Terms of Reference for an Environmental Impact Statement

Adelaide River Off-stream Water Storage (AROWS)

Department of Logistics and Infrastructure

LGAs: Coomalie and Litchfield

13 May 2025

ntepa Northern Territory Environment Protection Authority

Proposal	Adelaide River Off-stream Water Storage (AROWS)
Proponent	Department of Logistics and Infrastructure
NT EPA reference	EP2024/039
Local government area	Coomalie and Litchfield
Public consultation period	The proponent's draft terms of reference were made available for public consultation from 13 January 2025 to 25 February 2025

Further information and guidance on the environmental impact assessment process is available on the NT EPA website at: www.ntepa.nt.gov.au

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Contents

Definitions

Term	Definitions
cumulative impacts	Impacts to environmental values and sensitivities as a result of a combination of smaller impacts arising from the proposal, and/or that accumulate in conjunction with other developments, or natural events[1].
potentially affected area	Comprising the **proposal area** and surrounding land and waterways that may be impacted by the proposal.
proposal area	The proposed development footprint including the basin area, water extraction or intake area, delivery and supporting and connecting infrastructure.

[1] Referring a proposal to the NT EPA

1. Introduction

1.1. Overview

The Adelaide River Off-stream Water Storage (AROWS) (proposal) proposed by the Northern Territory Government (NT Government) Department of Logistics and Infrastructure (proponent) is being assessed by the Northern Territory Environment Protection Authority (NT EPA) under the *Environment Protection Act 2019* (EP Act) by the environmental impact statement (EIS) method.

These terms of reference (TOR) set out the matters relating to the environment that are to be addressed in the EIS for this proposal, in accordance with regulation 98(1)(a) of the Environment Protection Regulations 2020 (EP Regulations). The EIS must also address all requirements in the NT EPA's Preparing an environmental impact statement – Environmental impact assessment guidance for proponents.

1.2. Background

The proposal is for the construction, commissioning and operation of an off-stream water reservoir and its functional infrastructure components located adjacent to the Adelaide River in the Coomalie and Litchfield shires, approximately 55 km southeast of Darwin and 5 km north of Lake Bennett in the Northern Territory (NT).

The proposed reservoir is located in a natural basin measuring approximately 13 km in length and 2-3 km in width, with a north-south strike. Dam walls and a spillway are required to enclose and hold water in the basin adjacent to the Adelaide River.

The main components of the proposal are:

1. basin infrastructure – dam, embankment, spillway
2. intake infrastructure – all infrastructure for water extraction from the Adelaide River, and transfer and release into the reservoir (pumps, pipelines)
3. outlet and delivery infrastructure - to facilitate water transfer from the basin to connecting infrastructure (e.g. pump station)
4. connecting infrastructure - to facilitate the transfer of water from the delivery infrastructure pipeline to the Strauss Water Treatment Plant (pumps, pipeline, balance tank)
5. supporting infrastructure - to support construction, commissioning, and operation of the proposal (e.g. coffer dams, access tracks, laydown areas, site facilities).

Construction activities include site preparation, upgrades to existing infrastructure (e.g. roads and electrical substations) and construction and commissioning of new infrastructure (e.g. dam, embankment walls, as well as the intake, connecting and supporting infrastructure).

The proposal is projected to contribute up to 60 GL annually to the Darwin water supply network. Water extraction from the Adelaide River at times of high flow, is proposed to maintain the reservoir.

1.3. Assessment period

The draft EIS is to be submitted to the NT EPA within three years from the date of issue of these TOR (in line with regulation 99 of the EP Regulations and in consideration of the matters listed under EP Regulation 99(3)).

1.4. Assessment under bilateral agreement

The Australian Government Minister for the Environment and Water determined that the proposal is a controlled action for matters protected under the Commonwealth *Environment Protection and Biodiversity*

Conservation Act 1999 (EPBC Act) (EPBC Referral 2025/10101). The proposal requires assessment and approval under the EPBC Act, due to the potential for a significant impact on:

- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A).

The proposal is being assessed by the NT EPA in accordance with the bilateral assessment agreement made under section 45 of the EPBC Act. These TOR have been prepared to meet the requirements of both government jurisdictions.

Information on the EPBC Act can be obtained from the Commonwealth Department of Climate Change, Energy, the Environment and Water website at www.environment.gov.au/epbc/.

2. Matters to be addressed in the draft EIS

2.1. Executive summary of the draft EIS

A stand-alone summary of the draft EIS is required. The summary is to be presented in a way that is accessible to interested parties who may not wish to read the full draft EIS, enabling stakeholders to understand the likely consequences of the proposal.

The summary must provide the following at a minimum:

- a clear and concise overview of the proposal including proponent, elements of the proposal, development stages, activities, lifespan, the potentially affected area, and appropriate map/s
- a summary of the site selection process and alternatives considered
- a summary of the environmental values in the potentially affected area
- a summary of the potential significant environmental impacts of the proposal on the identified values
- a summary of measures to avoid, mitigate and/or offset potential significant impacts of the proposal, with a clear and measurable outcomes for environment protection
- a summary of stakeholder engagement and future commitments.

2.2. 3.1.1Proposal description

2.2.1. Overview

Provide a clear description of the proposal and the full scope of works for which approval is sought. The proposal description must include:

- a summary table listing the main physical components of the proposal and their maximum spatial extent or quantity, using appropriate parameters including the matters outlined in Table 1
- supporting maps, figures, images, diagrams, and flow charts
- the decision-making criteria and framework used in considering various options that would deliver the required outcomes, with identification of the various options that were evaluated in deciding the proposal design, why the preferred option was selected above other options, and how the environmental decision-making hierarchy was applied
- a discussion of how the proposal addresses sections 42 and 43 of the EP Act, including the principles of ecologically sustainable development (sections 17-24 of EP Act)
- any variations or modifications to the proposal since the referral information was submitted.

Provide detail about any information gaps or uncertainties in relation to the EIS, including any further studies or measures required to address these gaps. Where there is uncertainty in the concept design, footprint, capacity or life of the proposal or its components, the approach to resolving this uncertainty must be clearly explained and the maximum extent or range for each parameter provided.

The draft EIS is to:

- use committed language (e.g. 'will') instead of ambiguous terms (e.g. 'may,' 'where possible,' 'if required,' etc.)
- demonstrate that all proposed avoidance, mitigation and management measures, as well as all monitoring activities, are based on relevant guidance or are in accordance with contemporary best practice.

2.2.2. Potentially affected area

Delineate the potentially affected area of the proposal, taking into account the proposal area and the surrounding land and waterways that may be impacted by the proposal, with a suitable buffer to allow for uncertainty.

Provide maps showing:

- the extent of the potentially affected area alongside important local and regional features
- current land tenure, land use, and native title in the potentially affected area
- other interests in land such as minerals and petroleum
- sensitive environments, including towns, communities, homesteads and residences, any sites of conservation significance, and cultural values (if appropriate and with permission from relevant Aboriginal stakeholders) within the potentially affected area.

2.2.3. Proponent

Provide background to the proponent, including:

- the proponent's environmental history, including notification/disclosure of offences, or non-compliances with state/territory or Commonwealth environmental legislation
- experience in the water supply industry and development of major projects
- experience, qualifications and certification of all suitably qualified consultants and subconsultants engaged by the proponent to complete the EIS.

Outline any partnerships with other organisations or industries as part of the proposal.

2.2.4. Objectives of the proposal

List the objectives of the proposal and include a description of how the proposal meets these objectives. Include:

- key requirements of the proposal including the amount of water that the proposal must deliver to meet the specified current and future urban, industrial and agricultural water demand
- a description of how the proposal objectives are consistent with any water allocation planning objectives and environmental flow and water quality objectives, and any social, economic or cultural objectives.

2.2.5. Construction, commissioning, and operation

Provide a detailed description of all construction, commissioning and operational aspects of the proposal

as outlined in Table 1.

Table 1 Minimum information requirements for the proposal description

Topic	Required information
Site layout maps	• The description of the proposal must include, but not be limited to, detailed maps and graphic illustrations of: ○ the location and dimensions of existing disturbance, existing infrastructure (e.g. roads/tracks, railway, powerlines and pipelines), and natural and modified landforms (including a depiction of these overlaid on aerial photos or high-resolution satellite imagery) within the potentially affected area ○ the location and approximate dimensions of areas to be disturbed, structures to be built or repurposed including: ▪ all areas to be cleared[2] or disturbed ▪ access roads, rail, and service infrastructure ▪ stormwater and drainage infrastructure and water storages ▪ buildings and structures ▪ temporary stockpiles ▪ waste storage facilities. ○ the proposal layout in relation to environmental values and sensitive receptors within the potentially affected area ○ the boundaries of the proposal area in relation to any overlapping or adjacent leases or permits (mineral, petroleum or other); and any other interests in land including Native Title (claims or determined), Aboriginal freehold land, and pastoral land.
Design	• Describe design options considered, including different configurations of the proposal's infrastructure components, reasons for selection of preferred design options, and how the proposed design avoids and/or mitigates environmental constraints and potential significant impacts and risks to the surrounding environment. • Describe options for altering/changing the current use of Marrakai Road. • Describe how the proposal has been designed to minimise social, cultural, and environmental impacts, considering the needs of the community and stakeholders. • Outline any site/route selection processes that have been undertaken, any options considered and justify why the proposed site/route was selected. • Outline and justify any trade-offs in the site/route selection. Site/route selection is to consider the potential for disruption or damage to existing infrastructure, particularly where design of the proposal involves sharing of existing corridors. • Describe how the proposal has been designed to consider, or allow for, adaptation to a changing climate (e.g. capacity and efficiency of proposal

[2] In accordance with the NT Land Clearing Guidelines and/or requirements under the NT Planning Scheme.

Topic	Required information
	facilities to allow for potential increase in evaporation and/or large rainfall / flood events). • Where multiple design options exist, the choice of the preferred option(s) must be clearly explained, and a comparison provided against other options in terms of potential environmental impacts.

Construction	Describe all elements and stages of the construction phase including:
	• vegetation clearing and site preparation
	• construction methodology including equipment and machinery required
	• construction materials required – types, quantities, sources, storage requirements and potential hazards:
	  ○ where large volumes of fill or rock material are proposed to be imported to the site, identify the potential sources of this fill / borrow material, the criteria that will be adopted to confirm suitability for the proposed use and any related environmental regulatory requirements
	  ○ consider the potential significant impacts and risks within the potentially affected area.
	• location, extent, and nature of temporary stockpiles of borrow material and topsoil
	• any new supporting/ancillary infrastructure and upgrades required to service the proposal, including road access, and supply of electricity, water, and sewerage
	• maintenance of existing onsite infrastructure during construction
	• timeframes for completion
	• applicable legislation, guidelines, and standards.

