

APPENDIX

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DUNGOWAN DAM AND PIPELINE EIS

ESD Pathway Report



Report for EMM Consulting

Ecologically Sustainable Development Pathway: Dungowan Dam and pipeline project

28 September 2022



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Executive Summary

The Dungowan Dam and pipeline project is declared Critical State Significant Infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). As CSSI, the project is subject to Part 5, Division 5.2 of the EP&A Act, which requires the preparation of an Environmental Impact Statement (EIS) and the approval of the NSW Minister for Planning. The EIS has been prepared for the planning approval application for the project.

In addition to requiring approval from the NSW Minister for Planning, the project has been deemed a controlled action under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister for the Environment and Water. The Minister for the Environment and Water has accredited the NSW planning process for the assessment of the project. Therefore, a single EIS has been prepared to address the requirements set out by the NSW Department of Planning and Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water.

It is a requirement of the Planning Secretary's Environmental Assessment Requirements (SEARs) that the project address and incorporate Ecologically Sustainable Development (ESD) in the design, construction and operational phases.

The EIS has been prepared for the planning approval application for the project. EMM Consulting (EMM) has engaged Edge Environment (Edge) to provide sustainability advisory services to the development of the project in order to demonstrate the sustainability commitment expected of an CSSI project with a focus on addressing the SEARs related to ESD.

This report responds to ESD Key Issue 67, 68 and 69 of the SEARs (reference number SSI-10046) as follows:

67. *An assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.*
68. *How ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation¹) will be incorporated in the design and ongoing operation phases of the development.*
69. *Consideration of the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.*

Addressing the abovementioned requirements, this report outlines sustainability materiality issues for the project, ESD approaches, Infrastructure Sustainability (IS) rating estimated scores, and a recommended pathway for sustainability implementation that could be incorporated into the whole lifecycle of the project.

Our approach

Edge conducted a review of the SEARs, relevant NSW Government policies and legislative frameworks, and project documents to understand sustainability requirements for the project. Sustainability materiality assessment was undertaken to identify the sustainability (material) issues of highest priority for internal project stakeholders. Through the IS target development and the gap analysis workshop, consisting of a multi-disciplinary team, estimated IS scores achievable for the project were determined using the IS rating framework. Two ESD approaches for sustainability implementation were presented to the team – IS rating and Environmental Product Declaration (EPD). The IS rating is the most applicable ESD pathway for the Dungowan Dam and pipeline project as it drives the development of the project towards achieving sustainability outcomes, addresses key material issues and aligns with the strategic direction of the NSW government.

The original work for this report was undertaken in late 2020 and reviewed in May 2022 as a result of minor design and construction refinements since the initial assessment. It is also noted during this time, the responsibility for the project delivery was transferred from WaterNSW to Water Infrastructure NSW, a division of the NSW Department of Planning and Environment (DPE). Initial consultation was

¹ The SEARs reference to 'clause 7(4) of Schedule 2 of the Regulation' has now been replaced by Part 8, Division 5, Section 193 of the *Environmental Planning & Assessment Regulation 2021* as outlined in Section 1.3.1.

therefore undertaken with WaterNSW and more recent work has been undertaken with Water Infrastructure NSW.

Key findings

Most sustainability topics were considered by internal stakeholders as very important to extremely important. Topics around people and place were seen as being slightly less important. The IS weighted distribution shows a higher than standard weighting for climate, water use and water discharge, ecology and habitats, heritage values, and stakeholder engagement. Most other credits, including energy, are weighted lower than standard. The distribution of ratings points specific to the project is represented in Figure A by the dark blue bars.

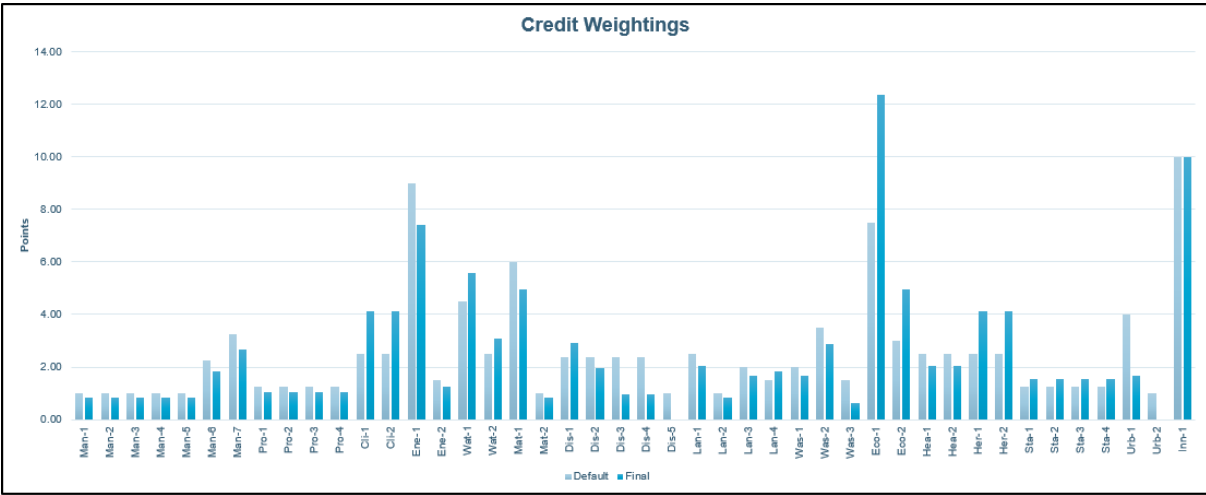


Figure A Default (light blue) and weighted (dark blue) points distribution across IS credits

As can be seen in Figure B, a minimum Business as Usual (BAU) score of 42 was determined to be achievable for the project with minimal investment in time, money, or resources; whereas an aspirational or stretch target score of 67 was determined through increased investment and optimal management of contractor performance. The BAU and stretch target scores are illustrated in Figure B below.

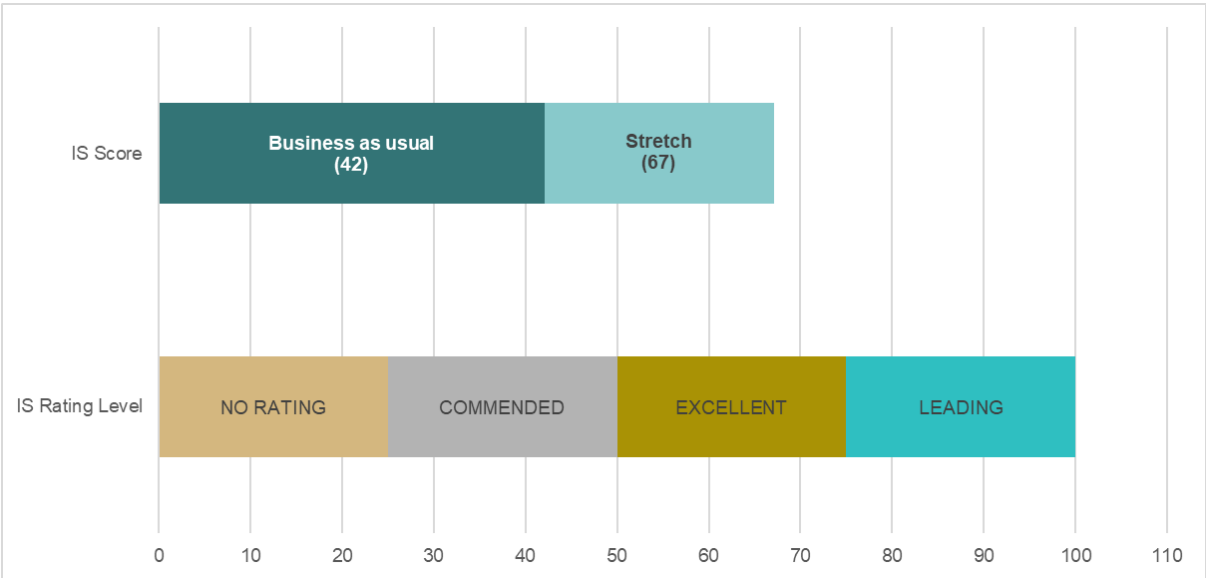


Figure B Summary of potential target IS Scores for the Dungowan Dam and pipeline project.

