure parameters used to run the Integrated Quantity Quality Model (IQQM) for the project to the Department of Regional Development, Manufacturing and Water (DRDMW) and an assessment of the IQQM run against *Water Plan (Burdekin Basin) 2007* Environmental Flow Objectives and Water Allocation Security Objectives as well as general and specific ecological outcomes.

15.197 DRDMW will compile an IQQM model where the parameters for each project are fixed. The only parameters that can be changed will be those that relate to the proponent's own project unless there is the written advice of the other proponent or DRDMW. In such a case this must be referenced in the EIS. Note: this information will be shared with other project proponents required to undertake cumulative impact assessments in the Burdekin Basin. Other project proponents will be required to provide this information for their projects to DRDMW within the same timeframe.

15.198 Include a cumulative impact scenario using the DRDMW Chief Executive approved IQQM which considers the interaction of the project with other current and proposed projects in the Burdekin Basin. Describe the project's contribution to the cumulative impacts of current and proposed water infrastructure projects on catchment hydrology. Present the key inputs, assumptions and outputs of an appropriately calibrated run of catchment modelling (cumulative impact scenario) using the approved IQQM.

15.199 Using the outputs of the cumulative impact scenario, describe the level of compliance achieved by the project with general and specific ecological outcomes of the *Water Plan (Burdekin Basin) 2007* or any draft water plan, as well as environmental flow objectives and water allocation security objectives of the current and any draft Water Plan for the Burdekin Basin, including an assessment against relevant performance indicators and outcomes.

15.200 Describe the combined cumulative impact of current and proposed water infrastructure projects on the GBR and how the project impacts the outcomes, objectives and target of the *Reef 2050 Long-Term Sustainability Plan* and *Reef 2050 Water Quality Improvement Plan*.

Describe how the project achieves consistency with the *Reef 2050 Cumulative Impact Management Policy* and the *Reef 2050 net benefit policy*.

Cumulative impacts on water quality

15.201 Within 12 months of the finalisation of the TOR, submit to the Office of the Coordinator-General estimates of trap efficiency of the dam, sediment yields, loads and subsequent impacts on sediment discharge. The key assumptions and inputs to any modelling used to generate these estimates should be described. Note: this information will be shared with other project proponents currently preparing environmental impact statements for projects in the Burdekin region.

15.202 Describe the likely impacts of the combined projects on the sediment budget of the Burdekin Basin, with reference to the volume of clay (<4µm), fine silt (4-16 µm) and coarse (>16 µm) sediment fractions trapped in proposed and likely impacts of the impoundments and downstream floes on downstream sediment (bed load and suspended) transport and end-of-river export.

15.203 Describe the project's contribution to the cumulative impacts of current and proposed water infrastructure projects on sediment discharge at the sub-catchment and catchment level. Present sediment rating curves which reflect the likely impacts of dam construction and significant land use changes, including any agricultural development associated with the project.

15.204 Describe the project's direct and indirect (through facilitated agriculture) contribution to catchment pollutant loads including dissolved inorganic nitrogen and particulate nutrients and photosystem-II inhibiting herbicides.

15.205 Describe the likely impacts of the combined projects on GBR ecosystems associated with sediment entrapment and discharge from the project. The assessment should consider the project's contribution to sediment erosion rates in the sub-catchment and impacts associated with elevated turbidity, sedimentation stress, and potential impacts from the associated nutrients including dissolved inorganic nitrogen. The assessment of impacts on the GBR should focus on the finer clay and silt sediment fractions that are most likely to reach the GBR lagoon and any impacts associated with reduced supply of coarse sediment.

Cumulative impacts on other values

15.206 The intra-project cumulative impact assessment prepared by each project proponent required to undertake cumulative impact assessments in the Burdekin Basin will be used to inform the Coordinator-General's evaluation of inter-project cumulative impacts on environmental, social, economic, and cultural values not considered by sections 15.194 - 15.205.

16. Matters of national environmental significance

Note

The proposed project was referred on 22 June 2020 to the Australian Government Department of Agriculture, Water and the Environment (DAWE) (EPBC reference number: 2020/8705).

On 28 August 2020, the delegate of the Minister for the Environment determined the proposed project to be a controlled action under the Commonwealth EPBC Act.

The controlling provisions are sections:

(a) 12 and 15A - World Heritage properties

(b) 15B and 15C - National Heritage places

(c) 16 and 17B – Ramsar wetlands

(d) 18 and 18A - Listed threatened species and communities

(e) 20 and 20A - Listed migratory species

(f) 24B and 24C - GBRMP

The project will be assessed by EIS under the assessment bilateral agreement between the Commonwealth and Queensland governments (section 45 of the EPBC Act).

The MNES section of the TOR should be a stand-alone chapter that primarily focuses on the MNES listed above. This section (the 'MNES section') is to contain sufficient information to be read alone with reference to technical data or supplementary reports where appropriate. Any detailed technical information to support the text in the MNES section is to be included as appendices to the draft EIS.

General content

16.1 The MNES section is to take into consideration the EPBC Act Significant Impact Guidelines that can be downloaded from DAWE's website.

16.2 The proponent is to ensure that the MNES section assesses compliance of the action with principles of Ecologically Sustainable Development and the objects of the EPBC Act (see Chapter 1 Part 1 of the EPBC Act).

Specific content

General information

16.3 Provide the background and context of the action including:

(a) the title of the action

(b) the full name and postal address of the designated proponent

(c) a clear outline of the objective of the action

(d) the location of the action

(e) the background to the development of the action

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, are currently, or will be, taken or that have been approved in the region affected by the action

(g) the current status of the action

(h) the consequences of not proceeding with the action.

Description of the action

16.4 All components of the action are to be described in detail, including construction, operation, maintenance, decommissioning and rehabilitation. This is to include the precise location of all works to be undertaken, structures to be built or elements of the action that may have impacts on MNES.

16.5 The description of the action is to also include details on how the works are to be undertaken (including stages of development and their timing) and design parameters for those aspects of the structures or elements of the action that may have relevant impacts. At a minimum, this section is to also include details of:

(a) final height of the dam raising and specific details of construction

(b) final total area in hectares of the inundation area

(c) ancillary infrastructure including new construction and upgrades

(d) realignment or replacement of services, structures, access etc. required due to final inundation area and dam raising

(e) re-establishment of existing quarries and establishment of new quarries (resource extraction areas) which includes location, size, method of extraction of materials and transport of materials

(f) treatment of contaminated land, including method of treatment, disposal of waste and contaminated material, standards and minimum thresholds required for removal/disposal

(g) maximum life of the action, including construction, operation, maintenance, decommissioning and rehabilitation

(h) number of jobs for the life of the action, including number of jobs for Indigenous employees and

(i) associated works and supporting infrastructure as part of the Burdekin Falls Dam Improvement Project or safety works, if undertaken

(j) other such actions, including, but not limited to, changes to hydrological flow (including dam releases etc.), concrete batching plant, material storage, construction camp and facilities, fines and dust control management, waste management generally and management of spills/contaminants/pollutants (e.g. prevention from entering waterways and groundwater).