Commissioning and operation	• Describe all elements and stages of the commissioning phase including:
	  ○ commissioning method (staging, reservoir filling, quality assurance and control for engineering structures etc.)
	  ○ timeframes for completion.
	• Describe all elements and stages of the operation phase including:
	  ○ dam storage and pumping capacity including information on maximum, minimum, average depths, dead storage level, and the area of inundation at full supply level
	  ○ spillway design including information on location, footprint, capacity, height (above the riverbed) and the predicted duration, timing, volume and frequency of spills and controlled water releases
	  ○ design and construction of pumping infrastructure including information on location, accessibility, pump specifications (i.e. type, capacity), screening, remote operation capability and flow rates adjustability
	  ○ inlet and outlet infrastructure design and construction including location, footprint, capacity, screening and flow regulation capabilities, construction details and volumes, tonnage and quality of materials required
	  ○ water extraction methodology including details on operational metrics (regime and rules), and any limitations to the effective operation and

Topic	Required information
	management of the proposal, in line with environmental flow and water quality objectives e.g. operation in dry years, climatic conditions ○ details on proposal infrastructure – location, size and type including environmental features/considerations/design principles ○ equipment and machinery required including details on storage reservoir monitoring and instrumentation ○ materials and chemicals required - major types, quantities, qualities, sources, potential hazards, transport and storage requirements and location ○ details on operation including reservoir operation, designed event frequency and/or operational requirements for reservoir water take and release, and strategies for flood control and drought mitigation ○ details on maintenance and contingency management including ongoing maintenance and upgrades required to service any infrastructure ○ sedimentation basin management ○ water quality management ○ applicable legislation, guidelines, standards and permits. • Where multiple options exist for any element of the operation, the choice of the preferred option must be clearly explained, and a comparison provided against other options in terms of potential environmental impacts.
Transport and traffic	Describe traffic and transport activities during construction, commissioning, and operation, including but not limited to: • proposed transport methods and routes including proposed haul roads, access tracks, public roads (including any proposed realignments, closures, and upgrades), proximity to sensitive receptors and sensitive areas (e.g. townships or communities/outstations, residents, waterways, sensitive and/or significant vegetation, cultural heritage values, threatened and invasive species) • forecast vehicle movements including type, size, volume, and frequency of movements, volumes of traffic, vehicle types, access routes, hours of operation • existing transport baseline information including current traffic numbers, movement patterns (during wet and dry seasons) and relevant existing infrastructure on potentially affected roads/road network.
Energy	Provide relevant information with respect to energy during construction, commissioning, and operation, including but not limited to: • energy requirements and sources • consideration of renewable sources of energy and justification of selected options.
Workforce	Provide an assessment of the workforce required for each phase of the proposal, including but not limited an evaluation of the following: • likely sources (local, regional, interstate, overseas)

Topic	Required information
	• workforce training opportunities • employment opportunities for Aboriginal people • indirect local and regional workforce opportunities created through local and regional procurement opportunities • benefits to the local and regional community.

2.3. Alternatives

State the rationale and justification for the proposal, and an assessment of water supply alternatives that considers the strategic, social, economic, and environmental implications, technical feasibility and commercial drivers. The assessment must be supported by:

- an updated evaluation of all water supply alternatives that were considered and could meet the objectives of the proposal (as set out in section 2.2.4) including, but not limited to, alternative dam sites (in-stream and off-stream) and desalination of seawater. For each of these alternatives, include an assessment of:
    - the short, medium and long term advantages and disadvantages
    - the operational requirements (including workforce, associated infrastructure requirements, the energy requirements and potential sources of energy)
    - an estimate of initial capital and ongoing operating costs
    - a comparative desktop assessment of the potential impacts on species of conservation significance
    - consideration of potential impacts and benefits to local and regional communities over the life of the proposal.
- clear justification for why the proposal is preferred over the alternatives
- a comparative discussion on the social, economic, cultural and environmental values preserved or enhanced through the selection of the proposal over the other alternatives
- a discussion of the implications of not proceeding with the proposal.

2.4. Whole of environment considerations

Provide a holistic assessment of the impacts of the proposal on the whole of the environment, in particular, a description of the connections and interactions between the environmental factors, and an assessment of cumulative impacts, and impacts at a local and regional scale. Succinctly discuss predicted outcomes in relation to the principles of environment protection and management (as set out in Part 2 of the EP Act), and the NT EPA environmental factors and objectives.

2.5. Consideration of the impacts of a changing climate

The draft EIS must:

- assess how adaptation to reasonable climate change scenarios has been considered in the design, construction, operation, and any effect on the viability of the proposal, with reference to reporting in: Climate Change in the Northern Territory: State of the science and climate change impacts (NESP ESCC Hub 2020).
- describe and assess the extent to which the outcomes and commitments proposed under the proposal will address any significant vulnerabilities of the proposal and the environmental values in the potentially affected area. The assessment must:
    - evaluate any adaption measures including both structural (e.g. design modifications, alternative

solutions) and non-structural (e.g. land-use planning, monitoring, emergency response programs) measures

- take into consideration the most current and reasonable climate change projections for the region
- include analysis against baseline conditions to understand historical climate change influences.

2.6. Information requirements for environmental factors

The NT EPA identified 10 environmental factors that could be significantly impacted by the proposal (Table 2). Further information about environmental factors is available in the NT EPA's environmental factors and objectives guidance.

Table 2 Environmental factors that must be addressed in the draft EIS

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
LAND	Landforms	Conserve the variety and integrity of distinctive physical landforms.
	Terrestrial environmental quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.
	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning.
WATER	Hydrological processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
	Inland water environmental quality	Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
	Aquatic ecosystems	Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning.
AIR	Atmospheric processes	Minimise greenhouse gas emissions so as to contribute to the NT Government's goal of achieving net zero greenhouse gas emissions by 2050.
PEOPLE	Community and economy	Enhance communities and the economy for the welfare, amenity, and benefit of current and future generations of Territorians.
	Culture and heritage	Protect culture and heritage.
	Human health	Protect the health of the Northern Territory population.

For each of the environmental factors listed in Table 2, the draft EIS is to provide an assessment of how the NT EPA's environmental objective would be met, as outlined in the NT EPA Guide for preparing an EIS

and detailed below.

The potentially affected area is to be delineated in the EIS to identify the components of the environment (under each environmental factor) and their specific values that have the potential to be impacted by implementation of the proposal.

If additional potential impacts are identified through the environmental impact assessment process, these must also be included in the draft EIS, even if this requires addressing additional environmental factors not specified in Table 2.

2.6.1. Landforms

Table 3 Minimum information required for assessment of Landforms

Aspect	Specific information required
NT EPA objective: Conserve the variety and integrity of distinctive physical landforms.	
Environmental values	• Describe the characteristics and current condition of distinctive physical landforms in the potentially affected area. This must include, at a minimum, descriptive and spatial information for the: o Daly and Eastern ranges o Adelaide River. • Identify areas of land with extreme or severe constraints that will require major management and/or engineered solutions to overcome. • Identify areas of land that will be excluded from proposal development due to the presence of extreme constraints that cannot be overcome. • Identify environmental, cultural, and social values associated with distinctive physical landforms in the potentially affected area that could be significantly impacted by implementing the proposal. This must include consideration of the ecological, social, and cultural significance, where relevant.
Potential significant impacts and risks	• Identify, describe, and assess potential significant impacts and risks to the quality and integrity of distinctive physical landforms. This must include, at a minimum, consideration of potential significant impacts associated with: o direct disturbance of landforms from proposal construction, commissioning and operation (earthworks, inundation, water extraction, etc.) o indirect disturbance of landforms from proposal construction and operation, such as erosion/topsoil migration/offsite movement of sediments. • Describe, using graphics and figures, any temporary or permanent changes to distinctive physical landforms, the landscape, and visual amenity from implementation of the proposal.
Avoidance, mitigation, and management	• Outline the measures for avoiding and mitigating the impacts identified above, with consideration of section 26 (environmental decision-making hierarchy) and section 27 (waste management hierarchy) of the EP Act. This must include at a minimum: o infrastructure (including supporting facilities) design and layout o proposal staging o construction methods

Aspect	Specific information required
	○ erosion and sediment control ○ site rehabilitation and restoration where relevant ○ end-of-life of assets management ○ compliance with any statutory or policy basis for the proposed measures.
Monitoring and reporting	Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures for each of these. The proposed monitoring and reporting must specify which phase it relates to, i.e. construction, commissioning, and/or operations.
Residual impact	Assess the significance of any residual impact or risk of the proposal to identified values associated with distinctive physical landforms.

2.6.2. Terrestrial environmental quality

Table 44 Minimum information required for assessment of Terrestrial environmental quality

Aspect	Specific information required
NT EPA objective: Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	
Environmental values	• Describe the characteristics and current condition of land and soils in the proposal area. This must include, at a minimum, descriptive and spatial information for the following: ○ slope characteristics and associated runoff and erosion risk, including details of existing erosion ○ soil drainage to the extent that it poses a constraint to the proposed land use ○ soil physical and chemical properties ○ potential or actual presence of contaminated soils as determined from a Preliminary Site Investigation and/or contaminated land investigations, if the need is indicated ○ presence of potential acid sulfate soils (PASS), acid sulfate soils (ASS) and acid forming material (AFM), and indicative volumes encountered. • Provide results and interpretation of any geotechnical, geochemical and soil investigations and surveys of the proposal area. Include an assessment of the suitability of sites for relevant proposal elements. • Identify environmental values that could be affected by impacts to terrestrial environmental quality (e.g. quality and integrity of land and soils) caused by the proposal. Include consideration of: ○ land uses, properties and public infrastructure surrounding the proposal ○ surface watercourses and groundwater aquifers ○ groundwater dependent ecosystems (GDEs)

Aspect	Specific information required
	○ aquatic ecosystems.
Potential significant impacts and risks	• Identify, describe, and assess potential significant impacts and risks to the quality and integrity of land and soils from proposed construction and operational activities including, cumulative impacts and risks. This must include at a minimum: ○ direct disturbance of land and soils during construction (e.g. land clearing, excavation, trenching, compaction, loss of soil structure) ○ indirect disturbance from construction and operation activities resulting in soil erosion, topsoil migration, sedimentation, and altered drainage patterns ○ disturbance or treatment of contaminated soils, PASS, ASS and AFM ○ contamination of soils from spills or leaks associated with transport, storage and handling of hazardous materials. • Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). • Quantify the significance and extent of impacts, at the proposal level and cumulatively, with use of and reference to relevant guidance.
Avoidance, mitigation, and management	• Outline measures for avoiding and mitigating impacts identified above, with consideration of section 26 (environmental decision-making hierarchy) and section 27 (waste management hierarchy) of the EP Act. Consider measures to enhance or restore environmental quality. These must include at a minimum: ○ infrastructure (including supporting facilities) design and layout ○ proposal staging ○ site rehabilitation and restoration where relevant ○ erosion and sediment control planning and implementation in line with best practice guidance (IECA 2008, Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia), Picton, NSW) ○ water management and efficiency (including stormwater) ○ PASS/ASS/AFM management (if present) (any proposed works must be undertaken in accordance with the National Acid Sulfate Soils Guidance ○ emergency, hazard and spill response management ○ end-of-life of assets management ○ compliance with any statutory or policy basis for the proposed measures. • Identify standards and controls (including management plans) to be implemented as part of the proposal and their likely effectiveness to mitigate and manage impacts to terrestrial environmental quality. • If ASS is detected, and exposure of these soils are unavoidable, an Acid Sulfate Soil Management Plan (ASSMP) is required. The ASSMP must include the following:

Aspect	Specific information required
	○ location of the proposed disturbance ○ depth and volume of soil to be disturbed ○ clearly presented analytical results ○ acid base accounting results which clearly indicate an accurate liming rate ○ an appropriate monitoring program.
Monitoring and reporting	• Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures. • Describe clear and measurable outcomes and commitments that will ensure the environmental objective is met and impacts of implementing the proposal remain acceptable. • The proposed monitoring and reporting must specify which proposal phase it relates to i.e. construction or operation.
Residual impact	Assess the significance of any residual impact or risk of the proposal to identified values.