Recommendations

The outcomes of this report will better inform the sustainability expectations of Water Infrastructure NSW during detailed design and address the SEARs related to ESD. A more comprehensive understanding around sustainability requirements and resource allocation requirements will allow Water Infrastructure NSW to inform decision-making around the project's ESD pathway and provision of wider sustainability outcomes.

ESD principles may be incorporated into the design and ongoing operation of the Dungowan Dam and pipeline project through focused design considering environmental impacts and through a gap analysis against IS ratings as a holistic sustainability rating tool.

The following actions are recommended to ensure that the Dungowan Dam and pipeline project is designed and operated in a way that integrates ESD principles into the decision-making processes to meet the SEARs' requirements.

1. The project target an 'Excellent' rating under the IS Design and As-built rating tool (version 1.2) with an aim to achieve a minimum rating score of 61. Key internal and external stakeholders should be engaged to allow for strategic development of high value, whole of life sustainability initiatives to be integrated into the project.
2. The project incorporate adaptability and resilience into the project design to accommodate future changes and avoid the threats of environmental damage. Resource efficiency, waste minimisation, low carbon emissions, sustainable procurement, stakeholder engagement, cultural heritage protection, and implementation of polluter pay principles must be considered. Ecological impacts should be minimised while habitat connectivity be enhanced. Importantly, the ESD principles should be embedded in delivery of the project and captured in a project Sustainability Plan, which is publicly accessible.
3. Take steps to identify sustainability initiatives and integrate sustainability actions into operational requirements (where relevant), as well as ensuring the ongoing monitoring and review of water, energy and transport efficiency through design, construction and operational phases. Consideration should be given to the balance between resource efficiency, cost-effectiveness, and sustainability outcomes aligned with relevant NSW policies, guidelines and strategic frameworks.

Glossary

BAU	Business As Usual
EIS	Environmental Impact Statement
EPD	Environmental Product Declaration
ESD	Ecologically Sustainable Development
DPE	NSW Department of Planning and Environment
FSL	Full Supply Level
GHG	Greenhouse Gas
GREP	NSW Government Resource Efficiency Policy
IS	Infrastructure Sustainability
ISAP	Infrastructure Sustainability Accredited Professional
ISCA	Infrastructure Sustainability Council of Australia
LCA	Life Cycle Analysis
LGA	Local Government Area
PCR	Product Category Rule
PMF	Probable Maximum Flood
SEARs	Secretary's Environmental Assessment Requirements
CSSI	Critical State Significant Infrastructure
WTP	Water Treatment Plant

1 Introduction

1.1 The project

The Peel River, part of the Namoi River catchment, provides water for irrigation as well as being the primary water supply for the city of Tamworth. Prompted by the millennium drought, investigations into the future water supply and demand for bulk water were undertaken for the regional city of Tamworth and the Peel Valley water users. The Dungowan Dam and pipeline project (the project) is a critical project to improving long-term water security for the region. The project includes a new dam at Dungowan (new Dungowan Dam) approximately 3.5 km downstream of the existing Dungowan Dam and a new section of pipeline about 32 km long between the proposed Dam outlet and the tie in point to an existing pipeline from Dungowan Showground to the Calala Water Treatment Plant (WTP).

In September 2022, the Minister for Planning and Homes declared the project to be Critical State Significant Infrastructure (CSSI) as it is a development that is essential for the State for economic and social reasons. This requires Schedule 5 of the *State Environmental Planning Policy (Planning Systems) 2021* to be updated to reflect the CSSI status of the project. As CSSI, the project is subject to Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which requires the preparation of an environmental impact statement (EIS) and the approval of the NSW Minister for Planning and Homes. The EIS has been prepared for the planning approval application for the project. This ESD pathway assessment has been prepared to support the EIS.

In addition to requiring approval from the NSW Minister for Planning and Homes, the project has been deemed a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister for the Environment and Water. The Minister for the Environment and Water has accredited the NSW planning process for the assessment of the project. Therefore, a single EIS has been prepared to address the requirements set out by the NSW Department of Planning and Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water.

1.2 Project location

The project is located in the Tamworth Regional local government area (LGA), the New England Tablelands bioregion and part of the New England and North West region of NSW, west of the Great Dividing Range (DPE 2017). The New England and North West region is home to approximately 186,900 people and has a total area of around 99,100 km² (ABS 2018).

The city of Tamworth is the nearest (and largest) town to the project with over 40,000 residents. Other nearby regional towns include Quirindi (70 km west), Manilla (90 km north-west), Gloucester (90 km south-east), Armidale (100 km north) and Gunnedah (110 km west of the project).

The existing Dungowan Dam is in the Namoi River catchment approximately 50 km south-east of Tamworth in NSW. The Namoi catchment covers 4,700 km² and borders the Gwydir and Castlereagh catchments and is bounded by the Great Dividing Range in the east, the Liverpool Ranges and Warrumbungle Ranges in the south, and the Nandewar Ranges and Mount Kaputar to the north.

The existing Dungowan Dam is on Dungowan Creek, which is a tributary of the Peel River. Dungowan Creek is confined by the existing Dungowan Dam, while the Peel River system is regulated by Chaffey Dam, located in the upper catchment near the town of Woolomin, approximately 45 km from Tamworth.

The project's regional setting is shown in Figure 1.