16.6 The description of the action is to provide the total size (in hectares) of the project site and the total size (in hectares) of the disturbance footprint. If the disturbance footprint is the same as the project site, the MNES section is to include a statement to this effect.

16.7 The MNES section is to include a map (or maps) which clearly identify all components of the action and their location in the proposed action area.

Feasible alternatives

16.8 Outline any feasible alternatives to the action to the extent reasonably practicable, including:

(a) if relevant, the alternative of taking no action

(b) a comparative description of the impacts of each alternative on listed threatened species and communities, listed migratory species, Ramsar wetland (BGB), GBRMP, Great Barrier Reef World Heritage Area (GBRWHA) and the Great Barrier Reef National Heritage Place (GBRNHP)

(c) sufficient detail to make clear why any alternative is preferred to another.

16.9 Short, medium and long-term advantages and disadvantages of the options are to be discussed.

Description of the environment

16.10 Describe the environment of the project site and surrounding areas (i.e. adjacent, upstream and/or downstream) that may be affected by the action. At a minimum, this section is to include details of:

(a) terrestrial and aquatic ecosystems, including key vegetation communities and relevant watercourses (e.g. Burdekin River catchment area)

(b) estuarine and coastal environments, including inshore coastal areas, vegetation, underwater ecological features, key habitats, Burdekin river & catchment areas and inshore reefs

(c) native flora and fauna, both terrestrial and aquatic

(d) pest species and weeds

(e) important habitat areas, recognised populations and habitat, and aggregations of listed species

(f) environment and conservation values of the GBRMP, GBRWHA and GBRNHP.

Relevant impacts

16.11 All relevant impacts of the action are to be assessed in accordance with relevant DAWE policies and guidelines, and information provided in the Species Profile and Threats (SPRAT) Database, including but not limited to habitat clearance, fragmentation and degradation, introduction and increase in numbers of pests, changes to hydrological regimes (including flow changes), impacts to water quality (including indirect and facilitated impacts), waste and chemical pollution and greenhouse gas emissions.

16.12 The MNES section is to include a description of all relevant impacts of the action (direct, indirect, cumulative and facilitated), including the magnitude, duration and frequency of the impacts. Relevant impacts are the impacts that the action will have, or is likely to have, on MNES. All stages and components of the action must be addressed, and the following information provided:

(a) a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts

(b) a statement, with supporting evidence, whether any relevant impacts are likely to be unknown, unpredictable or irreversible

(c) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

16.13 The MNES section is to provide a detailed assessment of any likely impact that the action may have on (at the local, regional, state, national and international scale) the MNES above.

16.14 The MNES section is to identify and assess the cumulative impacts on MNES (terrestrial, aquatic and marine) created by the existing dam structure and the activities of other existing and proposed adjacent, upstream and downstream relevant developments, water users and land users.

16.15 Establish and describe clear spatial and temporal boundaries for the assessment of cumulative impacts.

16.16 Describe the change in the duration, frequency, magnitude and timing of river flows and releases for current and future water infrastructure projects in the Burdekin Basin and potential influence on aquatic and marine biota and water quality, within and at end of the catchment, i.e. BGB Ramsar Site, GBRMP, GBRWHA and GBRNHP.

16.17 Identify water quality and environmental flow objectives within and at the end of the Burdekin Basin in relation to the BGB Ramsar Site, GBRMP, GBRWHA and GBRNHP.

16.18 Identify and consider current and future projects potentially involving the expansion and intensification of agriculture and other end uses relating to the action, approved or under consideration, within the Burdekin Basin, and wider areas as relevant. Describe the potential area of land that may be subject to land use change as a result of those projects and estimate the potential change in nutrient, sediment and pesticide inputs (including other pollutants) to surface and groundwater that may occur within catchment and wider areas, including end-of-catchment loads.

16.19 The MNES section is to address the potential cumulative impact of the project on ecosystem resilience. The cumulative effects of climate change impacts on the environment must also be considered in the assessment of ecosystem resilience. Where relevant to the potential impact, a risk assessment is to be conducted and documented.

Greenhouse gas emissions (GHG)

16.20 The MNES section is to outline the cumulative direct and indirect greenhouse gas emissions of the action. An inventory of the projected GHG associated with the action is to be provided. This inventory is to include scope 1 and 2 emissions and, for context, an outline of total global greenhouse gas emissions.

Avoidance, mitigation and management measures

16.21 The MNES section is to include detailed descriptions of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of all stages of the action on MNES. The proposed measures are to be based on best available practices, appropriate standards and supported by scientific evidence (e.g. outcomes of successful field trials, research papers, other projects, etc.). The MNES section is to include:

(a) proposed measures to be undertaken to avoid and mitigate the relevant impacts of the proposed action on MNES, including those required by other Commonwealth, State and local government approvals

(b) an assessment of the predicted effectiveness of the proposed measures

(c) any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advices, and a discussion on whether the proposed measures are not inconsistent with relevant recovery plans and threat abatement plans

(d) details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the proposed measures

(e) details on measures, if any, proposed to be undertaken by State and local government, including the name of the agency responsible for approving each measure

(f) information on the timing, frequency and duration of the measures to be implemented

(g) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

16.22 The MNES section is not to just state proposed management plans and/or broad objectives to describe avoidance, mitigation and management measures. The MNES section is to include detailed measures that will be implemented to avoid, mitigate and manage impacts on MNES. Committed language (i.e. 'will') rather than non-committal language (i.e. 'may', 'where possible', 'if required', etc.) is to be used.

16.23 The SPRAT Database, and associated statutory documents, may provide some relevant mitigation measures for listed threatened species and ecological communities. All proposed measures for MNES must consider the 'S.M.A.R.T' principle:

(a) S – Specific (what and how)

(b) M – Measurable (baseline information, number/value, auditable)

(c) A – Achievable (timeframe, money, personnel)

(d) R – Relevant (conservation advices, recovery plans, threat abatement plans)

(e) T – Time-bound (specific timeframe to complete).

Environmental offsets

Note

According to the EPBC Act *Environmental Offsets Policy* (2012), environmental offsets are measures that compensate for the residual adverse impacts of an action on the environment. Offsets provide environmental benefits to counterbalance the impacts that remain after avoidance and mitigation measures. It is important to consider environmental offsets early in the assessment process and correspondence with DAWE regarding offsetting is highly encouraged.