2.6.3. Terrestrial ecosystems

Table 55: Minimum information required for assessment of Terrestrial ecosystems

Aspect	Specific information required
NT EPA objective: Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning.	
Environmental values	• Identify terrestrial ecosystem values within and around the potentially affected area. This must include, at a minimum: ○ descriptive and spatial information (i.e. maps, geospatial data) on the location and extent of field-verified vegetation communities within the proposal area using vegetation mapping based on the Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping (Brocklehurst et al. 2007) ○ descriptive and any new spatial information (i.e. maps, geospatial data) of sensitive and significant vegetation including riparian areas, wildlife corridors, wetlands, closed forests, and GDEs (in accordance with the NT Land Clearing Guidelines ○ identification of all species of conservation significance, including restricted range and data deficient species in addition to threatened species listed under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) and EPBC Act, which have the potential to occur. Assess the likelihood of occurrence for all species that are known or likely to occur ○ identification of flora and fauna that hold social, cultural, and/or economic values and have the potential to occur, and describe the importance of these species

Aspect	Specific information required
	○ identification of flora and fauna known or likely to occur that are currently being assessed for eligibility for inclusion or change of conservation status under the EPBC Act ○ descriptive and spatial information for terrestrial groundwater-dependent ecosystem habitats that have the potential to be impacted by the proposal ○ maps of areas in proximity to the potentially affected area that are already protected and known biodiversity offset areas under both Commonwealth and NT legislation ○ descriptive and spatial information (i.e. maps, geospatial data) for all species of conservation significance, including restricted range species, data deficient species and listed terrestrial threatened flora and fauna and migratory species known, or considered likely to occur. This must include, at a minimum: ▪ the type, value, sensitivity, quality and geographic extent of suitable habitat (hectares), landscape context, listing status (TPWC Act, EPBC Act), threatening processes, estimates of population size, abundance and distribution ▪ descriptive information that clearly outlines the survey and identification effort undertaken, including estimates of population parameters used to evaluate the local and regional context for potential impacts from the proposal. At a minimum, the flora species considered must include: • *Helicteres macrothrix* • Typhonium spp. (including *T. praetermissum*, *T. taylori*, *T. johnsonianum*, *T.* sp. Charles Darwin and *T.* sp. aff mirabile) • *Stylidium ensatum* • *Cleome insolata* • *Utricularia singeriana* • *Utricularia dunstaniae*. • Terrestrial ecosystems baseline survey assessments that have been undertaken at appropriate times of the year, across the proposal area. Additional targeted effort is required in the proposal area for species of conservation significance. Survey results must be presented, including but not limited to: ○ relevant spatial data, survey effort and species records ○ identification of any critical or important areas for flora and fauna taxa of conservation significance including consideration of the importance of both small and large areas of habitat, habitat connectivity (e.g. wildlife corridors) and their location likely to be important for maintaining terrestrial ecological integrity and functioning ○ a description of the presence of invasive weeds (declared under the *Weed Management Act 2001*), pests and biosecurity risks observed or

Aspect	Specific information required
	considered likely to occur in the proposal area. • Include in appendices the detailed technical information, studies, or investigations necessary to support the draft EIS. Justify the suitability of the methods, surveys or processes used to identify/estimate species occurrence (presence/absence), relative abundance, habitat condition or quality, and the extent of values potentially impacted. • Any technical information provided is to include the details of all data collection. This is necessary to support the conclusions drawn in the EIS and should not be provided as summaries or abridged versions. Data must be provided in appropriate and readable formats (both numeric and spatial) with appropriate metadata to facilitate assessment, and in line with the NT EPA 'Biodiversity data policy' and 'Guidance for preparing biodiversity data packages' (e.g. geopackage files for spatial data with the geospatial parameters clearly identified). • Detail any information gaps or uncertainties in relation to terrestrial ecosystems, including any further studies or measures required to address these gaps. This must include at a minimum: o any taxonomic uncertainties for species of conservation significance, including the measures and methods employed to clarify uncertainty surrounding the identity, distribution and relative abundance of *Typhonium* species (all currently named taxa and known unidentified entities) identified in previous surveys. This must include verifiable identification records from information incorporating multiple lines of evidence to support the identity of *Typhonium* plants known to occur within the proposal area o appropriate justification, should survey methods diverge from relevant Commonwealth and NT guidelines, including citation of species experts or scientific literature.
Potential significant impacts and risks	• Identify, describe, and assess potential significant impacts (direct, indirect, and cumulative) of the proposal on terrestrial ecosystems and identified environmental values in accordance with requirements of the EP Act and EPBC Act. This must include, at a minimum: o habitat loss from vegetation clearing, basin inundation, including loss of sensitive and significant vegetation, and loss of habitat for species of conservation significance (assessment must include quantitative data) o habitat fragmentation due to infrastructure development, altered flows and altered floodplain inundation regime o habitat degradation for species of conservation significance, e.g. due to noise, light, vibration, dust, weeds, runoff, erosion, sedimentation impacts) o introduction or spread of invasive species due to workforce, vehicle and equipment movement, and construction of new access tracks o fauna mortality or injury caused by e.g. collision with vehicles and equipment, entrapment in excavations, basin inundation

Aspect	Specific information required
	○ potential changes to populations of species of conservation significance ○ potential significant impacts to flora and fauna that hold social, cultural or economic values ○ how the assessment of potential significant impacts to terrestrial ecosystems has taken the impacts of a changing climate into account ○ potential significant impacts to terrestrial GDEs ○ potential changes to fire regimes in the potentially affected area. • Identify areas of habitat critical to the survival of species of conservation significance, particularly those necessary for activities such as foraging, breeding, roosting, or dispersal. Include areas essential for the long-term maintenance of the species, with consideration of the preservation of species (e.g. pollinators), important populations, key populations for genetic diversity, and efforts related to population reintroduction or recovery. • Identify other industries and proposals near the proposal area that are likely to contribute to cumulative impacts on terrestrial ecosystems, including threatened species and habitats. • Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). • Quantify the significance and extent of impacts, at the proposal level and cumulatively, with use of and reference to relevant guideline thresholds.
Avoidance, mitigation, and management	• Outline the proposed measures to avoid, mitigate and manage the potential significant impacts identified above, with consideration of sections 26 (environmental decision-making hierarchy) and 27 (waste management hierarchy) of the EP Act, and measures to enhance or restore environmental quality. • The avoidance, mitigation and management measures proposed must include environmental objectives, performance criteria, monitoring and reporting methods, corrective actions, assigned responsibilities and timeframes for implementation and review in accordance with DCCEEW's Environmental Management Plan Guidelines and relevant NT Government and NT EPA guidance. • Demonstrate that proposed infrastructure has been designed and appropriately sited to avoid and mitigate impacts to terrestrial ecosystem values. If the siting of proposal elements is not able to avoid or mitigate impacts to terrestrial ecosystem values (i.e. threatened species habitat) provide a justification for why this was not feasible. • Describe any proposed measures to enhance or restore environmental quality through restoration or rehabilitation of areas impacted by the proposal in line with section 42 of the EP Act. • Identify proposed standards and controls (including management plans) to be implemented and their likely effectiveness to avoid and mitigate impacts to terrestrial ecosystem values. • Identify areas of land that will be excluded from proposal development due to the presence of extreme constraints that cannot be overcome.
Monitoring and	• Outline proposed monitoring and reporting activities related to potential

Aspect	Specific information required
reporting	significant impacts and risks to terrestrial ecosystems, and mitigation and management measures. For any potential significant impact, thresholds must be set and mitigation measures described, should thresholds be met or exceeded. • Describe clear and measurable indicators, outcomes and commitments that will ensure the NT EPA's environmental objective for terrestrial ecosystems will be met and impacts of implementing the proposal remain acceptable. • Specify timeframes for monitoring and reporting. The proposed monitoring and reporting must specify which proposal phase it relates to (i.e. construction, commissioning, and/or operations). • All monitoring activities must be substantiated and in accordance with available guidance, including advice from relevant NT Government advisory agencies, potential native title holders, Traditional Owners/Custodians, and/or their representatives.
Residual impact	Assess the significance of any residual impact or risk of the proposal to identified values.
Offsets	Where significant residual impact to terrestrial ecosystem values, including listed species under the EPBC Act and/or TPWC Act, is likely to remain after proposed avoidance and mitigation measures have been applied, identify any proposed offset and describe how it is consistent with the NT Offset Framework (as published) and the EPBC Act environmental offsets policy. This must include offset options and feasibility.

2.6.4. Hydrological processes

In these TOR, information requirements for the 'hydrological processes' factor must address potential impacts to the 'coastal processes' factor.

Table 66: Minimum information required for assessment of Hydrological processes

Aspect	Specific information required
NT EPA objective: Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	
Environmental values	• Describe the existing environment for groundwater resources in the Adelaide River catchment, upstream and downstream of the potentially affected area. Include a study of the groundwater systems and hydrogeology. Describe: o the characteristics and condition of groundwater systems and aquifers, recharge and discharge processes, surface water-groundwater interactions, the location and extent of springs and other GDEs, aquifer connectivity o the quantity, quality and significance of groundwater resources and related values o the known nature and type of aquifers at and near the proposal, geology,

Aspect	Specific information required
	hydrogeology of aquifers, aquifer depth and thickness, stratigraphy, depth to water level, groundwater flow directions and seasonal variation in levels ○ the proximity of existing groundwater users to the proposal, current groundwater uses, existing extraction rates and volumes, groundwater proposed to be used by the proposal (including a description of the quality, quantity, usage rate and proposed location of those resources), and capacity of target aquifers to provide the required volumes of water at the expected usage rate. • Describe the existing environment for surface water resources upstream and downstream of the potentially affected area, informed by a study of the surface water systems and hydrological processes. Describe: ○ the characteristics and condition of the existing hydrologic regime for surface waters, including an assessment of surface hydrology and details of catchment systems, waterways and water features that would potentially be impacted by the proposal ○ the quantity, quality and significance of surface water resources and related values, considering the potential impacts of the proposal on changes to stream flows, overland flow, flooding regimes and sediment transport processes ○ surface water flow characteristics, (e.g. velocity, direction, height, inflow/outflow areas and their variability), seasonal flow patterns, flow volumes, duration, frequency and timing, connectivity, magnitude of flow events (including a critical review of available stream gauging station data) ○ the history of flooding including frequency, duration, extent and levels, and the frequency and duration of floodplain/wetland inundation (upstream and downstream) ○ water allocation planning objectives and indicators, and the environmental flow regime. • Describe the existing hydrologic regime of the Adelaide River, including its tributaries, floodplains, and tidal reaches. Include a description of the hydrologic regimes of any waterways and water features that may be affected by the proposal. Include: ○ a description of the morphology, physical characteristics, integrity, form, structure and condition of land and water features created or modified by hydrological or coastal processes (e.g. tides, rivers, floods, coastal currents, major storms) ○ an assessment of channel depth and morphology, and stream bed and bank stability at the water intake area, sediment transport and erosion/deposition patterns upstream and downstream ○ a description of environmental flow requirements of the Adelaide River that support hydrological processes (floodplain/wetland recharge and connectivity, sediment and nutrient transport), ecosystems (aquatic, riverine, estuarine, floodplain, wetland, coastal), ecological processes (spawning, migration), and sites of cultural and social significance