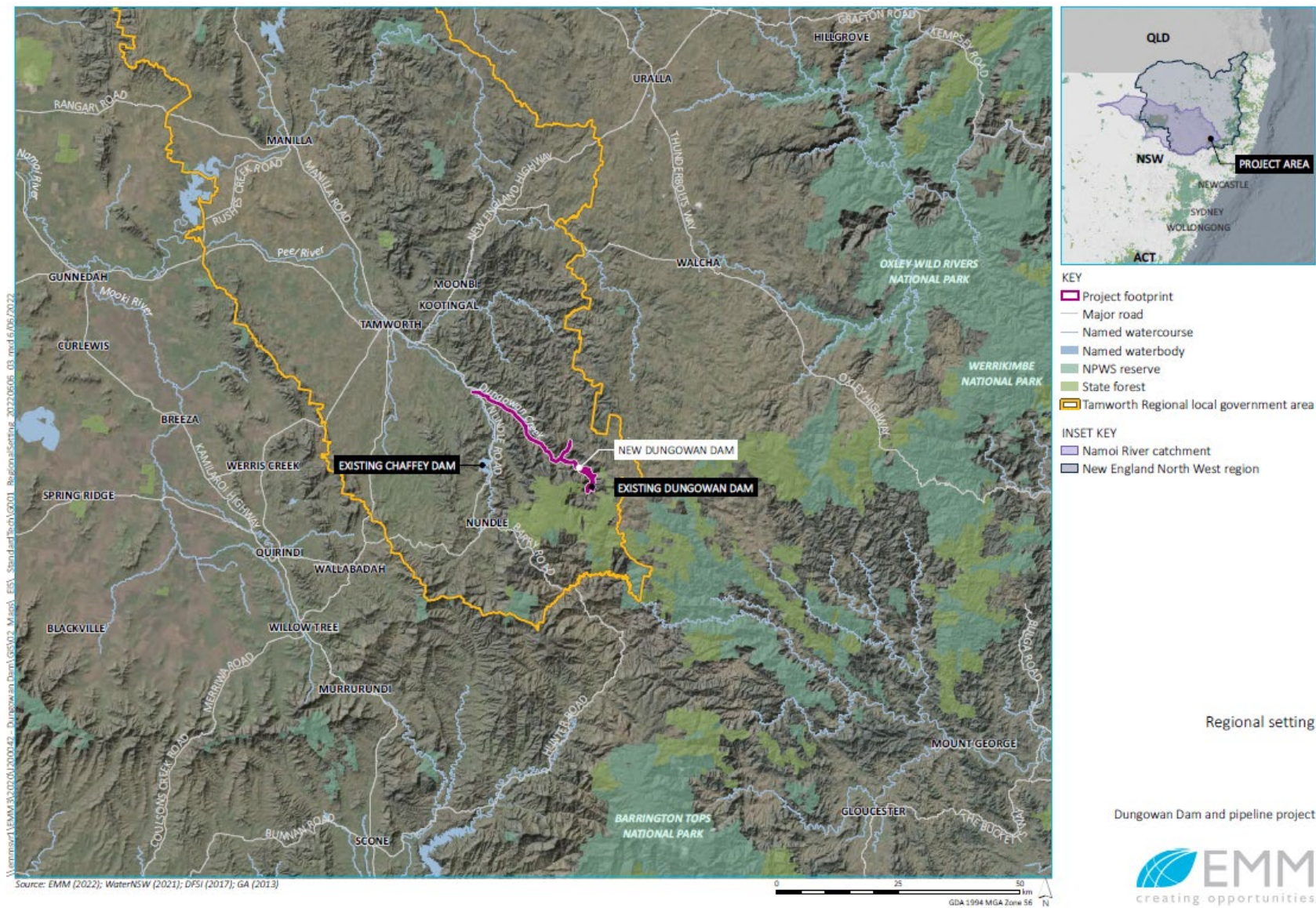


Figure 1 Regional setting

1.2.1 Project impact areas

In outlining the project, a project footprint has been defined to facilitate the assessment of direct impacts from the project:

- Project footprint: all areas where direct impacts may be experienced during construction and/or operation.

The project footprint has an area of 315 ha and is comprised of the construction and operational footprints, of which there is some overlap:

- Construction footprint: areas where vegetation clearing and/or ground disturbance is required for construction of the dam, pipeline and ancillary facilities, including the area needed to decommission and rehabilitate the existing dam.
- Operational footprint: areas where there will be permanent operational elements or easements, including infrastructure needed to operate the new Dungowan Dam and pipeline. The operation footprint includes the inundation area, being the area defined by the proposed full supply level (FSL) for the project.

The project footprint is shown in Figure 2.

Additional areas outside the project footprint have also been considered where relevant to the assessment of project impacts and include:

- Upstream flood extent: An area above the FSL to the level of a probable maximum flood (PMF) event that would be inundated for relatively short periods during operation associated with extreme rainfall events.
- Project area: A 10 km buffer around the project footprint defined to allow for assessment of potential indirect impacts.
- Downstream impact area: the area where hydrological changes may occur due to the project. This area is discussed in detail in the Surface Water Assessment (EMM 2022) as well as other technical reports subject to changed flow regimes as a result of the new Dungowan Dam operation. The downstream impact area includes Dungowan Creek and also the Peel River downstream of Chaffey Dam.

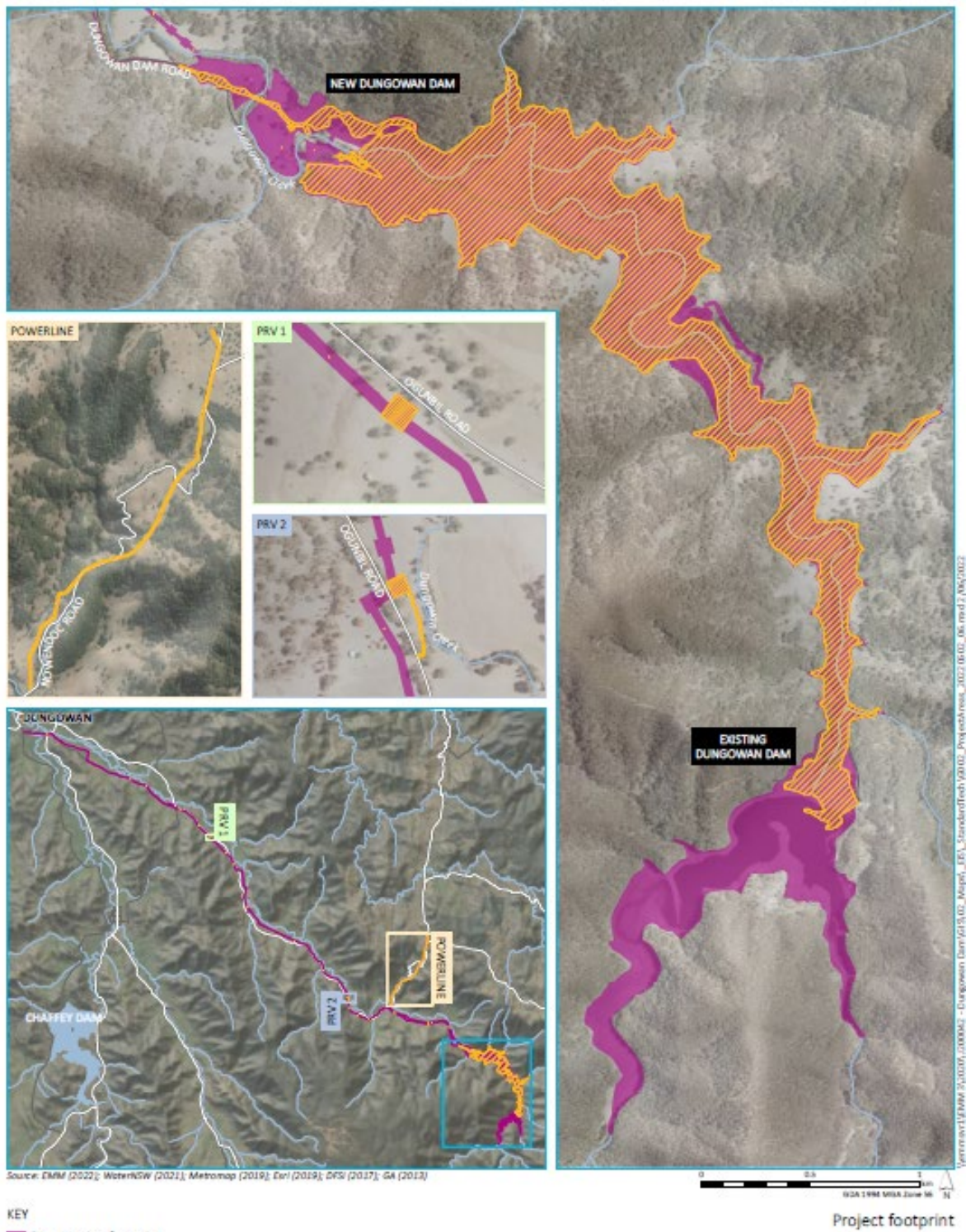


Figure 2 Project footprint

1.3 Purpose and objectives

This report has been prepared to inform the Dungowan Dam and pipeline project's (the project) Ecologically Sustainable Development (ESD) response to the Planning Secretary's Environmental Assessment Requirements (SEARs). The report outlines sustainability materiality issues for the project, ESD approaches, Infrastructure Sustainability (IS) rating estimated scores, and recommended pathway for sustainability implementation that will be incorporated into the future design, construction and operation of the project.