It is DAWE's standard practice that, if environmental offsets are required, a draft Offset Strategy and/or a draft Offset Area Management Plan (OAMP) are included in the assessment documentation for assessment and approval. Further, it is DAWE's expectation that the environmental offset is legally secured under relevant Queensland legislation prior to the commencement of the action. Where this is not achievable, DAWE will recommend to the Minister (or delegate) that the conditions of approval require the environmental offset/s or the OAMP be approved, and legally secured, prior to the commencement of the action.

16.24 The MNES section is to include an assessment of the likelihood of residual significant impacts occurring on MNES after avoidance, mitigation and management measures have been applied. If it is determined that a residual significant impact is likely, include a draft Offset Strategy as an appendix to the EIS that provides, at a minimum:

(a) details of the environmental offset/s[24](in hectares) for residual significant impacts of the action on relevant MNES, and/or their habitat

(b) details of how the environmental offset/s meets the principles of the EPBC Act Environmental Offsets Policy (2012) (EPBC Act Offset Policy), including the Offsets Assessments Guide, in particular how the proposed environmental offset/s will achieve an overall conservation outcome for the EPBC protected matter

(c) details of a strategy for the staging of environmental offset/s for each project stage (if proposed)

(d) details of appropriate offset area/s (including a map) to compensate for the residual significant impact on relevant MNES, and/or their habitat

(e) the methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to the project site for each relevant MNES, including:

  (i) Quantum of impact – area (in hectares)

  (ii) Quantum of impact – quality (e.g. using the Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the *Queensland Environmental Offsets Policy* [Version 1.2, April 2017], or subsequent revision)

(f) the methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to each potential offset area/s for each relevant MNES, including:

  (i) time over which loss is averted (max. 20 years)

  (ii) time until ecological benefit

  (iii) risk of loss (%) without offset

  (iv) risk of loss (%) with offset

  (v) confidence in result (%)

(g) evidence that the relevant MNES, and/or their habitat, can be present in the potential offset area/s

(h) information about how the proposed offset/s area provides connectivity with other relevant habitats and biodiversity corridors

(i) details of the mechanism to legally secure the environmental offset/s (under Queensland legislation or equivalent) to provide protection for the offset area/s against development incompatible with conservation.

16.25 Where offset area/s have been nominated, include a draft OAMP as an appendix to the EIS which includes information to demonstrate how the environmental offset/s compensate for residual significant impacts of the action on relevant MNES, and/or their habitat, in accordance with the principles of the Offsets Policy and all requirements of the Offsets Assessment Guide. The draft OAMP must include:

[24] The Department expects that an EPBC Act protected matter is present in the proposed environmental offset/s if it is present in the project site to align with the EPBC Act Offsets Policy

(a) a description of the environmental offset/s, including location, size, condition, environmental values present and surrounding land uses

(b) baseline data, including from field validation surveys, and quantifiable ecological data on habitat quality and other supporting evidence that documents the presence of the relevant MNES, and the quality of their habitat within the environmental offsets

(c) an assessment of the site habitat quality for the offset area/s using an appropriate methodology, with justification and supporting evidence, (e.g. using the Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the *Queensland Environmental Offsets Policy* [Version 1.2, April 2017], or subsequent revision

(d) details of how the environmental offset/s will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant listed threatened species and communities, and/or listed migratory species

(e) maps and shapefiles to clearly define the location and boundaries of the environmental offset/s, accompanied by the offset attributes (e.g. physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the listed threatened species and communities that the environmental offset/s compensates for, and the size of the environmental offset/s in hectares)

(f) specific offset completion criteria derived from the site habitat quality to demonstrate the improvement in the quality of habitat in the environmental offset/s over a specified timeframe

(g) details of the management actions, and timeframes for implementation, to be carried out to meet the offset completion criteria

(h) interim milestones that set targets at 5-yearly intervals for progress towards achieving the offset completion criteria

(i) details of the nature, timing and frequency of monitoring to inform progress against achieving the 5-yearly interim milestones (the frequency of monitoring must be sufficient to track progress towards each set of milestones, and sufficient to determine whether the environmental offset/s are likely to achieve those milestones in adequate time to implement all necessary corrective actions)

(j) proposed timing for the submission of internal monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved

(k) timing for the implementation of corrective actions if monitoring activities indicate the interim milestones will not or have not been achieved

(l) risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OAMP and timely achievement of the offset completion criteria, including a rating of all initial and post-mitigation residual risks in accordance with an appropriate risk assessment matrix

(m) if proposed for listed threatened species and communities, evidence of how the management actions and corrective actions take into account relevant approved conservation advices and are consistent with relevant recovery plans and threat abatement plans

(n) details of the legal mechanism for legally securing the proposed offset area/s, such that legal security remains in force over the offset area/s for at least 20 years to provide

enduring protection for the offset area/s against development incompatible with conservation.

16.26 The draft OAMP is to be prepared by a suitably qualified person and in accordance with DAWE's *Environmental Management Plan Guidelines* (2014).

16.27 The draft OAMP is to provide evidence, derived from field validation surveys and vegetation assessments, to demonstrate that an EPBC Act protected matter (e.g. listed threatened species, ecological community or listed migratory species) is or can be present in the proposed environmental offset/s. Field validation surveys must be undertaken in accordance with Commonwealth guidelines, State guidelines and/or best practice survey methodologies.

16.28 Supporting evidence is to be included in the draft OAMP to justify how proposed management action/s are additional to the existing requirements of the landholder in managing their land (e.g. weed and pest management requirements under the Queensland *Biosecurity Act 2014*, existing grazing regimes, etc.) as required by the principles of the EPBC Act Offsets Policy.

16.29 The draft OAMP is to include robust scientific evidence (e.g. published research, pilot studies, previously successful projects/programs, etc.) to demonstrate the success of proposed measures to create, revegetate, regenerate and/or improve habitat (e.g. tree planting, nest boxes, artificial hollows, etc.) in the proposed environmental offset/s for a listed threatened species or ecological community, or a listed migratory species.

16.30 Where the proposed environmental offset/s supports an offset for multiple MNES, proposed management action/s for one EPBC Act protected matter must not be detrimental (i.e. have an impact) to other EPBC Act protected matters.

16.31 Where an environmental offset/s is proposed, with a completed Offsets Assessment Guide[25] calculation, all inputs are to be supported by robust scientific evidence and/or supporting evidence (e.g. historical grazing regimes, satellite imagery, statements from landholders, etc.).

Listed threatened species and communities (sections 18 and 18A)

16.32 The MNES section is to address, at a minimum, impacts on the listed threatened species and communities at Appendix 2.[26]

16.33 The assessment of listed threatened species and communities in the MNES section is to have the following structure and detail.