Aspect	Specific information required
	○ a study of environmental flows including a semi-quantitative assessment of the total discharge to the coast, and the role of freshwater flooding (timing, magnitude and frequency) in the transport of sediment to the coast ○ a discussion of the dominant tides, waves and currents in the coastal zone of the Adelaide River catchment (frequency and movement) and influence on environmental flows ○ a description of historic and existing sediment transport dynamics across the catchment and subcatchments, including fine and coarse sediment inputs and yields and the influence of flooding on sediment transport to the coast ○ a discussion of the flushing, stratification and mixing processes that occur between freshwater and saltwater environments, and the salinity gradients present in the riverine, estuarine and coastal environments (upstream and downstream) ○ details about fluctuations in salinity in the floodplain, including in porewater, during freshwater flooding ○ details about the quality and reliability of data and information provided, information sources, and any assumptions, exclusions, uncertainties and limitations ○ references to environmental studies, data and investigative surveys undertaken for the assessment, including their results, limitations and uncertainties. • Describe existing climate characteristics and rainfall patterns (including magnitude and seasonal variability) relevant to the assessment. Provide a critical review and assessment of available spatial and temporal climate data including information on the intensity, frequency, and duration of extreme weather conditions. • Provide a description of the existing regulatory framework for surface water and groundwater resources relevant to the proposal, including any water allocation policies and plans. • Provide the results and interpretation of hydrological, hydrogeological, and any relevant geotechnical investigations. • Identify groundwater and surface water resources needed for construction purposes. • Identify the land uses and declared beneficial uses of water in the potentially affected area (with consideration of the Darwin Rural Adelaide River Water Control District and regulatory framework) that could be directly or indirectly affected by impacts to hydrological processes caused by implementing the proposal.
Potential significant impacts and risks	• Describe how the potentially affected area has been defined, as it relates to the hydrology of groundwater and surface water systems. • Identify, describe, and assess the potential significant impacts of the proposal on groundwater systems in the potentially affected area. This must include at a minimum:

Aspect	Specific information required
	○ impacts on hydrogeological processes within and around the basin from construction activities, including potential changes to local groundwater levels, flows, spring discharges, and impacts on existing water users ○ groundwater drawdown during construction due to dewatering, including impacts to any connected water system, GDEs (e.g. springs, wetlands) and existing water users within and around any groundwater source used during construction ○ groundwater mounding from basin inundation and seepage to groundwater, potentially causing waterlogging in surrounding areas, changes to connected groundwater dependent or other water systems (including springs and seeps), and impacts on water users in downstream areas. • Identify, describe, and assess potential significant impacts of the proposal on surface water systems in the potentially affected area. This must include at a minimum: ○ impacts on the natural basin, catchment, and surface hydrology from construction activities, including potential changes to overland flows, stream flows, and impacts on existing water users ○ the rates, volume and timing of water extraction from the Adelaide River resulting in changes to natural flow and flood regimes, and impacts on upstream and downstream riverine, estuarine, floodplain/wetland and coastal ecosystems ○ the rates, volume and timing and of any operational or controlled water releases from the reservoir to the downstream receiving environment, and impacts on river flows, riparian vegetation, in-stream and floodplain/wetland habitats ○ unplanned events including the risk of dam failure and related impacts on downstream land use ○ changes to hydrological processes in the potentially affected area due to evaporation losses from the reservoir, and potential impacts on local water users. • Provide a hydraulic and hydrological analysis (flood impact assessment) that: ○ demonstrates the design flood peak discharges for the proposal area including baseline and operational scenarios for all flood and stormwater events up to a 1% Annual Exceedance Probability (AEP), and Probable Maximum Flood and dam failure scenarios ○ models the extent of flooding across the Adelaide River catchment 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 ○ uses best practice data analysis and hydrological and hydraulic modelling to simulate a full range of flood events (baseline hydrology) and provides site-specific baseline data and historical data to assess seasonal, long-term and extreme variations in flooding

Aspect	Specific information required
	○ assesses how the proposal may change flooding characteristics (upstream and downstream) taking into consideration potential sea-level rise scenarios ○ includes maps (flow, water level/depth and velocity) to clearly illustrate the baseline and operational scenario impacts for all relevant design events ○ considers all infrastructure associated with the proposal including roads and linear infrastructure and proposed measures to avoid or mitigate impact to people, property (including damage to other properties), and the environment during flood events ○ details how design and management of all stages of the proposal will mitigate potential impacts on level of flood risk (upstream and downstream). • Identify, describe, and assess potential changes in stream flows from the proposal compared to existing conditions, and potential significant impacts to the Adelaide River catchment (supported by modelling). Describe: ○ in-stream and off-stream wetland inundation frequency, timing and duration ○ sediment/nutrient/energy processes in the catchment and subcatchments ○ changes to sediment transport, potential erosion/scouring, sediment deposition upstream and downstream, bank and channel morphology and stability ○ the effect of environmental flow requirements on supply reliability and water availability for consumptive use ○ changes in flow patterns including changes in the magnitude of flow events, flow frequency and timing, volumes and duration, connectivity, and changes in flows reaching estuarine waters and coastal floodplains, when compared at a meaningful scale with existing flows in the system ○ modelled outputs including hydrographs of predicted changes to the existing flow regime as a result of proposal implementation at a range of representative locations. • Identify, describe, and assess potential significant impacts on morphology and sediment transport processes and associated environmental values in the potentially affected area. This must include, at a minimum: ○ alteration of river morphology and associated geophysical characteristics in riverine, estuarine and coastal ecosystems (upstream and downstream) ○ anticipated uncertainty of impacts from changes to the timing, rate and volume of sediment/nutrient transport and deposition patterns over time (i.e. >100 - 1000 years) ○ changes to existing tidal conditions from water extraction, considering impacts on environmental flows upstream and downstream from the intake zone, and implications for the lower reaches of the Adelaide River

Aspect	Specific information required
	and its tributaries and floodplains ○ changes to sediment processes (transport, erosion, and deposition) from the proposal under a range of flow scenarios, and downstream impacts on sediment delivery to the coast (including total annual water and sediment discharge to the sea), including consideration of any reduction of downstream transport of large particles due to harvesting peak flows ○ potential impacts on bank and channel morphology, riparian vegetation stability, and instream and off-stream habitats ○ uncertainty about potential changes to environmental flows, and the impacts to sediment/nutrient/energy processes. • Demonstrate that models used for the assessment of impacts to hydrological processes have adequate resolution and extent for simulation of catchment-wide impacts and localised impacts. The model is to allow for inclusion of baseline data, adequate conceptualisation of the site, catchment, and sub catchments. • Describe how ground truthing of predicted impacts will be carried out over the life of the proposal. • Consult with relevant government agencies (e.g. NT Water Resources Division, NT Flora and Fauna Division, NT Fisheries Division and Commonwealth Department of Climate Change, Energy, the Environment and Water), and demonstrate how their feedback has been considered and/or adopted in relation to modelling methods and characterisation of scenarios for predictions. Report on assumptions and parameters used in the model, justification for their use and predictive uncertainty. Discuss the sensitivity of input parameters and critical assumptions, and how this may change predictions. • Describe any uncertainties and further work required to increase understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act).
Avoidance, mitigation, and management	• Outline the measures for avoiding or mitigating impacts identified above, with consideration of section 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act and ensure that measures to enhance or restore environmental quality are included. • Outline the management plans and adaptive management strategies including trigger action response plans that would be implemented, and specify the associated performance indicators, timeframes for implementation, and the roles and responsibilities of the personnel involved. • Describe measures to avoid and mitigate potential significant impacts of water extraction from the Adelaide River, including how the volumes, rates, timing, and duration of extraction have been developed with consideration of: ○ the seasonal nature, climate and weather conditions in the Adelaide River catchment including variability of rainfall evaporation rates, occurrence of extreme weather events and consecutive seasons of low rainfall/dry and drought conditions

Aspect	Specific information required
	○ available climate and flow data, including any limitations ○ dam water balance including seepage, evaporation rates, and other losses ○ environmental flow requirements ○ conservation areas, recreation (e.g. recreational fishing), commercial (e.g. tourism) and cultural values ○ compliance with relevant legislation, standards and policies, including the requirements of any: ▪ water allocation plan (e.g. water allocation objectives, environmental flow objectives, extraction patterns, release patterns, release capacity, consumptive uses) ▪ water extraction licence under the *Water Act 1992* ▪ impacts of a changing climate (i.e. changing patterns of rainfall, hydrology and extreme weather events). • Describe how operation of the dam and associated infrastructure would be optimised to maintain flood flows and downstream sediment discharge. • Describe proposed mitigation measures to manage potential significant impacts to floodplains/wetlands, groundwater dependent ecosystems and waterways.
Monitoring and reporting	• Provide details on proposed monitoring and reporting related to potential impacts and risks to hydrological processes. • Describe the framework to monitor the effectiveness of proposed management measures, including timeframes and key performance indicators for implementing the proposed measures. • Describe clear and measurable outcomes and commitments, indicators, trigger values and limits that will be used for monitoring, and how adaptive management actions will be initiated. • Describe which proposal phase the proposed monitoring and reporting relates to (i.e. construction, commissioning, operations, decommissioning). Specify the timeframes for monitoring and reporting. • Demonstrate that proposed monitoring locations in the potentially affected area (e.g. bores, designated monitoring areas) are appropriately sited to monitor relevant events.
Residual impact	Assess the significance of any residual impact or risk of the proposal to identified values.

2.6.5. Inland water environmental quality

In these TOR, information requirements for the 'inland water environmental quality' factor must address potential impacts to the 'marine environmental quality' factor.

Table 77: Minimum information required for assessment of Inland water environmental quality

Aspect	Specific information required
NT EPA objective: Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	

Environmental values	• Describe and assess the existing water quality of the Adelaide River catchment, upstream and downstream of the proposal. This must include, at a minimum:
	  ○ a critical review of the available groundwater and surface water quality data (physical, chemical and biological)
	  ○ a critical review of the available spatial and temporal sediment quality data (targeting metals and nutrient analytes)
	  ○ an assessment of groundwater quality, surface water quality, and sediment quality, including the collection of baseline water quality/sediment data
	  ○ the results and interpretation of groundwater, surface water, and sediment quality sampling and monitoring programs, and an assessment of their relevance to the proposal area
	  ○ the suitability of water for intended uses (i.e. construction and water supply)
	  ○ consideration of seasonal environmental flow patterns (including for wetlands), saltwater/freshwater dynamics, existing land uses and soils/geological characteristics
	  ○ a discussion on the relationship between water quality and flow in the Adelaide River, its tributaries and floodplains and association with other processes such as sediment and nutrient transport, stratification, eutrophication and deoxygenation.
	• Identify the existing land uses and declared beneficial uses of water in the Darwin Rural Adelaide River Water Control District that could be affected by the proposal.
	• Detail any information gaps and identify further studies or measures required to address them.