Specifically, this report responds to ESD Key Issue 67, 68 and 69 of the SEARs (reference number SSI-10046) as follow:

67. *An assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.*
68. *How ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation²) will be incorporated in the design and ongoing operation phases of the development.*
69. *Consideration of the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.*

EMM is preparing the Environmental Impact Statement (EIS) for the project, which is being delivered by Water Infrastructure NSW. Edge Environment has been engaged to provide sustainability advisory services to the development of the project in order to demonstrate the sustainability commitment expected of a Critical State Significant Infrastructure project with a focus on addressing the above ESD SEARs. Core methodology used to deliver this project are summarised in Figure 3 and described below.

- Identify sustainability requirements for the project through a review of the SEARs and other relevant NSW Government legislation frameworks;
- Undertake sustainability materiality assessment to identify the material sustainability issues of highest priority for the internal project stakeholders;
- Conduct gap analysis and determine estimated IS scores (business as usual (BAU) and Stretch target) in accordance with IS rating scheme;
- Investigate IS rating and Environmental Product Declaration (EPD) approaches for sustainability implementation and develop assessment criteria for ESD approach identification; and
- Recommend an ESD pathway for the project and sustainability requirements for implementation during procurement and project delivery phase.

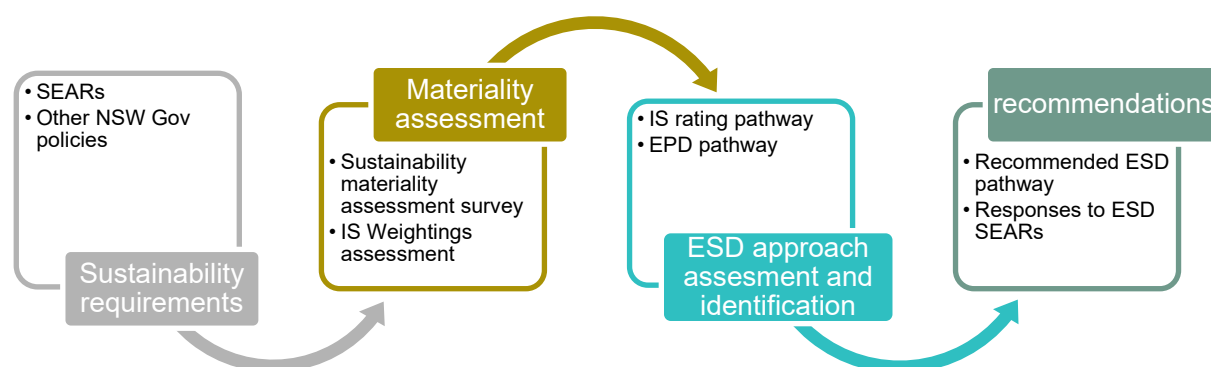


Figure 3 Summary of key steps of Edge's sustainability advisory services to the Dungowan Dam and pipeline project

² The SEARs reference to 'clause 7(4) of Schedule 2 of the Regulation' has now been replaced by Part 8, Division 5, Section 193 of the *Environmental Planning & Assessment Regulation 2021* as outlined in Section 1.3.1.

1.3.1 ESD principles

The principle of ESD is incorporated in various planning and environmental statutes across Australia. The National Strategy for Ecologically Sustainable Development, endorsed by all Australian jurisdictions in 1992, defines the goal of ESD as:

“development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.”

Part 8, Division 5, Section 193 of the *Environmental Planning & Assessment Regulation 2021* identifies the Principles of ESD as follows:

...

(2) The precautionary principle is that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

...

(4) The principle of inter-generational equity is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

(5) The principle of the conservation of biological diversity and ecological integrity is that the conservation of biological diversity and ecological integrity should be a fundamental consideration.

(6) The principle of improved valuation, pricing and incentive mechanisms is that environmental factors should be included in the valuation of assets and services...

These Principles are consistent with those identified in Clause 3A of the EPBC Act. The EPBC Act also identifies reporting requirements for all Commonwealth agencies to report how they are in accord with and contributing to ESD. This at its simplest will involve agencies explaining how they ensured that their activities were undertaken in an environmentally sustainable way. Agencies should also report how they are embedding the above ESD principles into their activities and furthering them on an on-going basis.

In New South Wales, one of the objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act) is to:

“... facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.”

ESD requires “the effective integration of social, economic and environmental considerations in decision-making processes”.³

The above sustainability requirements as well as other NSW policy and legislative frameworks will collectively influence the sustainability response for the development of this project.

1.4 Report structure

The structure of this report follows introduction (Section 1), project description (Section 2), materiality assessment (Section 3), ESD approaches (Section 4), IS target development and gap analysis (Section 5), ESD approach assessment and identification (Section 6) and recommendations (Section 7).

The SEARs that relate to ESD are outlined in Table 1, along with a reference to where the response to each can be found in this report.

³ *Protection of the Environment Administration Act 1991* s 6(2).

Table 1 Relevant matters raised in SEARs

SEAR	Key issue	Report location
67.	An assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.	Section 5 and 7.1
68.	How ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation ⁴) will be incorporated in the design and ongoing operation phases of the development.	Section 7.2
69.	Consideration of the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.	Section 7.3

The outcomes of this report will better inform the sustainability expectations of Water Infrastructure NSW during detailed design and address the SEARs related to ESD.

A more comprehensive understanding around sustainability requirements and resource allocation requirements will allow the Water Infrastructure NSW to better inform decision-making around the project's ESD pathway and provision of wider sustainability outcomes.

⁴ The SEARs reference to 'clause 7(4) of Schedule 2 of the Regulation' has now been replaced by Part 8, Division 5, Section 193 of the *Environmental Planning & Assessment Regulation 2021* as outlined in Section 1.3.1.

2 Description of the project

This chapter provides a summary of the Dungowan Dam and pipeline project. It outlines the permanent infrastructure required to operate the project, as well as the key construction elements and activities required to construct the project. A comprehensive and detailed description of the project is provided as Appendix B1 of the EIS, which has been relied upon for the basis of this technical assessment.

2.1 Project overview

Water Infrastructure NSW proposes to build a new dam at Dungowan (new Dungowan Dam) about 3.5 km downstream of the existing Dungowan Dam and an enlarged delivery pipeline from the new Dungowan Dam outlet to the tie in point to the existing pipeline from Dungowan Showground to the Calala WTP. The existing pipeline from Dungowan Showground to the Calala WTP is not part of the Dungowan Dam and pipeline project. A summary of project elements is provided in Table 2. An overview of the project is provided in Figure 4.