(a) Description

(b) Desktop analysis

(c) Survey effort

(d) Survey outcomes

(e) Habitat assessment

[25] It is DAWE's expectation that the agreed inputs into the Offsets Assessment Guide are specified in the conditions of approval (if the action is approved, subject to conditions, under the EPBC Act).

[26] This may not be a complete list of listed threatened species and ecological communities that will or are likely be impacted by the action. It is the proponent's responsibility to ensure that any listed threatened species and ecological communities at the time of the controlled action decision, which will or are likely to be impacted by the project, are assessed for the Minister's consideration. Any listing events (e.g. the listing or up-listing of a species) that occur after the controlled action decision (28 August 2020) do not affect the assessment and approval process.

(f) Impact assessment[27]

(g) Avoidance, mitigation and management[28]

(h) Statutory requirements

(i) Significant impact assessment.[29]

Description

16.34 Describe each listed threatened species and ecological communities (including EPBC Act listing status, distribution, habitat, life history, etc.); these descriptions are to align with the information in the SPRAT Database and relevant DAWE documents.[30]

Desktop analysis

16.35 Describe the desktop assessment methodology used to inform the field surveys within, adjacent to, downstream and upstream of the project site.

16.36 The MNES section is to identify and describe known historical records of listed threatened species and ecological communities in the broader region (this may also include downstream of the project site). All known records are to be supported by an appropriate source (i.e. Commonwealth and State databases, published research, publicly available survey reports, etc.), the year of the record and a brief description of the habitat in which the record was identified.

Survey effort

16.37 Provide details of the scope, methodology, timing and effort of field surveys (which are to be undertaken by qualified species experts with demonstrated experienced in detecting the relevant listed threatened species and ecological communities) within, adjacent to, downstream and upstream of the project site. Provide details of:

(a) how surveys were undertaken in accordance with relevant Commonwealth and State guidelines or best practice survey guidelines at the time of the surveys

(b) if relevant, the justification for divergence from relevant Commonwealth and State guidelines or best practice survey guidelines at the time of the surveys.

16.38 Surveys are to be of a suitable standard, including the scope, timing and spatial and temporal replication, to be able to detect cryptic or difficult to detect terrestrial and aquatic species. Surveys are to also target areas upstream, downstream and adjacent to the project site, particularly for species which regularly disperse through the landscape or aquatic environments (particularly seasonally) and/or have large home ranges.

Survey outcomes

16.39 State the total number of records (individuals and evidence of presence) of listed threatened species and ecological communities within, adjacent to, upstream and/or downstream of the

[27] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[28] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[29] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.
[30] DAWE strongly recommends that the habitat assessment is undertaken in line with the habitat descriptions outlined in SPRAT Database and relevant DAWE documents. However, the proponent may deviate from the information available in the SPRAT Database when undertaking the habitat assessments if appropriate. Any variation in habitat assessment approach must be discussed with DAWE prior to the submission of the preliminary documentation and must be supported by scientific evidence including published research, independent expert advice and information derived from field surveys (DAWE does not accept the consideration of Queensland Regional Ecosystem mapping to determine habitat for listed threatened species).

project site. All records are to include the year of the record and a brief description of the habitat in which the record was identified.

Habitat assessment

16.40 Provide a robust assessment of the potential habitat available within, adjacent to, upstream and/or downstream of the project site for listed threatened species and ecological communities. This is to include the assessment of specific habitat requirement/s relevant to each listed threatened species and ecological community (e.g. breeding, foraging, dispersal, important habitat, roosting, etc.).

16.41 Habitat assessments are to be derived from information obtained from:

(a) field surveys and vegetation assessments (e.g. hollow-bearing tree surveys)

(b) the SPRAT Database

(c) relevant DAWE documents (e.g. approved conservation advices, recovery plans, listing advices, draft referral guidelines, etc.)

(d) published research and other relevant sources.

16.42 Detailed mapping of habitat type/s for relevant listed threatened species and ecological communities that are found to be, or may potentially be, present within, adjacent to, upstream and/or downstream of the project site are to be included in the MNES section, and must:

(a) be specific to the habitat assessment undertaken for each listed threatened species and ecological community

(b) include an overlay of the disturbance footprint

(c) include known records of individuals (or evidence of individuals) derived from desktop analysis and/or field surveys.

16.43 The MNES section is not to just consider Queensland regional ecosystem (RE) mapping to determine habitat for listed threatened species – habitat assessments must consider and align with the information in the SPRAT Database and relevant DAWE documents. However, some Queensland Res align with the descriptions for some ecological communities and therefore the use of Queensland REs is acceptable in these cases.

16.44 Provide the total amount of each type of habitat (in hectares) within, adjacent to, upstream and downstream of the project site for each listed threatened species and ecological community.

16.45 The MNES section is to also include a detailed habitat assessment for the listed threatened species and communities at Appendix 2 and any other listed threatened species and/or ecological communities identified during desktop analysis and/or field surveys.

16.46 DAWE considers it is reasonable that a species may use a project site at some point in time if the vegetation and/or habitat feature/s to support its requirements are present. As such, even if a listed threatened species and/or community is not recorded during field surveys, the potential for occurrence of listed threatened species and communities is to also be considered and assessed in the MNES section.

Impact assessment[31] [32]

16.47 Describe and assess all impacts (direct, indirect, facilitated and cumulative) to listed threatened species and ecological communities and any other listed threatened species and communities that are found to be or may potentially be present in areas that may be impacted by the action.

16.48 Identify which component/s and stage/s of the action and/or consequential actions are of relevance to each listed threatened species and/or ecological community.

16.49 For threatened ecological communities, the total direct impact (in hectares) to each identified patch within and adjacent to the project site is to be provided in the MNES section compared to its current extent. Further, the impact assessment for ecological communities must include a discussion on the post-impact viability of each individual patch within and adjacent to the project site to be directly impacted from fragmentation as a result of vegetation clearance.

16.50 Provide the total amount of each type of habitat (in hectares) in the disturbance footprint for each listed threatened species and ecological community.

16.51 Assess how the action impacts the outcomes, objectives, and targets of relevant reports and documents including, but not limited to:

(a) *The Reef 2050 Long-Term Sustainability Plan* (2018)

(b) *Reef 2050 Water Quality Improvement Plan 2017-2022* (2018)

(c) *Cumulative Impact Management Policy* (2018)

(d) *Net Benefit Policy* (2018).

Avoidance, mitigation and management[33]

16.52 Describe all relevant species-specific measures proposed to avoid, mitigate and manage potential impacts on listed threatened species and ecological communities.

16.53 The MNES section is not to just state proposed management plans and/or broad objectives to describe avoidance, mitigation and management measures. The MNES section is to include detailed measures that will be implemented to avoid, mitigate and manage impacts on listed threatened species and ecological communities. Committed language (i.e. 'will') rather than non-committal language (i.e. 'may', 'where possible', 'if required', etc.) is to be used.