Potential significant impacts and risks	• Describe how the potentially affected area has been defined, as it relates to the quality of groundwater and surface water systems.
	• Identify, describe, and assess the impacts of the proposal on upstream and downstream water quality, environmental values, and the water quality objectives applicable to the Adelaide River catchment. Information is to be supported with references to relevant legislation, policies, and guidelines. Include consideration of:
	  ○ possible sources of water contamination (e.g. erosion and sedimentation acid forming, saline, sodic or dispersive soils if present, spills or discharges of hazardous materials)
	  ○ rates and timing of water extraction from the Adelaide River
	  ○ anticipated changes in salinity, sediment and nutrient dynamics, and the physico-chemical parameters of water and sediments
	  ○ anticipated impacts on salinity in the Adelaide River, both upstream and

Aspect	Specific information required
	downstream from the proposal. • Discuss the predicted water quality in the reservoir and potential for issues to emerge (such as stratification or turn-over, eutrophication and deoxygenation), and identify and describe the potential sources and impacts of any contamination during construction and operation (e.g. potential for algal blooms). • Identify and assess the processes that have the potential to significantly impact the existing water quality and productivity of the Adelaide River and its tributaries. • Using detailed flow and water quality modelling (e.g. catchment model, in-stream model, ecological response model), evaluate the potential for significant adverse impacts on water quality, while also considering climate change and extreme weather conditions. • Consult with relevant government agencies (e.g. NT Water Resources Division, NT Flora and Fauna Division, NT Fisheries Division and Commonwealth Department of Climate Change, Energy, the Environment and Water) regarding the model design and characterisation of scenarios for predictions and demonstrate how their feedback has been considered and/or adopted. Report on assumptions and parameters used in the model, justification for their use and predictive uncertainty. Discuss the sensitivity of input parameters and critical assumptions, and how this may change predictions. • Describe changes to the water quality in the proposed reservoir over time due to processes such as decomposition, eutrophication, stratification or 'turn-over,' sedimentation, precipitation, evaporation, which could cause a reduction in water quality, and its potential seepage into groundwater. • Discuss the timing and quality of any operational or controlled water releases from the reservoir to the Adelaide River, and the potential significant impact on river flows, water, and sediment quality, including any change in the freshwater/saltwater (salinity) dynamics. • Complete an analysis of physico-chemical data, assessment of changes in hydrodynamics, salinity, sediment, and nutrient dynamics e.g. mixing of fresh, brackish and seawater as a consequence of the proposal. • Quantify the significance of water quality impacts from the proposal taking into account: o site specific water quality data o outcomes of relevant studies and investigations o any relevant guideline thresholds, e.g. Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG (2018) and the NHMRC's Australian Drinking Water Guidelines o water quality objectives and declared beneficial uses. • Describe any uncertainties and further work required to increase understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains demonstrate how the precautionary principle has been applied (section 19 of EP Act).

Aspect	Specific information required
Avoidance, mitigation, and management	• Outline the measures for avoiding or mitigating impacts identified above, with consideration of section 26 (Environmental decision-making hierarchy) and section 27 (Waste management hierarchy) of the EP Act and ensure that measures to enhance or restore environmental quality are included. At a minimum, avoidance and mitigation measures must take into account: ○ erosion, sediment and drainage controls ○ acid sulfate, saline, sodic and dispersive soils management (if present) ○ treatment options for reservoir and controlled/emergency discharge ○ chemical and fuel spill management ○ existing land uses (e.g. agricultural, mining) within the catchment. • Outline the management and operational plans and adaptive management strategies including trigger action response plans that would be implemented, and specify the associated performance indicators, timeframes for implementation. • Demonstrate that the timing, rates, and volumes of water extraction will avoid significant impacts to water quality in the Adelaide River. Include consideration of natural seasonal variation (e.g. temperature, salinity, dissolved oxygen, turbidity, nutrient loads and chemical concentrations, and sediment/nutrient load transfer to downstream environments).
Monitoring and reporting	• Demonstrate that appropriate water quality monitoring and reporting has been developed for each proposal phase, i.e. construction, commissioning, operations, decommissioning, and/or post-closure. • Describe how corrective management actions will be initiated and completed. • Demonstrate that proposed water quality monitoring sites are appropriately located to monitor relevant impacts. • Describe clear and measurable indicators, outcomes and commitments that will ensure the environmental objective is met, the impacts of implementing the proposal remain acceptable, and specify timeframes for monitoring and reporting.
Residual impact	Assess the significance of any residual impact or risk of the proposal to identified values.

2.6.6. Aquatic ecosystems

In these TOR, information requirements for the 'aquatic ecosystems' factor must address potential impacts to the 'marine ecosystems' factor.

Table 88: Minimum information required for assessment of Aquatic ecosystems

Aspect	Specific information required
NT EPA objective: Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning.	

Aspect	Specific information required

Environmental values	• Identify, describe, and characterise the aquatic, riverine, estuarine, floodplain/wetland and coastal ecosystems within the Adelaide River catchment that could be affected by the proposal (upstream and downstream). This must include, at a minimum:
	  ○ a critical review of available literature and data to identify habitats and species that have the potential to occur
	  ○ identification of all threatened aquatic, riverine and estuarine flora and fauna species listed under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) and the EPBC Act including species under assessment for inclusion or conservation status changes under the EPBC Act
	  ○ the location and extent of representative habitats in the Adelaide River and its tributaries and floodplains including refugial habitats critical for species existence during the dry season, such as potential nursery areas for sawfish or other important habitats for aquatic and water-dependent species
	  ○ the population structure of mangrove and/or other aquatic, riparian, estuarine, floodplain and coastal vegetation, using existing databases and/or findings from field surveys and investigations
	  ○ flora and fauna species of social, economic or cultural significance (i.e. barramundi, turtle) and invasive species
	  ○ a likelihood of occurrence assessment for all threatened aquatic, migratory and marine species as listed under the TPWC Act and/or the EPBC Act.
	• Develop a fish migration conceptual model to identify seasonal and flow related movement patterns of the species of conservation significance that have the potential to be impacted by the proposal using studies and literature specific to the Adelaide River, and its tributaries.
	• Identify and assess sensitive time periods for listed threatened species, and/or key ecological functions including for: seasonal and inter-annual variability; in the timing and relationship to flow; and of key ecological processes. The study must include assessing the upstream migration of juvenile cherabin and other migrating species.
	• Undertake a field assessment of habitat, water quality, natural and existing upstream and downstream movement, seasonal and spatial variation of habitat requirements of all flora and fauna (aquatic, riverine and estuarine) that could be affected by the proposal. The survey efforts are to be standardised and quantified. Survey results must be presented including, but not limited to:
	  ○ identification of aquatic vertebrate fauna and selected macroinvertebrate species (e.g. decapod crustacea and molluscs, and macrophytes in representative samples of habitat) to confirm presence or absence, and the habitats that they rely on for foraging, breeding, nesting, migration, dispersal (adults, juveniles and larvae)
	  ○ identification of any other important species including euryhaline species, turtles, waterbirds and shorebirds that have the potential to occur

Aspect	Specific information required
	○ identification and assessment of the timing and flow-dependence of upstream and downstream migration events of aquatic fish and invertebrates (notably juvenile cherabin) ○ use of environmental DNA (eDNA) techniques i.e. analysis (eDNA metabarcoding and/or species-specific quantitative PCR (qPCR) to help determine species presence (including key indicator species) and seasonal distribution where appropriate, thereby utilising the sourcing of local reference DNA data and improved knowledge of the probability of detection for a range of target species ○ identification of critical or important areas for matters of national environmental significance (MNES) including consideration of the importance of habitat connectivity and areas likely to be important for maintaining aquatic and estuarine ecological integrity and functioning and include map(s) of areas that are already protected and known offset areas under both Commonwealth and NT legislation ○ identification and assessment of the limitations of survey techniques (including techniques used in previous (2023/2024) surveys) that may have caused difficulties in detecting species such as the largetooth sawfish, northern river shark and speartooth shark. • Justify the suitability of the survey methods or processes used to identify/estimate the presence/absence and potential extent of values within the potentially affected area. If survey's methods diverge from relevant Commonwealth and NT guidelines, justify them with their respective input from species experts or/and scientific literature. • Identify species, species-groups, or assemblages which may be suitable for ongoing monitoring in the Adelaide River catchment to provide assurance that ecological structure and function has not been impaired. The criteria for selection of species, species-groups and assemblages must include: ○ species previously well studied (in the Adelaide River or in similar catchments in northern Australia) ○ focal species including, but not limited to: cherabin (*Macrobrachium spinipes*), largetooth sawfish (*Pristis pristis*), speartooth shark (*Glyphis glyphis*), barramundi (*Lates calcarifer*), archerfish (*Toxotidae spp*) and introduced/invasive species e.g. siamese fighting fish (*Betta splendens*) or *Hymenachne amplexicaule* (Hymenachne) ○ species that are affected by fragmentation/loss of habitat, invasive species and/or entrapment/entrainment ○ species that are plausibly affected by changes in flow and water quality ○ importance to conservation to Traditional Owners/Custodians and/or fisheries. • Conduct a comprehensive review on how temporal and spatial dynamics of tidal behavior, local climatic conditions, seasonal variability in river flows and floods have shaped the ecosystems in the lower reaches of the Adelaide River and tidal creeks near the coastal zone. • Include detailed technical information, studies, or investigations (including

Aspect	Specific information required
	data) necessary to support the draft EIS in appendices. • Consult with relevant government agencies (i.e. DLPE Flora and Fauna Division, Department of Agriculture and Fisheries, DCCEEW) regarding suitable survey methods and further advice on other ecosystem values to be identified and demonstrate how their feedback has been considered and/or adopted.
Potential significant impacts and risks	• Describe how the potentially affected area has been defined, as it relates to aquatic and estuarine ecosystems. • Identify, describe, and assess potential significant impacts on aquatic ecosystems within the potentially affected area. This must include, at a minimum: o a review of current studies being undertaken by the Water Resources Division of DLPE about the effect of flow/extraction scenarios on the extent and duration of inundation using LIDAR data and hydrological modelling, and consideration of the ecological values of downstream habitats o a review of the Adelaide River floodplain and associated range of biological and ecological values, and identify how those ecological values, and seasonal inundation of the floodplain habitat, will be impacted o a review of relevant studies on the effect of water extraction on the salinity regime and a review of potential significant impacts on tidal freshwater fish species. • Describe and provide an assessment of potential significant impacts on the quality and integrity of aquatic ecosystems as a result of: o direct disturbance from construction, commissioning and operations (e.g. land clearing, earthworks, construction dewatering, operational surface water extraction, inundation etc.), resulting in habitat fragmentation, habitat loss, fauna mortality/injury/entrapment, disturbance to flow-dependent species o indirect disturbance from construction and operation, such as erosion/topsoil migration, offsite movement of sediments, introduction/spread of invasive species, controlled/emergency basin discharges o the risk of water storage being completely drawn down in certain years, and subsequent potential impacts on MNES that may become dependent on the water storage. • Provide an assessment of changes in the frequency and duration of seasonal floodplain/wetland inundation, and potential impacts to habitat for species. This must include, at a minimum: o identify potential significant impacts on waterbird colonies and structural changes to habitats, e.g. wetlands, at a proposal scale and regional scale o impacts on mangroves in the lower reaches of Adelaide River providing habitat for waterbirds o identify the potential significant impacts on riparian vegetation (i.e.