Table 2 Overview of the project

Project element	Summary of the project
New Dungowan Dam infrastructure	Earth and rockfill embankment dam with height of ~58 m and a dam crest length of ~270 m.
	Storage capacity of 22.5 GL at full supply level (FSL) of RL 660.2 m AHD.
	The new Dungowan Dam on Dungowan Creek has a catchment size of 175 km ² and is part of the Peel Valley and Namoi River catchment.
	Inundation extent (to FSL) of 130 ha (1.3 km ²)
	Spillway to the south of the dam wall including an approach channel, uncontrolled concrete ogee crest, chute and stilling basin. Free standing multiple-level intake tower connected with a bridge to the embankment, diversion tunnel with outlet conduit, valve house and associated pipework and valves.
	A permanent access road over the Dam crest to the valve house for operation and maintenance.
	Water diversion works including a diversion tunnel and temporary pipeline and upstream and downstream cofferdams to facilitate construction of the dam wall embankment.
Pipeline infrastructure	31.6 km of buried high-density polyethylene (HDPE) pipe between 710 mm to 900 mm nominal diameter.
	Maximum 71 ML/day from the proposed dam to the junction with the pipeline from Chaffey Dam to the Calala Water Treatment Plant, to replace the existing 22 ML/day pipeline. The pipeline would connect to the valve house on the left abutment of the embankment. Valve infrastructure would include control valves installed in two above ground buildings along the pipeline.
	10 m wide easement for the 31.6 km length of the pipeline. The replacement pipeline extends from the new Dungowan Dam to a connection point with the existing pipeline between Dungowan Showground and Calala WTP.
Ancillary infrastructure and works	Road works to improve existing roads to provide construction access, temporary establishment and use of a construction compound, an accommodation camp, two upstream quarries and four borrow areas within the inundation area.
	A new 4.2 km long 11 kV overhead powerline (including a new easement and access track) connecting to an existing overhead line approximately 6 km north west of the dam. The existing overhead line that extends approximately 13.2 km to the Niangala area would also require minor upgrades, including re-stringing of new overhead wiring and replacement of some poles.
Decommissioning of existing Dungowan Dam	Dewatering of existing dam, removal of existing Dungowan Dam infrastructure and full height breach of the existing Dungowan Dam wall. Rehabilitation of inundation area of the existing Dungowan Dam.

Disturbance	<p>Areas of disturbance have been identified based on the direct impacts of the project. There is some overlap in the areas disturbed during construction and operation, with a resulting total disturbance area proposed for the project of 315 ha (project footprint).</p> <p>Disturbance would occur in a staged manner, with construction requiring disturbance of approximately 315 ha (construction footprint). Following construction and once rehabilitation is completed, there would be a permanent disturbance of approximately 158 ha comprising the inundation area and permanent infrastructure (operational footprint).</p>
Construction	Construction duration of approximately 6 years.
	Construction workforce of approximately 125 workers at construction peak.
Operation	<p>WaterNSW will be responsible for management, operation and general maintenance of the new dam. Tamworth Regional Council will be responsible for the management, operation and general maintenance of the pipeline. Public use and access to the dam would not be permitted and there would be no public facilities available during operation.</p>
	<p>One to two new full time workers plus part time work for existing WaterNSW operations team.</p> <p>Due to the new Dungowan Dam being prioritised over Chaffey Dam for Tamworth's future water supply, the water reserved for town water in Chaffey Dam would increase from 14.3 GL to 30 GL to ensure that water is set aside to meet Tamworth's town water supply water demand in years when rainfall is low.</p>
Design life	100 years for zoned earthen embankment, structural concrete elements of the dam and the pipeline. 15 to 50 years for other non-structural project elements and pavements.
Assessment period (operational)	The assessment end point is when the water system performance reaches a level when an additional water supply option or change to the Water Sharing Plan is required. This has been estimated to be when the mean average annual water demand from Tamworth increases to 11 GL/year.

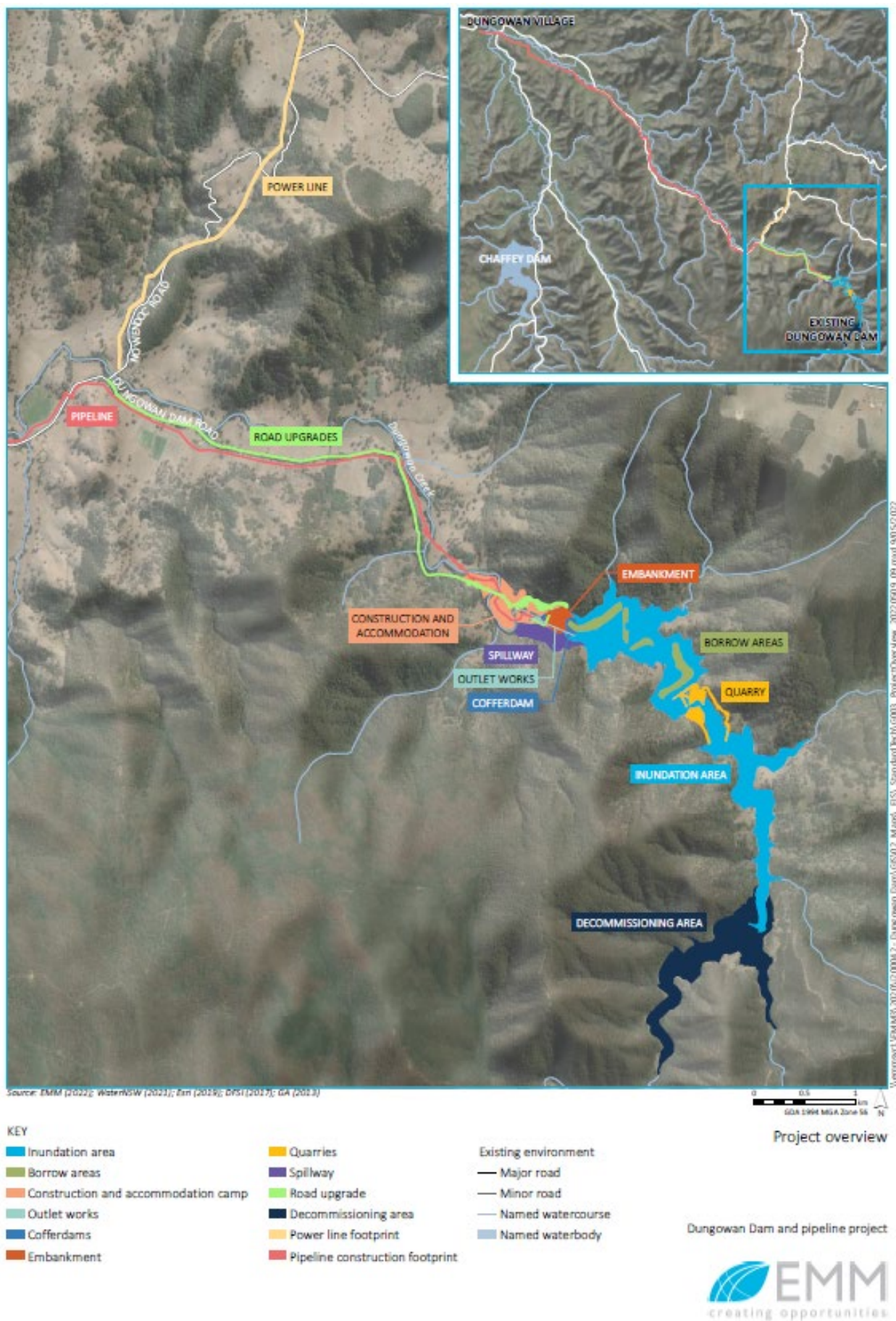


Figure 4 Project overview

3 Materiality assessment

3.1 Overview

A materiality assessment identifies the most important (material) sustainability issues (including both impacts and opportunities) for infrastructure projects and assets. It captures input from stakeholders on the environmental, social, management and governance related topics that they believe should be actively addressed throughout the project lifecycle.

The benefit of a materiality assessment is that it helps structure and prioritise the sustainability approach by identifying which areas of sustainability to focus on. This then informs objectives, targets, indicators and reporting.