Statutory requirements

16.54 Where relevant, discuss how the proponent has had regard to relevant approved conservation advice/s.

16.55 The MNES section is to demonstrate, with supporting evidence, that the action will not be inconsistent with Australia's obligations under:

(a) the Biodiversity Convention

[31] Impact assessment is to include the indirect, facilitated and cumulative impacts the action will have on listed threatened species and communities in downstream catchment areas and wetlands, including estuarine, coastal and marine environments. (e.g. the lower Burdekin catchment area and inshore reefs).

[32] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.

[33] Appropriate measures may be detailed on the SPRAT Database for relevant listed threatened species and ecological communities. All proposed measures must consider the 'S.M.A.R.T' principle (see below) and as outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.

(b) the Convention on Conservation of Nature in the South Pacific (Apia Convention)

(c) the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

(d) a recovery plan or threat abatement plan.

Significant impact assessment[34]

16.56 After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on relevant listed threatened species and ecological communities. The significant impact assessment is to consider the DAWE's *Significant impact guidelines 1.1* (2013).

16.57 The MNES section is to provide a clear and definitive conclusion (i.e. 'likely' or 'unlikely'), including the extent and nature, of residual significant impacts on relevant listed threatened species and ecological communities to align with the *EPBC Act Environmental Offsets Policy* (2012).

Listed migratory species (sections 20 and 20A)

16.58 The MNES section is to address, at a minimum, impacts on the listed migratory species at Appendix 3.[35]

16.59 Similar to the 'Listed threatened species and communities' section, the assessment of listed migratory species in the MNES section is to have the following structure and detail. Where there are different requirements to the listed threatened species and communities' section, these are outlined.

(a) Description

(b) Desktop analysis

(c) Survey effort

(d) Survey outcomes

(e) Habitat assessment

(f) Impact assessment[36]

(g) Avoidance, mitigation and management[37]

(h) Statutory requirements

(i) The MNES section must demonstrate, with supporting evidence, that the action will not be inconsistent with Australia's obligations under:

- the Bonn Convention
- China-Australia Migratory Bird Agreement
- Japan-Australia Migratory Bird Agreement

[34] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.
[35] This may not be a complete list of listed migratory species that will or are likely be impacted by the action. It is the proponent's responsibility to ensure that any listed migratory species at the time of the controlled action decision, which will or are likely to be impacted by the action, are assessed for the Minister's consideration. Any listing events that occur after the controlled action decision (28 August 2020) do not affect the assessment and approval process.
[36] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[37] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.

- an international agreement approved under subsection 209(4) of the EPBC Act

(j) Significant impact assessment.[38]

Great Barrier Reef Marine Park (sections 24B and 24C)

16.60 The GBRMP is a marine protected area which is recognised to have a high conservation value. Assessments of impacts are to be discussed with reference to the environment of the GBRMP, which includes social, economic and cultural aspects of the environment.

Note

Environment means (as per section 528 of the EPBC Act):

(a) ecosystems and their constituent parts, including people and communities and

(b) natural and physical resources and

(c) the qualities and characteristics of locations, places and areas and

(d) heritage values of places and

(e) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b), (c) or (d).

Description

16.61 The MNES section is to describe the current pressures on the GBRMP and the environmental values within the GBRMP, including Upstart Bay and surrounds in the context of (but not limited to):

(a) water quality

(b) freshwater wetlands, mangrove forests, coral reefs and sea grass meadows

(c) bony fish/shellfish (i.e. the river system has been identified as an important fish habitat area)

(d) biodiversity (i.e. Dugong feeding ground and coral reproduction)

(e) significant cultural heritage items and areas in lower Burdekin Basin area and Upstart Bay (i.e. ship and plane wrecks in Upstart Bay).

16.62 Overall, the MNES section is to demonstrate how, with detailed supporting justification, the integrity of the GBRMP will be maintained throughout the undertaking of the proposed action and after the action has been decommissioned.

16.63 The description of the environmental values within and surrounding the GBRMP is to be supported by baseline data derived from field surveys, scientific evidence derived from research papers and expert advice, public consultation, other approval processes, and information collected from desktop research (e.g. Commonwealth and State government databases/websites [including Commonwealth Scientific and Industrial Research Organisation (CSIRO)], universities, outcomes of previous field surveys, modelling, scientific investigations, etc.).

[38] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.

Desktop analysis

16.64 Describe the desktop assessment methodology used to inform the field surveys within, adjacent to, downstream and upstream of the project site.

Survey effort

16.65 See listed threatened species and communities section for detail.

Survey outcomes

16.66 Describe the values of the GBRMP identified through surveys undertaken. This may include the total number of records of species that are values of the GBRMP. All records must be supported by the year of the record and a brief description of the habitat in which the record was identified.

Impact assessment[39]

16.67 Describe and assess all impacts (direct, indirect, facilitated and cumulative) to the environment of the GBRMP, including for listed threatened species, listed migratory species and listed marine species and cetaceans in the GBRMP.

16.68 Describe the relevant impacts of the action on the values and/or integrity of the GBRMP including, but not limited to:

(a) nutrient and sediment from catchment runoff

(b) pesticide and herbicide from catchment runoff

(c) other pollutants (e.g. pharmaceuticals, chemicals, heavy metals, increased salinity) from catchment runoff

(d) barriers to water flow (including reduced water flow)

(e) modification of Coastal habitats

(f) increase of erosional and depositional processes from alteration to hydrological regime

(g) known or potential pest species being introduced or established (including existing pest species being spread or increased in numbers)

(h) nuisance algal growth

(i) impacts on listed threatened and migratory species, and marine species

(j) greenhouse gas emissions.

16.69 Assess the impacts of the action against relevant reports and documents including, but not limited to:

(a) The *Reef 2050 Long-Term Sustainability Plan* (2018)

(b) *Reef 2050 Water Quality Improvement Plan 2017-2022* (2018)

(c) *Cumulative Impact Management Policy* (2018)

(d) *Net Benefit Policy* (2018)

[39] Impact assessment is to include the indirect, facilitated and cumulative impacts the action will have on listed threatened species, listed migratory species and listed marine species and cetaceans in downstream catchment areas and wetlands, including estuarine, coastal and marine environments (e.g. the lower Burdekin catchment area and inshore reefs) as well as meet the impact assessment outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.

(e) Great Barrier Reef Strategic Assessment Reports

(f) Great Barrier Reef Outlook Reports

(g) *Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans* (2018)

(h) *Recovery plan for marine turtles in Australia* (2018).

16.70 Demonstrate how the action contributes to an overall or 'net' improvement to ecosystem health, water quality and the condition of the affected values, consistent with *The Reef 2050 Long-Term Sustainability Plan* (2018).