Aspect	Specific information required
	dieback of freshwater melaleuca and expansion of mangroves), and instream ecosystems as a result of increased channel salinity or greater upstream tidal activity in terms of extent, intensity, etc. ○ identify and assess how water extraction as a result of the proposal could impact fish recruitment (including Barramundi) thereby affecting connectivity between river channels and floodplains, and conduct further studies as required to address information gaps including impacts of operations on food webs, flows, sediment and nutrient loads in the Adelaide River catchment. • Identify and assess the impacts to fish, fish diversity and biomass and subsequent impacts on ecological processes due to saltwater intrusion both upstream and laterally into floodplains. Consideration is needed of how increased salinity in the tidal freshwater reach may lead to a reduction in habitat availability for species with a low and narrow salinity tolerance for spawning, such as the nursery fish (*Kurus gulliveri*). • Identify any long term or short-term potential significant impacts on the freshwater and saltwater crocodile population throughout the potentially affected area. • Identify, describe, and assess potential significant impacts of the proposal on the quality and integrity of riverine, estuarine, and coastal ecosystems of the Adelaide River that depend on environmental flows. This must include, at a minimum: ○ the potential significant impacts of the proposal on all listed threatened, migratory and marine species and their habitats, riparian vegetation, aquatic, riverine and estuarine ecosystems, in-stream and floodplain habitats ○ changes to the extent, frequency and duration of environmental flows, and the potential significant impacts on aquatic species that rely largely upon seasonal flow variations in their lifecycle, particularly for spawning and juvenile development (this assessment may take into consideration their migration patterns, flood pulses and critical nursery habitats) ○ the potential significant impacts on species adapted to pulse-stimulated habitats as a result of changes to environmental flows and the transport of sediment and nutrients ○ the extent of habitat fragmentation due to altered flows, with consideration of connectivity and its impact on the integrity of sensitive habitat and the flora and fauna they support ○ assessment of impacts on biodiversity, ecological integrity and function (i.e. primary production, food web operation, species breeding and migration, avian assemblages, utilisation of nutrient loads). • Identify potential significant impacts from the proposal on the Adelaide River Coastal Floodplain as a Site of Conservation Significance and as a Wetland of National Significance (refer to A Directory of Important Wetlands in Australia: Third edition - DCCEEW). • Use detailed flow and water quality modelling to evaluate the potential for significant impacts on riverine, aquatic, floodplain and estuarine ecosystems

Aspect	Specific information required
	also taking into consideration climate change and extreme weather conditions. • Identify other industries (and/or water uses) and proposed development proposals within the potentially affected area that may contribute to cumulative impacts to ecosystems and habitats, threatened and/or migratory species and other ecosystem values. Assess the quantitative or qualitative significance of these cumulative impacts. • Describe any uncertainties and further work required to increase understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). Quantify the significance and extent of impacts, at the proposal level and cumulatively, using relevant guideline thresholds.
Avoidance, mitigation, and management	• Outline the measures for avoiding, mitigating, or offsetting impacts identified above, with consideration of Section 26 (Environmental decision-making hierarchy) and Section 27 (Waste management hierarchy) of the EP Act. Also consider measures to enhance or restore environmental quality through restoration or rehabilitation in line with section 42 of the EP Act. • The avoidance, mitigation and management measures proposed must include environmental objectives, performance criteria, monitoring and reporting methods, corrective actions, assigned responsibilities and timeframes for implementation and review in accordance with the DCCEEW Environmental Management Plan Guidelines. • Identify how impacts to the quality and integrity of ecosystems in the potentially affected area can be avoided and mitigated. • Provide avoidance, mitigation, and management measures to address impacts on breeding of species and fish recruitment in the Adelaide River, its tributaries, and adjacent floodplains as a result of water extraction. This must include an assessment of the design, construction, use, effectiveness, and management of fish screening systems. • Provide avoidance and mitigation measures addressing biosecurity and the risk of new invasive species that may be introduced into the potentially affected area. Include a clear plan for managing and mitigating the impacts from Siamese fighting fish. • Using the understanding of timing and flow-dependance of migration events of aquatic species, consider design or operation of pump infrastructure to avoid disrupting the migration of key species past the extraction point. A key species that must be considered is the cherabin (an abundant and important prey item for aquatic predators in the Adelaide River, its tributaries, and adjacent floodplains). • Use the information gathered on distribution and understanding of potential significant impacts to listed threatened aquatic and migratory species (in particular the freshwater sawfish, northern river shark and speartooth shark) to identify appropriate avoidance and mitigation measures to protect these species. • Identify potentially affected areas that will require major management solutions (i.e. areas of existing eutrophication, areas of runoff and sedimentation, areas of pollution, adverse impacts on MNES that use the

Aspect	Specific information required
	flooded area) prior to implementation of the proposal, proposed mitigation measures, and areas that will be avoided if the constraints cannot be overcome.

Monitoring and reporting	• Outline proposed monitoring and reporting activities related to potential significant impacts and risks, and mitigation and management measures to the aquatic and estuarine ecosystems. The proposed monitoring and reporting must specify which proposal phase it relates to and include, but not limited to:
	  ○ a requirement for setting water quality and environmental flow thresholds and describe mitigating actions should thresholds be met or exceeded
	  ○ using species, species groups or assemblages identified as suitable for monitoring, as indicators that ecological structure and function has not been impaired.
	• Describe clear and measurable indicators, outcomes and commitments that will ensure the environmental objective is met and impacts of implementing the proposal remain acceptable.
	• Specify timeframes and methodologies for monitoring and reporting, ensuring they align with the nature of the impact and occur at appropriate stages of the proposal.

Residual impact	Assess the significance of any residual impact or risk of the proposal to identified aquatic ecosystem values. Describe the level of certainty underpinning the predicted residual impacts.
Offsets	Where a significant residual impact to listed species under the EPBC Act and TPWC Act may remain after applying the mitigation hierarchy, identify offsets and describe how any proposed offset is consistent with the NT Offset Framework (as published) and the EPBC Act environmental offsets policy.

2.6.7. Atmospheric processes

Table 9: Minimum information required for assessment of Atmospheric processes

Aspect	Specific information required
NT EPA Objective: Minimise greenhouse gas emissions so as to contribute to the NT Government's goal of achieving net zero greenhouse gas emissions (GHG) by 2050.	
Environmental values	Describe and assess the GHG emissions that would be generated by implementing the proposal, and discuss the potential effect of the proposal on the scale, magnitude, and trajectory of GHG emissions in the NT.
Potential significant impacts and risks	• Using Australian Government recognised emissions accounting methodologies - update estimates of the proposal's Scope 1 and Scope 2 GHG emissions (e.g. land clearing, diesel exhaust, electricity, basin methane emissions during construction, commissioning, and operation). • Present the updated estimates as an inventory of projected annual emissions for each relevant GHG, for each fiscal year and total for the life of the

Aspect	Specific information required
	proposal, with emissions expressed in tonnes CO_2 equivalent (tonnes CO_2-e). • Describe any uncertainties and further work required to improve understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). • Quantify the significance and extent of impacts, at the proposal level and cumulatively, with use of and reference to relevant guideline thresholds.
Avoidance, mitigation, and management	Describe any energy efficiency and mitigation and management measures that will be adopted during the design, construction, commissioning and operation phases of the proposal to reduce or minimise GHG emissions to as low as reasonably practicable, and that demonstrate application of best practice - so as to contribute to the NT's target of net zero by 2050 (for example by sourcing renewable power).
Monitoring and reporting	• Outline any proposed monitoring and reporting of GHG emissions. • Identify whether the Commonwealth *National Greenhouse and Energy Reporting Act 2007* Safeguard Mechanism obligations apply to the proposal.
Residual impact	Describe the net contribution to the NT's GHG over the 100-year life of the proposal.
Offsets	Where a significant residual impact may remain after applying the environmental decision-making hierarchy, identify any proposed GHG emission offsets and describe how any proposed offset is consistent with the NT Offset Framework (as published) and NT GHG emissions offsets policy.

2.6.8. Community and economy

Table 1010: Minimum information required for assessment of Community and economy

Aspect	Specific information required
NT EPA objective: Enhance communities and the economy for the welfare, amenity, and benefit of current and future generations of Territorians.	
Environmental values	Identify and describe the existing social and economic profiles, and the social and economic values and sensitivities, which could be affected by the proposal. Include focused discussion about existing community values such as popular recreational fishing locations.

Aspect	Specific information required

Potential significant impacts and risks	• Identify, describe, and assess the potential significant social and economic impacts, along with the social and economic benefits, associated with the proposal for the local, regional and NT community and economy, with reference to relevant principles of ecologically sustainable development (sections 17 – 24 of the EP Act).
	• Provide an economic and social impact assessment in accordance with the NT EPA guidelines for Economic and Social Impact Assessment.
	• The assessment must address Infrastructure Australia's recommendations on the AROWS Detailed Business Case and use up-to-date information, standards and risk assessment procedures.
	• The assessment must include, but not be limited to:
	  ○ impacts of the proposal on the operation of existing water supply sources (Darwin River Dam, McMinns and Howard East borefields, Manton Dam) and its customers
	  ○ potential and/or perceived changes to land use in areas of the potentially affected area
	  ○ potential partial and/or complete property acquisition for the proposal
	  ○ demand management and water efficiency programs impacts
	  ○ an analysis of the economic risks and consequences of forecast industrial, urban and agricultural demands not being realised
	  ○ revenue estimates not being realised.
	• The following issues must be considered in the assessment to evaluate whether potential economic and social impacts are significant, or whether they (cumulatively) affect the proposal's overall value proposition, acceptability and consistency with relevant principles of ecologically sustainable development:
	  ○ the construction, management and operation of the reservoir and the water resource including the operational costs such as extraction, pumping, and transfer from the reservoir to the future Strauss Water Treatment Plant
	  ○ impacts on other businesses and industries due to competition for labour and materials
	  ○ impacts to recreational fishers, from potential loss of access to popular fishing sites and/or reduced fishing quality in the catchment
	  ○ a comparison to alternative option(s) on social and economic aspects.
	• Consider the potential benefits from: improved access to the Adelaide River for recreational fishing, potential public access to the basin area for fishing opportunities and/or enhanced amenity and access through realignment or upgrade of Marrakai Road and any additional impacts and benefits of the proposal that emerge during development of the EIS.
	• Demonstrate that the assessment of the economic and social impacts and benefits of the proposal is informed by an inclusive and collaborative

Aspect	Specific information required
	community and stakeholder engagement and consultation process, including consultation with relevant mining operators and appropriate Traditional Owners/Custodians. • Describe any uncertainties and further work required to improve understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). • Quantify the significance and extent of impacts, at the proposal level and cumulatively, with use of and reference to relevant guideline thresholds.
Avoidance, mitigation, and management	• Describe measures to avoid, mitigate and manage potential significant social and economic impacts, and to enhance benefits to the community and economy, over the life of the proposal (consider section 6.5 of the NT EPA guidelines for Economic and Social Impact Assessment). • Describe how the views of stakeholders have been considered in proposed avoidance, mitigation and management measures.
Monitoring and reporting	• Outline proposed monitoring and reporting activities related to potential significant impacts and benefits and that will be used to demonstrate and measure how enhancement of the community and economy is achieved.
Residual impact	• Assess the significance of any residual impact or risk to identified values and the acceptability of the residual impact to stakeholders. • Assess the significance of any residual impacts on the Territory economy.