3.2 Dungowan Dam and pipeline project materiality issues

The materiality assessment for the project was undertaken on the 9th December 2020 via a stakeholder survey approach covering sustainability themes across both the IS rating tool (more details in Section 4.1) and the SEARs. Following the change in project scope and new information from recent studies, the materiality assessment was reviewed on the 20th May 2022, with participation from EMM Consulting and representative from Water Infrastructure NSW. There was no change in levels of importance or additional material sustainability issues. The materiality assessment questionnaire used for this project is provided in Annexure A.

Of all respondents, nearly half were from the discipline area of environment, followed by design, community engagement and other. Most sustainability topics were considered by internal stakeholders as moderate to extremely important, with knowledge sharing and noise and vibration being of less importance. Areas of management and governance; resources and ecology; emission pollution and waste; and people and place were considered of equal importance. Table 3 shows the results from the materiality assessment survey.

Table 3 Sustainability related topics of high importance for the Dungowan Dam and pipeline project internal stakeholders

Priority	Management and governance	Resources and ecology	Emission, pollution and waste	People and place
Extremely important	<ul style="list-style-type: none"> Whole-of-life approach Environmental compliance 	<ul style="list-style-type: none"> Efficient use of energy Locally sourced materials Geotechnical stability Climate adaptation and resilience Flooding Alternative to potable water during construction phase 	<ul style="list-style-type: none"> Upstream and downstream water resources Water management Land contamination Groundwater contamination 	<ul style="list-style-type: none"> Aboriginal cultural heritage Stakeholder engagement Livelihood displacement Diversity inclusion and equality
Very important	<ul style="list-style-type: none"> Sustainability leadership Auditing and reporting Sustainability procurement 	<ul style="list-style-type: none"> Biodiversity and habitat Efficient use of water Use of low-carbon materials 	<ul style="list-style-type: none"> Material reuse and recycling Waste management 	<ul style="list-style-type: none"> Local employment and skills development Training and education for employees Public domain areas Sustainability rating
Moderate important	Knowledge sharing		Noise and vibration	

It should be noted that the materiality assessment was undertaken with internal stakeholders only.

A more comprehensive materiality assessment involving inputs from both internal and external stakeholders may be considered in the future to allow for strategic development of high value, whole of life sustainability initiatives to be integrated into the project.

4 Ecologically Sustainable Development Approaches

To meet the requirements of the SEARs (Key Issue 67), the project's ESD approach needs to include 'An assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level'.

Two ESD approaches have been considered for the project to satisfy the above requirement:

1. Infrastructure Sustainability Rating - *an accredited ESD rating system*; and
2. Environmental Product Declaration - *an equivalent program of ESD performance*.

4.1 Infrastructure Sustainability (IS) rating

4.1.1 Overview of IS rating

The IS Rating is Australia and New Zealand's only comprehensive rating system for evaluating sustainability across the planning, design, construction and operational phases of infrastructure programs, projects, networks and assets. IS evaluates the sustainability performance of the quadruple bottom line (Governance, Economic, Environmental and Social) of infrastructure development. The rating can be applied in the following project milestones (Infrastructure Sustainability Council of Australia, 2016):

- **Design** – awarded based on the inclusion of design elements and construction requirements for sustainability in project documentation. The rating may be awarded after completion of design. This is an 'interim' rating and must be replaced by an As Built rating after construction.
- **As Built** – awarded for the inclusion of design elements, and construction requirements for sustainability in the project documentation along with the measured sustainability performance during construction and built into the infrastructure asset. This rating is awarded after practical completion of the project and supersedes the Design rating.
- **Operation** – awarded any time during operation of an asset. The Operation rating is based on the measured sustainability performance of the operating infrastructure asset. There is no requirement for the infrastructure asset to have achieved either a Design rating or an As Built rating to achieve an Operation rating. Existing infrastructure assets in operation are eligible to apply for an Operation rating. The Operation rating must be revalidated every five years.

Figure 5 illustrates the timing of the ratings based on a typical infrastructure asset life cycle.

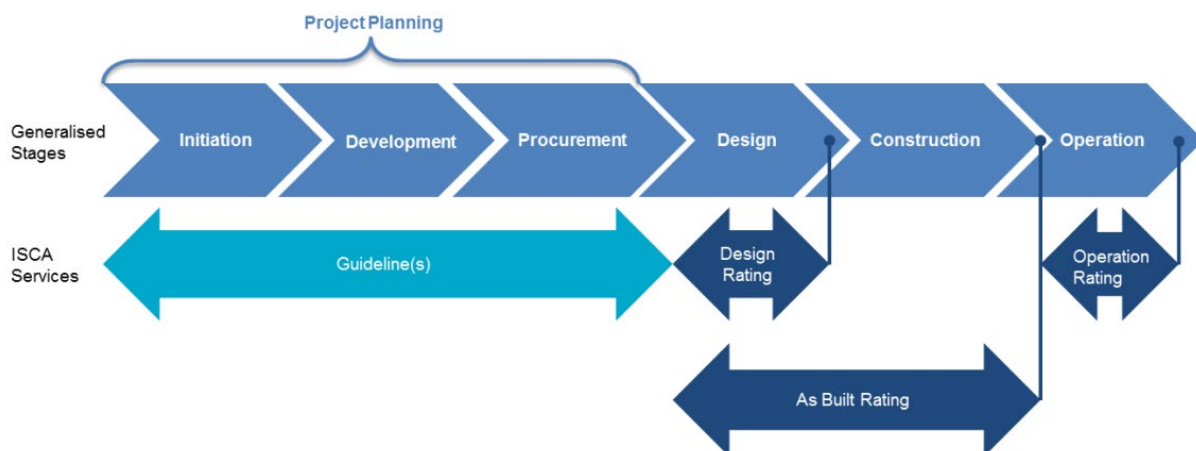


Figure 5 Infrastructure ratings and IS rating types
Source: ISCA Technical Manual V1.2 (p.16)

The IS rating scheme v1.0 was first released in 2012 with IS v1.2 released in 2016 and IS v2.0 released on 1 July 2018. There have been over 100 projects and assets which have registered for or been certified with an IS Rating in Australia and New Zealand. The certified rating is awarded to the defined infrastructure project or asset itself rather than to the organisation that built or sponsored the project. An IS rating can be awarded to a range of infrastructure types, including airports, rail, road, ports, telecommunications, utilities, waste, water and social infrastructure.

The IS rating is a voluntary, third-party assured assessment that evaluates the sustainability performance, and enables industry to be recognised for good performance (Infrastructure Sustainability Council of Australia, 2016). By facilitating the measurement, promotion and sharing of information on sustainability outcomes and how to improve them, IS rating provides the incentives and knowledge required to improve infrastructure outcomes for the community.

4.1.2 IS rating process and framework

The project investigated possible IS ratings to better understand the process and benefits of the system, and to understand what rating the project might be able to achieve. The project has undertaken an IS target Development and gap analysis process, a stakeholder workshop and has ultimately identified estimated IS scores achievable (see Section 5).