Avoidance, mitigation and management[40]

16.71 See listed threatened species and communities section for detail.

Significant impact assessment[41]

16.72 After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on the environment of the GBRMP. The significant impact assessment must consider the Department's *Significant impact guidelines 1.1* (2013).

16.73 Provide a clear and definitive conclusion (i.e. 'likely' or 'unlikely'), including the extent and nature, of residual significant impacts on the GBRMP to align with the *EPBC Act Environmental Offsets Policy* (2012).

World heritage properties (sections 12 and 15A)

16.74 The primary purpose of management of natural heritage and cultural heritage of a declared World Heritage property is to be, in accordance with Australia's obligations under the World Heritage Convention, to identify, protect, conserve, present, transmit to future generations and, if appropriate, rehabilitate the World Heritage values of the property.

16.75 The assessment of the GBRWHA in the MNES section is to have the following structure and detail.

(a) Description

(b) Impact assessment[42]

(c) Avoidance, mitigation and management[43]

(d) Statutory requirements

(e) Significant impact assessment.[44]

Description

16.76 Identify and describe the world heritage values of the GBRWHA that are likely to be impacted by the action. The relevant world heritage values are those described in *Statement of outstanding universal value for the Great Barrier Reef World Heritage Area*.

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[40] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[41] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.
[42] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[43] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[44] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.

Impact assessment[45]

16.77 Describe and assess all impacts (direct, indirect, facilitated and cumulative) of the action on the values and/or integrity of the GBRWHA including, but not limited to:

(a) nutrient and sediment from catchment runoff

(b) pesticide and herbicide from catchment runoff

(c) other pollutants (e.g. pharmaceuticals, chemicals, heavy metals) from catchment runoff

(d) barriers to water flow

(e) modification of Coastal habitats

(f) increase of erosional and depositional processes from alteration to hydrological regime

(g) known or potential pest species being introduced or established (including existing pest species being spread or increased in numbers)

(h) impacts on listed threatened and migratory species, and marine species

(i) greenhouse gas emissions.

16.78 Assess the impacts of the action against relevant reports and documents including, but not limited to:

(a) EPBC Act referral guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area (2014)

(b) The *Reef 2050 Long-Term Sustainability Plan* (2018)

(c) *Reef 2050 Water Quality Improvement Plan 2017-2022* (2018)

(d) *Cumulative Impact Management Policy* (2018)

(e) *Net Benefit Policy* (2018)

(f) Great Barrier Reef Strategic Assessment Reports

(g) Great Barrier Reef Outlook Reports.

16.79 The MNES section is to demonstrate how the action contributes to an overall or 'net' improvement to ecosystem health, water quality and the condition of the affected values, consistent with *The Reef 2050 Long-Term Sustainability Plan* (2018).

Avoidance, mitigation and management[46]

16.80 Describe all relevant measures proposed to avoid, mitigate and manage potential impacts on the GBRWHA.

Statutory requirements

16.81 Demonstrate that the action will not be inconsistent with:

(a) Australia's obligations under the World Heritage Convention or

(b) the Australian World Heritage management principles or

[45] The impact assessment is to include consideration of the requirements in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[46] As required in the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.

(c) a plan that has been prepared for the management of a declared World Heritage property under section 316 or as described in section 321 of the EPBC Act.

Significant impact assessment[47]

16.82 After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on the GBRWHA. The significant impact assessment is to consider the DAWE's *Significant impact guidelines 1.1* (2013).

16.83 The MNES section is to provide a clear and definitive conclusion (i.e. 'likely' or 'unlikely'), including the extent and nature, of residual significant impacts on the GBRWHA to align with the *EPBC Act Environmental Offsets Policy* (2012).

16.84 Overall, the MNES section is to demonstrate how, with detailed supporting justification, the integrity of the outstanding universal value of the GBRWHA will be maintained throughout the undertaking of the proposed action and after the action has been decommissioned.

National Heritage places (sections 15B and 15C)

16.85 The objective in managing National Heritage places is to identify, protect, conserve, present and transmit, to all generations, their National Heritage values.

16.86 The assessment of the GBRNHP in the MNES section is to have the following structure and detail.

(a) Description

(b) Impact assessment[48]

(c) Avoidance, mitigation and management[49]

(d) Statutory requirements

(e) Significant impact assessment.[50]

Description

16.87 Identify and provide a comprehensive description of the place, including information about its location, physical features, condition, historical context and current uses; and describe the national heritage values of the GBRNHP that are likely to be impacted by the action.

Impact assessment[51]

16.88 Describe and assess all impacts (direct, indirect, facilitated and cumulative) of the action on the values and/or integrity of the GBRNHP including, but not limited to:

(a) nutrient and sediment from catchment runoff

(b) pesticide and herbicide from catchment runoff

(c) other pollutants (e.g. pharmaceuticals, chemicals, heavy metals) from catchment runoff

(d) barriers to water flow

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[47] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.
[48] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[49] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[50] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.
[51] The impact assessment is to include consideration of the requirements in the 'Relevant Impacts' sections 16.11 – 16.19 above.

(e) modification of Coastal habitats

(f) increase of erosional and depositional processes from alteration to hydrological regime

(g) known or potential pest species being introduced or established (including existing pest species being spread or increased in numbers)

(h) impacts on listed threatened and migratory species, and marine species

(i) greenhouse gas emissions.

16.89 Assess the impacts of the action against relevant reports and documents including, but not limited to:

(a) The *Reef 2050 Long-Term Sustainability Plan* (2018)

(b) *Reef 2050 Water Quality Improvement Plan 2017-2022* (2018)

(c) *Cumulative Impact Management Policy* (2018)

(d) *Net Benefit Policy* (2018)

(e) Great Barrier Reef Strategic Assessment Reports

(f) Great Barrier Reef Outlook Reports.

16.90 The MNES section is to demonstrate how the action contributes to an overall or 'net' improvement to ecosystem health, water quality and the condition of the affected values, consistent with *The Reef 2050 Long-Term Sustainability Plan* (2018).

Avoidance, mitigation and management[52]

16.91 Describe all relevant measures proposed to avoid, mitigate and manage potential impacts on the GBRNHP.

Statutory requirements

16.92 Demonstrate that the action will not be inconsistent with:

(a) the National Heritage management principles or

(b) an agreement to which the Commonwealth is party in relation to a National Heritage place or

(c) a plan that has been prepared for the management of a National Heritage place under section 324S or as described in section 324X of the EPBC Act.

Significant impact assessment[53]

16.93 After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on the GBRNHP. The significant impact assessment is to consider the Department's *Significant impact guidelines 1.1* (2013).