2.6.9. Culture and heritage

Table 1111: Minimum information required for assessment of Culture and heritage

Aspect	Specific information required
NT EPA objective: Protect culture and heritage.	
Environmental values	• Identify the Traditional Owners of land within the proposal area. • Undertake a study to identify, describe and characterise existing Aboriginal and non-Aboriginal cultural heritage values (tangible and intangible) that may be affected by the proposal, including but not limited to: o Aboriginal sacred sites o heritage places and objects o boundaries of native title claim applications and determinations. • Justify the suitability of methods used to conduct studies, surveys and investigations to identify cultural heritage values. Results of studies undertaken are to inform the information provided in the EIS (e.g. archaeological and anthropological investigations and surveys, statutory/regulatory processes, consultations and other research). • Provide maps showing the location and extent of cultural heritage values within the proposal area (including sacred sites, heritage places and objects, Traditional Owner land and cultural practice areas). The maps of cultural

Aspect	Specific information required
	heritage values must include the location and boundaries of each component of the proposal, including inundation areas and all infrastructure elements and development necessary for the proposal. • Describe any gaps, uncertainties and further work required to improve understanding of cultural heritage values and reduce uncertainty. • Describe the environmental values important to Aboriginal people, which may be affected by the proposal, including but not limited to values, uses and aspirations of water resources relevant to the proposal, and information regarding economic development opportunities and methods proposed to protect these values.
Potential significant impacts and risks	• Describe and assess the potential significant impacts on cultural heritage values from implementing the proposal. Include at a minimum an assessment of: o the risk of damage or destruction of archaeological features and sites of cultural heritage significance, during construction, commissioning and operation (taking into account the refined modelling and assessment of impacts to groundwater and surface water from operational activities) e.g. potential impacts related to: ▪ land clearing, soil disturbance, dust, erosion, vehicle and equipment movements ▪ damage or burial of heritage features as a result of proposal operations (e.g. water extraction, sedimentation, exposure to pollutants, controlled releases from reservoir) ▪ increased public access from new roads, tracks and land infrastructure, and increased awareness of archaeological and cultural heritage values ▪ effects of basin inundation on cultural heritage values ▪ changes to amenity (e.g. noise, odour, dust, vibration and aesthetics) and the extent of its importance in maintaining cultural heritage values. o the duration, magnitude, and extent of potential significant impacts to cultural heritage values o the risk of discovery of unexpected finds of heritage places and objects, or ancestral remains o methods for locating, salvage or removal of any cultural heritage values within the proposal area o the extent of any temporary or permanent land access or use restrictions for cultural practices o cumulative impacts from the proposal on cultural heritage values, including the incremental destruction of heritage places or objects that may occur in the proposal area o intergenerational impact to the perception of a place's cultural heritage value once it has been altered. • Quantify the significance and extent of cumulative impacts to cultural heritage, with use of and reference to relevant guideline thresholds.

Aspect	Specific information required
	• Provide details of consultation with the Aboriginal Areas Protection Authority, DLPE Heritage Unit, Traditional Owners and their representatives regarding potential significant impacts to sacred sites, and heritage places and objects, including identification of participants, and results of consultation. • Provide an Authority Certificate (if one has been obtained) or clarify if an application has been made under the *Northern Territory Aboriginal Sacred Sites Act 1989* that covers the proposal area and proposed activities during all phases of the proposal (i.e. construction, commissioning, and operation). • Present information in accord with the wishes of Aboriginal stakeholders regarding the confidentiality of cultural information and traditional knowledge, noting the proponent may request that identified information not be made public in accordance with section 281(2)(b) of the EP Act. • Describe how the impacts of a changing climate have been considered in the assessment of potential impacts to cultural heritage values. • Assess the potential cumulative impacts to cultural heritage values from the proposal and other activities in the region. Describe any uncertainties and further work required to improve understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act).

Avoidance, mitigation, and management	• Outline the measures for avoiding and mitigating the impacts identified above, with consideration of section 26 (environmental decision-making hierarchy) and section 27 (waste management hierarchy) of the EP Act.
	• Provide a cultural heritage management plan (CHMP) that identifies and describes the measures that will be implemented to avoid, mitigate and manage impacts to identified cultural heritage values. Include standards and controls and at a minimum address the following:
	  ○ measures to protect, and avoid entry to sacred sites e.g. sacred sites clearance, an Authority Certificate
	  ○ provide strategies to avoid and mitigate impacts to all identified cultural heritage values during construction, commissioning, and operation
	  ○ any requirement to obtain authorisation under the *Heritage Act 2011* to carry out work on a heritage place or object
	  ○ a strategy to address how unexpected archaeological finds of heritage places and objects (additional to those identified in the EIS) would be identified and managed during implementation of the proposal.

Monitoring and reporting	• Outline proposed methodology and timeframes for monitoring and reporting activities related to potential significant impacts and risks to cultural heritage values. • The proposed monitoring and reporting must specify which proposal phase it relates to (i.e. construction, commissioning, or operation). • Explain how the proposed monitoring and reporting responds to advice from relevant government advisory agencies, native title holders, Traditional Owners and/or their representatives. • Describe clear and measurable outcomes and commitments for the

Aspect	Specific information required
	protection of cultural heritage values.
Residual impact	• Determine whether there are likely to be any significant residual environmental impacts or risks to identified cultural heritage values.

2.6.10. Human health

Table 1212: Minimum information required for assessment of Human health

Aspect	Specific information required
NT EPA objective: Protect the health of the Northern Territory population.	
Environmental values	Describe the location and size of human populations in proximity to the proposal area. Provide maps to support descriptions as appropriate.

Potential significant impacts and risks	• Describe and assess potential significant impacts on human health associated with the proposed construction, commissioning, and operation activities, including:
	  ○ any increased human exposure to risk of crocodile attacks
	  ○ increased human exposure to vector-borne diseases as a result of introduction of mosquitoes or increase in their population size/breeding sites
	  ○ potential 'population at risk' implications from a dam break/failure (include discussion in relation to any ANCOLD guidelines and requirements)
	  ○ potential for algal blooms in the reservoir.
	• The assessment must:
	  ○ be informed by investigations and/or other relevant information
	  ○ be informed by a baseline mosquito investigation including a minimum of 12 months of mosquito trapping and any relevant learnings from Darwin River Dam and Manton Dam areas
	  ○ quantify the significance of potential impacts and risks against any relevant guideline thresholds
	  ○ consider cumulative impacts and the reversibility of potential significant impacts
	  ○ quantify the significance and extent of impacts, at the proposal level and cumulatively, with use of and reference to relevant guideline thresholds
	  ○ describe any uncertainties and further work required to improve understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act).

Avoidance, mitigation, and management	Outline the measures for avoiding, mitigating, and managing significant impacts identified above.

Aspect	Specific information required
Monitoring and reporting	Outline proposed monitoring and reporting activities related to potential significant impacts and risks and mitigation and management measures to human health values. The proposed monitoring and reporting must specify which proposal phases it relates to.
Residual impact	Identify the significance of any residual impact or risk of the proposal to identified values.

2.7. Matters of national environmental significance

The EPBC Act provides for the Commonwealth to accredit NT EPA assessments of proposals under the EP Act. The proposal was referred and was determined to be a controlled action, with the following relevant controlling provisions:

- Listed threatened species and communities (section 18 and 18A)
- Listed migratory species (sections 20 and 20A).

To ensure the proposed action does not have unacceptable adverse impacts of the survival of listed threatened or migratory species, the draft EIS must address all relevant matters of national environmental significance (MNES) and explain how adequate consideration has been given to the conservation advice for each EPBC Act listed species that are known or likely to be impacted, and Australia's obligations under international conventions and agreements.

The draft EIS must explain how the proposal is consistent with any guidelines, threat abatement plans, bioregional plans or recovery plans including, but not limited to:

- Conservation advice for:
  - *Helicteres macrothrix*
  - Mertens' water monitor (*Varanus mertensi*)
  - Mitchell's water monitor (*Varanus mitchelli*)
  - northern blue-tongued skink (*Tiliqua scincoides intermedia*)
  - black-footed tree-rat (*Mesembriomys gouldii rattoides*)
  - northern river shark (*Glyphis garricki*)
  - speartooth shark (*Glyphis glyphis*)
  - largetooth sawfish (*Pristis pristis*)
    - noting that this species is currently proposed to be transferred from the Vulnerable category to the Endangered category of the threatened species list under the EPBC Act. During consultation on the proposed eligibility, DCCEEW released updated draft conservation advice, which must be considered in the assessment: Consultation document Largetooth sawfish (*Pristis pristis*)
  - dwarf sawfish (*Pristis clavata*)
  - northern brushtail possum (*Trichosurus vulpecula arnhemensis*)
  - Gouldian finch (*Erythrura gouldiae*)
  - red goshawk (*Erythrotriorchis radiatus*)
  - bare-rumped sheath tailed bat (*Saccolaimus saccolaimus nudicluniatus*).

- National recovery Plans for:
  - northern quoll (*Dasyurus hallucatus*)
  - Gouldian finch (*Erythrura gouldiae*)
  - red goshawk (*Erythrotriorchis radiatus*)
  - Sawfish and River Sharks Multispecies Recovery Plan
  - bare-rumped sheath tailed bat (*Saccolaimus saccolaimus nudicluniatus*).
- Threat abatement plans:
  - Biological effects, including lethal toxic ingestion, caused by cane toads
  - Reduce the impacts on northern Australia's biodiversity by the five listed grasses
  - Predation by feral cats
  - Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*).
- The following survey guidelines:
  - Survey guidelines for Australia's threatened bats
  - Survey guidelines for Australia's threatened birds
  - Survey guidelines for Australia's threatened fish
  - Survey guidelines for Australia's threatened mammals
  - Survey guidelines for Australia's threatened reptiles
- Additional DCCEEW guidance documents and relevant form:
  - Matters of National Environmental Significance: Significant Impact Guidelines 1.1
  - EPBC Act referral guideline for the endangered northern quoll Dasyurus hallucatus
  - DCCEEW's Environmental management plan guidelines
  - Action Management Plan Election Form
  - EPBC Act Environmental Offsets Policy
  - Interim Engaging with First Nations People and Communities Assessments and Approvals Under the EPBC Act
  - Guide to providing maps and boundary data for EPBC Act projects
  - Marine bioregional plan for the North Marine Region

Should the proponent choose to lodge an action management plan for approval in accordance with Section 132B of the EPBC Act (i.e. following assessment, as a condition of approval), note that additional fees may apply under the cost recovery arrangements. A link to this action management plan election form can be provided on request.