Should the project register for the IS rating in the future, the following are the four main stages in the IS rating process:

1. Registration
2. Assessment
3. Verification
4. Certification

The IS rating tool assesses a project or asset based on performance across fifteen categories, grouped into six themes. These are summarised in Table 4. Each category includes credits that address a specific aspect of sustainability performance within the category. Each credit has a weighting and a score associated with each benchmark level. The overall score for the asset is a sum of all the points achieved for each credit. The maximum achievable score is 100 points with the following levels assigned based on the final score (Infrastructure Sustainability Council of Australia, 2016):

- Not eligible to apply for a certified rating: Less than 25 points
- **Commended:** Between 25 and 50 points
- **Excellent:** Between 50 and 75 points
- **Leading:** Over 75 points

Table 4 Rating Scheme Framework (IS Technical Manual v1.2)

Themes	Categories	Abbreviation
Management and Governance	Management Systems	Man
	Procurement and Purchasing	Pro
	Climate Change Adaptation	Cli
Using Resources	Energy and Carbon	Ene
	Water	Wat
	Materials	Mat
Emissions, Pollution and Waste	Discharges to Air, Land and Water	Dis
	Land	Lan
	Waste	Was
Ecology	Ecology	Eco
People and Place	Community Health, Wellbeing and Safety	Hea
	Heritage	Her
	Stakeholder Participation	Sta
	Urban & Landscape Design	Urb
Innovation	Innovation	Inn

4.2 Environmental Product Declaration

4.2.1 Overview of EPD

An Environmental Product Declaration (EPD®) is a registered document that provides relevant, verified and comparable information about the environmental impact of goods and services⁵. It is seen as a standardised way of quantifying the potential environmental impacts of a product or service. EPDs are produced according to a consistent set of rules – Product Category Rules (PCR) – that define the requirements within a given product category. These rules have been developed through an extensive stakeholder consultation process and are in accordance with the international standard ISO 14025 (Type III Environmental Declaration) as they enable transparency and comparability between EPDs (The International EPD System, 2020).

An EPD of an infrastructure project reflects the sustainability of the materials it uses, the construction activities, the utilisation of the asset throughout its life and its decommissioning. An EPD reports environmental data over the life cycle of a product or service. Because EPDs also capture the benefits of resource recovery, such as recycling or reuse of materials, they also report on the circularity potential of the asset.

EPDs can be developed for products, services and built assets, including roads, bridges and tunnels. In Australasia, EPDs are increasingly popular with building products. This is partly due to ISCA's recognition of EPDs as a demonstration of environmental responsibility. More and more leading companies understand the benefits of taking a life cycle-based communication approach for their product environmental profile. Companies may also develop EPDs because they see it as competitive tool, aligning with their corporate strategy and/or responding to a customer expectation. EPD data and information can be used to aid environmental assessment of infrastructure projects (e.g. enabling infrastructure clients to claim ISCA credits for using construction product EPDs).

EPDs are based on a Life Cycle Assessment (LCA) which is an ISO-standardised analysis of the product/system/project from extraction of raw materials to the end of life, or from cradle to grave (Figure 6). LCA can be used to guide decisions and optimise material selection, design and operations of a building/infrastructure's life cycle.

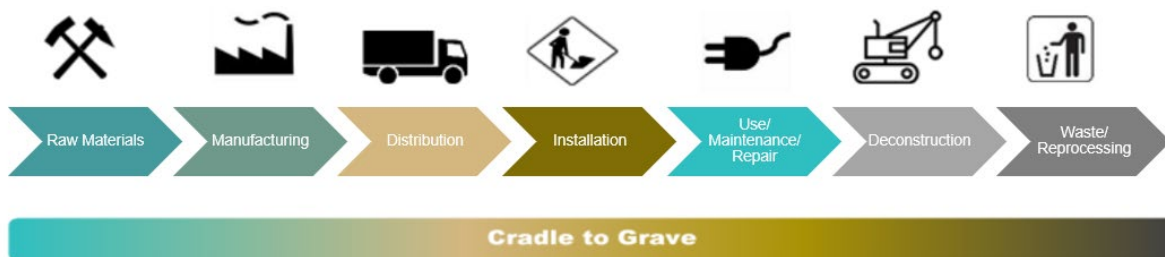


Figure 6 Asset life cycle stages

4.2.2 EPD process

Creating an EPD and getting it registered and published by EPD Australasia includes the following steps:

1. Perform LCA study based on PCR
2. Compile information in the EPD Report based on the LCA
3. Verification
4. Registration and publication with EPD Australasia

All EPDs are verified either by an independent verifier, or by a certification body. The EPD approach was not tested and is beyond the scope of this report. Should the project proceed with the EPD approach, the initiatives will follow an LCA based approach at the detailed design stage considering a 100-year project life. Because EPDs are tools for both sustainable design and performance transparency, they can be embedded at different levels of the project.

⁵ <https://edgeenvironment.com/uptake-of-epds-in-australia>

EPDs can be used to improve and calibrate the environmental impacts of an infrastructure project when products with EPDs are benchmarked and specified into the design, and the whole project rounds up the effort with a EPDs of its own, for each component of the dam project separately.

5 IS Target Development and Gap Analysis

An IS strategy and gap analysis workshop was conducted with key project stakeholders in attendance (see Annexure B and C for workshop participants and worksheets) on the 9th December 2020. The following section presents the workshop results and key findings.

5.1 Weightings assessment summary

A weightings assessment identifies a project's most material sustainability issues based on available information about the project, such as asset life, climate vulnerability, energy, water and material intensity and proximity to pollution receivers. Each credit weighting reflects the credits relative significance and overall contribution to the sustainability performance of the project or asset. The weightings assessment was reviewed on the 20th May 2022 following the change in project scope and updated available information. The results from the review remain similar to that of the original assessment. The detailed weightings assessment and reference documentation is provided in Annexure D (Table 8).

Figure 7 outlines the default distribution of ratings points across the 44 credits for an IS version 1.2 rated project (shown in as light blue bars). The points are redistributed through the weightings assessment process as the relative significance of each is determined. Following the workshop, the distribution of ratings points specific to the project is represented in Figure 7 by the darker blue bars.

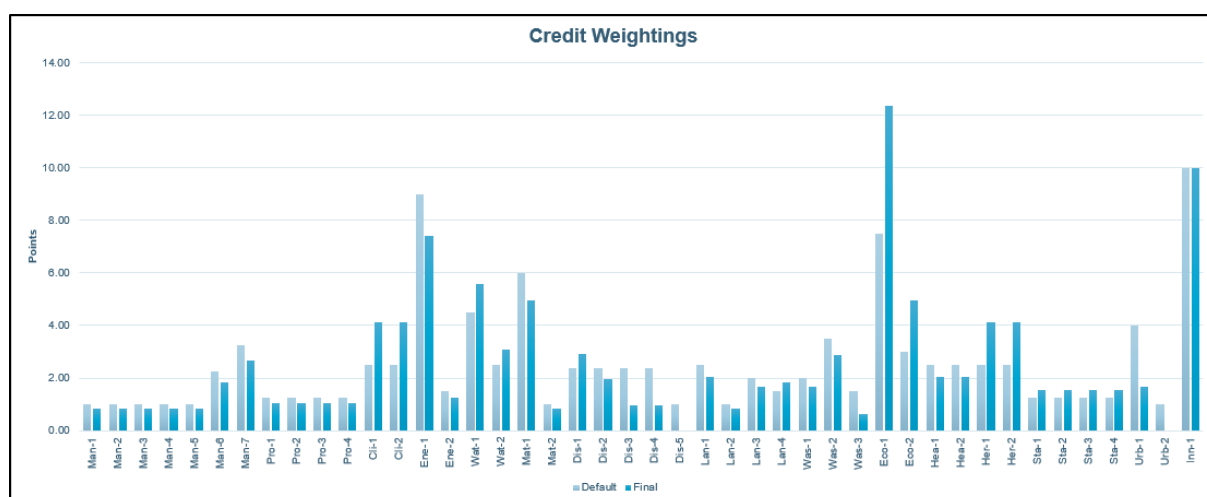


Figure 7: Default (light blue) and weighted (dark blue) points distribution across IS credits

The weighted distribution shows a higher than standard weighting for climate, water use and water discharge, ecology and habitats, heritage values and stakeholder engagement. Most other credits, including energy, are weighted lower than standard. Credits rated as “not material” have been scoped out of the assessment.