16.94 The MNES section is to provide a clear and definitive conclusion (i.e. 'likely' or 'unlikely'), including the extent and nature, of residual significant impacts on the GBRNHP to align with the *EPBC Act Environmental Offsets Policy* (2012).

[52] As required in the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[53] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.

16.95 Overall, the MNES section is to demonstrate how, with detailed supporting justification, the integrity of the outstanding heritage value of the GBRNHP will be maintained throughout the undertaking of the proposed action and after the action has been decommissioned.

Ramsar wetlands (sections 16 and 17B)

Note

The primary purpose of management of a declared Ramsar wetland must be, in accordance with the Ramsar Convention, to describe and maintain the ecological character of the wetland by promoting conservation of the wetland and wise and sustainable use of the wetland for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem

The BGB Ramsar site was listed in 1993 under six of the possible nine criteria.

1. Contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
2. Supports vulnerable, endangered or critically endangered species or threatened ecological communities.
3. Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
4. Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
5. Regularly supports 20,000 or more waterbirds.
6. Regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

16.96 The assessment of the BGB Ramsar site in the MNES section is to have the following structure and detail.

(a) Description

(b) Impact assessment[54]

(c) Avoidance, mitigation and management[55]

(d) Statutory requirements

(e) Significant impact assessment.[56]

Description

16.97 Identify and provide a comprehensive description of its ecological character and state the characteristics that make the BGB Ramsar site a wetland of international importance under the Ramsar Convention. Describe the values of the wetland that are likely to be impacted by the action; include and refer to the criteria for identifying wetlands of international importance.

[54] The impact assessment must meet the requirements outlined in the 'Relevant Impacts' sections 16.11 – 16.19 above.
[55] As outlined at the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.
[56] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.

16.98 The MNES section is to describe the current pressures on BGB Ramsar site and the ecological characteristics of BGB Ramsar site and surrounds in the context of (but not limited to):

(a) erosion, sediments and salinity (i.e. turbidity)

(b) indirect and facilitated impacts of increased intensification and expansion of agriculture and development

(c) change in hydrological regime (i.e. connected groundwater and wetland systems, flow changes, hydrological connectivity, increased flooding)

(d) change to the physicochemical status of the wetland (i.e. nutrients, other chemicals)

(e) habitat modification/loss and/or disruption of lifecycle of listed species

(f) introduction or establishment of pest species.

16.99 Overall, the MNES section is to demonstrate how, with detailed supporting justification, the integrity of the ecological character of the wetland will be maintained throughout the undertaking of the proposed action and after the action has been decommissioned.

16.100 The description of the environmental values within and surrounding BGB Ramsar site is to be supported by baseline data derived from field surveys, scientific evidence derived from research papers and expert advice, public consultation, other approval processes, and information collected from desktop research (e.g. Commonwealth and State government databases/websites [including CSIRO], universities, outcomes of previous field surveys, modelling, scientific investigations, etc.).

Impact assessment[57]

16.101 Discuss the relevant impacts of the action that endanger the ecological character and/or integrity of the BGB Ramsar site including, but not limited to:

(a) nutrient and sediment from catchment runoff

(b) pesticide and herbicide from catchment runoff

(c) other pollutants (e.g. pharmaceuticals, chemicals, heavy metals) from catchment runoff

(d) barriers to water flow

(e) modification of Coastal habitats

(f) increase of erosional and depositional processes from alteration to hydrological regime

(g) known or potential pest species being introduced or established (including existing pest species being spread or increased in numbers)

(h) impacts on listed threatened and migratory species, and marine species

(i) greenhouse gas emissions.

Avoidance, mitigation and management[58]

16.102 Describe all relevant measures proposed to avoid, mitigate and manage potential impacts on the BGB Ramsar site a wetland of international importance.

[57] The impact assessment must include consideration of the requirements in the 'Relevant Impacts' sections 16.11 – 16.19 above.

[58] As required in the 'Avoidance, Mitigation and Management Measures' sections 16.21 – 16.23 above.

Statutory requirements

16.103 Demonstrate that the project will not be inconsistent with:

(a) the Ramsar Convention

(b) the Australian Ramsar management principles

(c) If a plan for managing the BGB Ramsar site has been prepared in accordance with section 333 of the EPBC Act - that plan.

Significant impact assessment[59]

16.104 After consideration of proposed avoidance, mitigation and management measures, provide an assessment of the likelihood of residual significant impacts on the ecological character of the BGB Ramsar site. The significant impact assessment must consider DAWE's *Significant impact guidelines 1.1* (2013).

16.105 The MNES section must provide a clear and definitive conclusion (i.e. 'likely' or 'unlikely'), including the extent and nature, of residual significant impacts on the ecological characteristics of BGB to align with the *EPBC Act Environmental Offsets Policy* (2012). Overall, the MNES section must demonstrate how, with detailed supporting justification, the integrity of the ecological character of the BGB Ramsar site will be maintained throughout the undertaking of the proposed action and after the action has been decommissioned.

Other approvals and conditions

16.106 The MNES section is to include information on any other approvals or requirements for approvals and any conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action. This is to include:

(a) details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:

(i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy

(ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the action

(c) a statement identifying any additional approval that is required

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

Environmental record of person(s) proposing to take the action

16.107 The information provided is to include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

[59] As outlined at the 'Environmental Offsets' sections 16.24 – 16.31.

(a) the person proposing to take the action

(b) for an action for which a person has applied for a permit, the person making the application.

16.108 If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.

Economic and social matters

16.109 The economic and social impacts of the action, both positive and negative, are to be analysed in the MNES section. Matters of interest may include:

(a) details of any public consultation activities undertaken, including any consultation with Indigenous stakeholders, and their outcomes

(b) projected economic costs (e.g. capital investment) and benefits of the action, including the basis for their estimation through cost/benefit analysis or similar studies

(c) employment opportunities expected to be generated by the action (including construction and operational phases), including number of jobs for Indigenous employees.

16.110 Economic and social impacts are to be considered at the local, regional and national levels. Details of the relevant cost and benefits of alternative options to the action, as identified above, are to also be included.

Ecologically Sustainable Development (ESD)

16.111 Provide a discussion of how the project will conform to the principles of ESD. To assist you, the *National Strategy for Ecologically Sustainable Development* (1992) is available at: **https://environment.gov.au/about-us/esd**.

Information sources provided in the MNES section

16.112 For information given in the MNES section, the MNES section is to state:

(a) the source of the information

(b) how recent the information is

(c) how the reliability of the information was tested

(d) what uncertainties (if any) are in the information.

17. Appendices to the EIS

17.1 Appendices are to provide the complete technical evidence used to develop assumptions, statements and findings in the main text of the EIS.

17.2 No significant issue or matter is to be mentioned for the first time in an appendix—it is to be addressed in the main text of the EIS.