The draft EIS must include a discussion of how the proposal meets the principles of ecologically sustainable development, as defined under section 3A of the EPBC Act.

2.8. Offsets

Provide details of an overall biodiversity offset strategy for any significant residual impacts of the proposal on the terrestrial and aquatic environment, ensuring the strategy is sufficiently detailed to demonstrate a reasonable level of feasibility in line with the requirements of Part 7 of the EPBC Act Environmental Offsets Policy. Offsets may be required as a condition of any approval under the EPBC Act. Offsets must

be consistent with the NT Offsets Framework, NT Biodiversity Offsets Policy, and/or the EPBC Act environmental offsets policy.

3. Other requirements

3.1. Stakeholder engagement and consultation

Proponents have a general duty under section 43 of the EP Act to provide communities and stakeholders that may be affected by a proposal with an opportunity for consultation to assist community understanding of the proposal and its potential significant impacts and benefits. If an impact or benefit is uncertain, this must be clearly stated.

The proponent must engage and consult with stakeholders[3] who are affected by and interested in the proposal. The proponent must document the following in the EIS:

- the proponent's approach to stakeholder engagement and consultation for the life of the proposal, through provision of a stakeholder engagement plan, including demonstration that this is consistent with the NT EPA's guidance for proponents: Stakeholder Engagement and Consultation and aligns with best practice guidance
- a summary of information presented in the referral on consultation undertaken up until mid-2024, including identified stakeholder groups, issues raised, and adjustments made to the proposal because of consultation
- details of further stakeholder engagement and consultation undertaken on the proposal during the EIS phase including:
    - the engagement approach
    - any additional identified stakeholders
    - methods use for the communication with stakeholders and how proposal information was disseminated
    - how stakeholder input was invited
    - how any new information on the potential significant impacts/benefits of the proposal were communicated (if necessary)
    - issues raised in consultations
    - any adjustments to the proposal as a result of consultation.

3.1.1. Aboriginal stakeholders

The draft EIS, including a stakeholder engagement plan, a cultural heritage management plan and an economic and social impact assessment, is to be informed by consultation with stakeholders, including Aboriginal stakeholders. The draft EIS should set out the processes applied to identifying and determining Aboriginal stakeholders.

Aboriginal stakeholders must include:

- native title claimants (claims under consideration and decided) with native title rights and interests within the potentially affected area
- Traditional Owners of land within the potentially affected area.

[3] As defined in the NT EPA Guidance for Proponents - Stakeholder Engagement and Consultation

The draft EIS is to describe the Aboriginal stakeholders and demonstrate how the proponent has:

- recognised the role of Aboriginal people as stewards of their country
- recognised the rights and interests of Aboriginal stakeholders in the Adelaide River catchment, and encouraged their participation in environmental decision-making in relation to the proposal
- enabled Aboriginal stakeholders (and in particular potentially affected Native Title Holders, Traditional Owners, and Custodians) to make decisions about the proposal
- engaged with Aboriginal stakeholders in a culturally appropriate manner, using specialist expertise where required
- provided Aboriginal stakeholders with information in appropriate detail, language, and format for understanding of the proposal and its potential significant impacts and benefits
- promoted the cooperative use of Aboriginal knowledge of biodiversity and Aboriginal culture in environmental decision-making
- treated the views of Aboriginal stakeholders as the primary source of information on Aboriginal cultural values
- discussed options with, and obtained the views of, Aboriginal stakeholders regarding environmental management and cultural heritage management (including environmental monitoring and reporting)
- adopted measures to protect the rights and interests of Aboriginal people in relation to the areas that may be impacted.

3.2. Public consultation requirements

The public consultation requirements for the EIS are outlined in Part 5 Division 6 of the EP Regulations. Additional specific details are provided below.

3.2.1. Submission period

The submission period under the EP Act during which feedback can be given on the draft EIS is between 30 and 60 business days. The duration of the period will be confirmed during the draft EIS pre-lodgment phase.

3.2.2. Form and manner for publication

The draft EIS must:

- be divided into two parts:
  - a main report (with executive summary available as separate document)
  - appendices to the main report.
- have a navigable table of contents
- present information in format that is easy to follow
- use hyperlinks to assist with navigation through the document
- generally conform with the web content accessibility guidelines (WCAG) 2.0 level AA and material relevant to creating accessible documents on the NT Government Website.

3.2.3. Public consultation locations

The draft EIS is to be made available in hard copy for public consultation during the submission period at:

- NT EPA, Level 1, Arnhemica House, 16 Parap Road, Parap, NT 0820
- Northern Territory Library, Parliament House, Darwin, NT 0800
- Environment Centre Northern Territory, Unit 3, 98 Woods St, Darwin, NT 0800

- Northern Land Council, 45 Mitchell Street, Darwin
- NT Farmers Association, Shop 15A, 460 Stuart Highway, Coolalinga
- Adelaide River Post Office Store, 1 Stuart Highway, Adelaide River

4. Appendix A – List of relevant guidance material

The following guidance material, in addition to the guidance material referenced in 2.7 (Matters of national environmental significance) is considered relevant to the TOR. This list is not exhaustive, but captures guidance used in the preparation of these TOR and to inform the preparation of the EIS. The proponent must draw on further relevant industry and best practice guidance as part of developing the EIS.

- Brocklehurst, P. S. et al., 2007. Northern Territory guidelines and field methodology for vegetation survey and mapping. Available at: https://territorystories.nt.gov.au/10070/635994/0
- CSIRO 2020. Climate Change in the Northern Territory: State of the science and climate change impacts. https://depws.nt.gov.au/__data/assets/pdf_file/0011/944831/state-of-the-science-and-climate-change-impacts-final-report.pdf
- Commonwealth of Australia, 2008. Threat Abatement Plan for predation by feral cats. Department of Agriculture, Water and the Environment: https://www.dcceew.gov.au/sites/default/files/documents/tap-predation-feral-cats-2015.pdf
- Commonwealth of Australia, 2013. Significant Impact Guidelines 1.1: Matters of National Environmental Significance. Department of Climate Change, Energy, the Environment and Water: https://www.dcceew.gov.au/environment/epbc/publications/significant-impact-guidelines-11-matters-national-environmental-significance
- DCCEEW, 2023. Interim Engaging with First National People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999: https://www.dcceew.gov.au/sites/default/files/documents/interim-engaging-with-first-nations-people-and-communities-assessments-and-approvals-under-epbc-act.pdf
- DENR, 2020. Northern Territory Water Allocation Planning Framework. Department of Environment and Natural Resources: https://depws.nt.gov.au/__data/assets/pdf_file/0011/476669/nt-water-allocation-planning-framework.pdf
- DENR, 2020. Land clearing guidelines. Department of Environment and Natural Resources: https://nt.gov.au/property/land-clearing
- DENR, 2020. Northern Territory Climate Change Response: Towards 2050. Department of Environment and Natural Resources: https://climatechange.nt.gov.au/nt-climate-change-response/northern-territory-climate-change-response-towards-2050
- DEPWS, 2021. Northern Territory Offsets Framework. Department of Environment, Parks and Water Security: https://depws.nt.gov.au/environment-information/northern-territory-offsets-framework/northern-territory-offsets-framework
- DEPWS, 2023. Biodiversity Offsets Policy. Department of Environment, Parks and Water Security https://depws.nt.gov.au/__data/assets/pdf_file/0003/1182450/biodiversity-offsets-policy.pdf
- DoH, 2017. Guidelines for Preventing Mosquito Breeding Associated with Construction Practice near Tidal Areas in the NT. https://digitallibrary.health.nt.gov.au/.
- Infrastructure Australia, 2021. Guide to economic appraisal. https://www.infrastructureaustralia.gov.au/guide-economic-appraisal
- NESP Earth Systems and Climate Change Hub, 2020. Climate change in the Northern Territory: state of the science and climate change impacts. National Environment Science Programme, Earth Systems and Climate Change Hub: http://nespclimate.com.au/building-understanding-of-climate-change-in-the-northern-territory/
- Northern Territory Government, 2017. Preventing weed spread guide, Weed Management Branch: https://nt.gov.au/environment/weeds/how-to-manage-weeds/prevent-weed-spread-industry-and-recreation
- NT EPA, 2013a. Guidelines for Assessment of Impacts on Terrestrial Biodiversity. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/publications-and-advice/environmental-

management

- NT EPA, 2013b. Guidelines for the Preparation of an Economic and Social Impact Assessment. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/publications-and-advice/environmental-management
- NT EPA, 2013c. Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the NT. Northern Territory Environment Protection Authority. https://ntepa.nt.gov.au/__data/assets/pdf_file/0006/284685/siting_design_landfills.pdf
- NT EPA, 2015. Waste Management Strategy for the Northern Territory 2015-2022. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/publications-and-advice/environmental-management
- NT EPA, 2017. Guideline: Recommended Land Use Separation Distances. https://ntepa.nt.gov.au/__data/assets/pdf_file/0006/453192/guideline_recommended_land_separation_distances_oct.pdf
- NT EPA, 2018. Guidance on Adaptive Management. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/622092/guideline_adaptive_management.pdf
- NT EPA, 2019. Environmental impact assessment guidance for proponents: Preparing an environmental impact statement. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/744862/guidance_proponents_preparing_eis.PDF
- NT EPA, 2020a. Environmental impact assessment guidance: NT EPA Environmental Factors and Objectives. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/publications-and-advice/environmental-management
- NT EPA, 2020b. Environmental impact assessment guidance for proponents: Stakeholder Engagement and Consultation. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/publications-and-advice/environmental-management
- NT EPA, 2021. Environmental impact assessment guidance for proponents: Stakeholder Engagement and Consultation. Northern Territory Environment Protection Authority: https://ntepa.nt.gov.au/__data/assets/pdf_file/0005/884696/guidance-proponents-stakeholder-engagement-and-consultation.pdf
- NT EPA, 2022. Waste. https://ntepa.nt.gov.au/your-environment/waste
- NT EPA, 2022. Draft Environmental factor guidance: Culture and heritage. https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1103484/draft-environmental-factor-guidance-culture-and-heritage.pdf
- NT EPA, 2023. Environmental factor guidance: Atmospheric Processes. Greenhouse Gas Emissions https://depws.nt.gov.au/__data/assets/pdf_file/0007/1278511/environmental-factor-guidance-atmospheric-processes-august-2023.pdf
- NT EPA, 2024a Draft Biodiversity Data Policy: https://ntepa.nt.gov.au/__data/assets/pdf_file/0007/1487734/guidance-preparing-biodiversity-data-packages.pdf
- NT EPA, 2024b. Draft Guidance for preparing biodiversity data packages: https://ntepa.nt.gov.au/__data/assets/pdf_file/0007/1487734/guidance-preparing-biodiversity-data-packages.pdf
- NT EPA, 2025a. Draft Environmental factor guidance: Terrestrial ecosystems: https://ntepa.nt.gov.au/consultation/draft-environmental-factor-guidance-terrestrial-ecosystems
- NT EPA, 2025b. Draft Guidelines for assessment of impacts on terrestrial biodiversity: https://ntepa.nt.gov.au/consultation/draft-guidelines-for-assessment-of-impacts-on-terrestrial-biodiversity