17.3 Include a table listing the section and sub-section of the EIS where each requirement of the TOR is addressed.

17.4 Include a list citing all reference material used or relied on in the EIS.

17.5 Include a glossary of terms and a list of acronyms and abbreviations.

Part D Acronyms and abbreviations

The following acronyms and abbreviations have been in this document.

Acronym/abbreviation	Definition
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AEP	annual exceedance probability
AHD	Australian Height Datum
ASS	Acid sulfate soil
BGB	Bowling Green Bay
CBA	cost benefit analysis
CHMP	Cultural heritage management plan
Cth	Commonwealth
CO_2	carbon dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Aust)
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water and the Environment (Cth)
DES	Department of Environment and Science
DRDMW	Department of Regional Development, Manufacturing and Water
DTMR	Department of Transport and Main Roads
EIS	Draft environmental impact statement
EMP	environmental management plan
EP Act	*Environmental Protection Act 1994*
EP Regulation	Environmental Protection Regulation 2019
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*
EPP	Environmental Protection Policy (under the EP Act)
ERA	Environmentally relevant activity
ESD	ecologically sustainable development
FSL	full supply level
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef marine park
GBRNHP	Great Barrier Reef national heritage place
GBRWHA	Great Barrier Reef world heritage area
GDA2020	Geocentric Datum of Australia 2020
GDB	geodatabase
GHG	greenhouse gases
GTIA	Guide to Traffic Impact Assessment
IQQM	Integrated Quantity Quality Model
km	kilometres
m	metres

Acronym/abbreviation	Definition
MB	megabytes
ML	megalitres
MNES	matters of national environmental significance
MSES	matters of state environmental significance
OAMP	Offset area management plan
PDF	portable document format
RE	regional ecosystem
RPI Act	*Regional Planning Interests Act 2014*
SDAP	State Development Assessment Provisions
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SIA	social impact assessment
SPP	State Planning Policy 2017
SPRAT	Species Profile and Threats
SRI	significant residual impact
TOR	terms of reference
USB	universal serial bus
VM Act	*Vegetation Management Act 1999*

Appendix 1. Policies and guidelines

General

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Appendix 2. MNES listed threatened species and communities (section 18 and 18A)

This section identifies the listed threatened species and ecological communities relevant to this controlled action (EPBC2020/8705) under the EPBC Act, which at a minimum, is to be included in the impact assessment in the MNES section of the EIS.

Note: The lists below may not be a complete list of listed threatened species and ecological communities that will or are likely be impacted by the action. It is the proponent's responsibility to ensure that any listed threatened species and ecological communities at the time of the controlled action decision, which will or are likely to be impacted by the action, are assessed for the Minister's consideration. Any listing events (e.g. the listing or up-listing of a species) that occur after the controlled action decision (28 August 2020) do not affect the assessment and approval process.

Threatened ecological communities

Species	Category
Brigalow (*Acacia harpophylla* dominant and co-dominant)	Endangered
Poplar Box Grassy Woodland on Alluvial Plains	Endangered
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered

Threatened species

Common name	Genus / species	Category
Curlew sandpiper	*Calidris ferruginea*	Critically endangered (also listed migratory)
Eastern curlew	*Numenius madagascariensis*	Critically endangered (also listed migratory)
Red goshawk	*Erythrotriorchis radiatus*	Vulnerable
Grey falcon	*Falco hypoleucos*	Vulnerable
Squatter pigeon (southern)	*Geophaps scripta scripta*	Vulnerable
Star finch (eastern or southern)	*Neochmia ruficauda ruficauda*	Endangered
Southern black-throated finch	*Poephila cincta cincta*	Endangered
Australian painted snipe	*Rostratula australis*	Endangered
Masked owl (northern)	*Tyto novaehollandiae kimberli*	Vulnerable
Northern quoll	*Dasyurus hallucatus*	Endangered
Ghost bat	*Macroderma gigas*	Vulnerable
Greater glider	*Petauroides volans*	Vulnerable
Greater large-eared horseshoe bat	*Rhinolophus robertsi*	Vulnerable
Bare-rumped sheath-tailed bat	*Saccolaimus saccolaimus nudicluniatus*	Vulnerable
Koala	Phascolarctos cinereus	Vulnerable

Common name	Genus / species	Category
Minature moss-orchid, hoop pine orchid	*Bulbophyllum globuliforme*	Vulnerable
Bluegrass	*Dichanthium setosum*	Vulnerable
Black ironbox	*Eucalyptus raveretiana*	Vulnerable
Waxy cabbage palm	*Livistona lanuginosa*	Vulnerable
Quassia	*Samadera bidwillii*	Vulnerable
	Tephrosia leveillei	Vulnerable
Ornamental snake	*Denisonia maculata*	Vulnerable
Yakka skink	*Egernia rugosa*	Vulnerable
Mount cooper striped skink, Mount cooper striped lerista	*Lerista vittata*	Vulnerable
Freshwater sawfish	*Pristis pristis*	Vulnerable (also listed migratory)

Appendix 3. MNES listed migratory species (section 20 and 20A)

This section identifies the listed migratory species relevant to this controlled action (EPBC2020/8705) under the EPBC Act, which at a minimum, is to be included in the impact assessment in the MNES section of the EIS.

Note: The list below may not be a complete list of listed migratory species that will or are likely be impacted by the action. It is the proponent's responsibility to ensure that any listed migratory species at the time of the controlled action decision, which will or are likely to be impacted by the action, are assessed for the Minister's consideration. Any listing events (e.g. the listing or up-listing of a species) that occur after the controlled action decision (28 August 2020) do not affect the assessment and approval process.

Listed migratory species

- Salt-water crocodile (*Crocodylus porosus*)
- Fork-tailed swift (*Apus pacificus*)
- Oriental cuckoo (*Cuculus optatus*)
- Black-faced monarch (*Monarcha melanopsis*)
- Satin flycatcher (*Myiagra cyanoleuca*)
- Yellow wagtail (*Motacilla flava*)
- Common sandpiper (*Actitis hypoleucos*)
- Sharp-tailed sandpiper (*Calidris acuminata*)
- Pectoral sandpiper (*Calidris melanotos*)
- Latham's snipe (*Gallinago hardwickii*)
- Osprey (*Pandion haliaetus)*
- Caspian tern (*Hydroprogne caspia*)[#]
- Gull-Billed tern (*Gelochelidon nilotica*)[#]

[#]Listed migratory species observed during preliminary surveys and were not listed within the Protected matters search tool.

Office of the Coordinator-General
PO Box 15517 City East Qld 4002 Australia
tel 13 QGOV (13 74 68)
cpdinfo@coordinatorgeneral.qld.gov.au
www.dsdilgp.qld.gov.au/cg

Queensland Government