Table 5 summarises the materiality scores in the context of the project, using the legend shown below.

	Scoped out (0)
	Low materiality (1)
	Moderate materiality (2)
	High – Very high (3-4)

Table 5 The materiality scores calculated for the Dungowan Dam and pipeline project.

Credits		Credits	
Man-1	Sustainability leadership and commitment	Dis-4	Air quality
Man-2	Risk and Opportunity Management	Dis-5	Light pollution
Man-3	Organisational Structure and Roles & Responsibilities	Lan-1	Previous land use
Man-4	Inspection and Auditing	Lan-2	Conservation of on-site resources
Man-5	Reporting and Review	Lan-3	Contamination and remediation
Man-6	Knowledge sharing	Lan-4	Flooding design
Man-7	Decision Making	Was-1	Waste management
Pro-1	Commitment to Sustainable Procurement	Was-2	Diversion from landfill
Pro-2	Identification of Suppliers	Was-3	Deconstruction/disassembly/adaptability
Pro-3	Supplier Evaluation and Contract Award	Eco-1	Ecological value
Pro-4	Managing Supplier Performance	Eco-2	Habitat connectivity
Cli-1	Climate change risk assessment	Hea-1	Community health and wellbeing
Cli-2	Adaptation measures	Hea-2	Crime prevention
Ene-1	Energy and carbon monitoring and reduction	Her-1	Heritage assessment and management
Ene-2	Use of Renewable Energy	Her-2	Monitoring of heritage
Wat-1	Water use monitoring and reduction	Sta-1	Stakeholder engagement strategy
Wat-2	Replace Potable Water	Sta-2	Level of engagement
Mat-1	Materials lifecycle impact measurement and reduction	Sta-3	Effective communication
Mat-2	Environmentally labelled products and supply chains	Sta-4	Addressing community concerns
Dis-1	Receiving water quality	Urb-1	Urban design
Dis-2	Noise	Urb-2	Implementation
Dis-3	Vibration	Inn-1	Innovation

5.2 IS target development

The outcomes of the workshop showed that a minimum BAU score of 42 was achievable on the project with minimal investment in time, money or resources. An aspirational or stretch target score of 67 was also determined through increased investment and optimal management of contractor performance. Workshop notes and the scorecard are presented in Annexure E and F respectively.

A follow up conversation was undertaken with the EMM project staff and key Water Infrastructure NSW (previously WaterNSW) stakeholders to clarify any data gaps and confirm the IS target scores. The BAU and stretch target scores are illustrated in Figure 8 below.

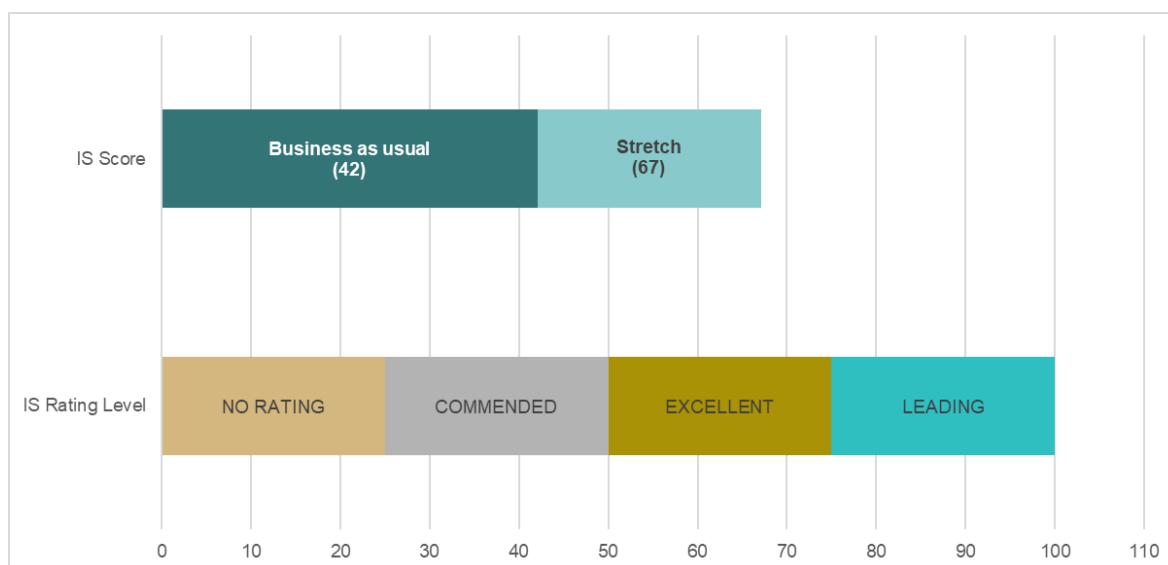


Figure 8 Summary of potential target IS Scores for the Dungowan Dam and pipeline project

The findings from the workshop suggest that it would be challenging to stretch the effort for Man-1, Man-2, Man-7, Pro-3, Dis-3, Dis-4, Lan-3, Sta-2 and Sta-3 credits. This means these credits would unlikely achieve higher performance levels than they already achieve under BAU, even if strategic investment is undertaken. Man-5, Ene-2 and Mat-2 were given a score of 0 but seen to have potential to achieve higher performance levels with additional effort. A copy of the scorecard is provided in Annexure F.

A minimum rating target of 61 was deemed achievable by the project through increased investment in sustainability and optimal management of contractor performance. Further details around a minimum rating target, credit requirements, recommendations and internal responsibilities associated with the delivery of individual IS credits to achieve a minimum score of 61 is outlined in Annexure H.

It is important to recognise that an IS rating will not drive project sustainability. Rather, the IS framework is designed as an indicator of the sustainability initiatives implemented through the delivery of an asset.

6 Ecologically Sustainable Development pathway identification

This section provides a comparative analysis of the IS rating and EPD approaches and the criteria used to guide ESD pathway selection. Detailed information about the two approaches is described in Section 4.

6.1 Characteristics of ESD approaches

Table 6 below summarises characteristics of the IS rating and EPD approaches based on an array of aspects including purpose, performance assessment, benefits, challenges, and costs.

Table 6 Characteristics of IS rating compared to EPD

Aspects	IS rating	EPD
Purpose	To assess the infrastructure performance against the set benchmarks for sustainable delivery and operation	To communicate the environmental impact of a product or service accurately and transparently
Performance assessment	Environment + social / community + governance + management	Environment
Comparability	Yes	No minimum level or preference. Comparable only within the same category of products.
Mandating practice	Mandated by several government agencies e.g. DPE, TfNSW, VicRoads, Main Roads WA, QLD Transport	Voluntary
Benefits	<ul style="list-style-type: none"> Provides a consistent and measurable process for benchmarking sustainability performance Well recognised for performance in project sustainability, project attitude and management commitments Fosters innovation and continuous improvement 	<ul style="list-style-type: none"> Provides a snapshot of resource use and environmental impacts of products and services Demonstrates organisation's genuine commitment to environmental responsibility Helps communicate the environmental credentials to customers and consumers
Challenges	<ul style="list-style-type: none"> Requires corporate buy-in and management commitments Costly and resource-intensive Requires good records and alignment to credits 	<ul style="list-style-type: none"> Commitment to full disclosure (of what is usually confidential information) about how products /services are made Requires data collection and environmental information to conduct LCA Requires expertise in LCA and environmental declarations
Costs	\$\$\$\$\$ (registration + internal resources for the entire project + external consultants)	\$\$\$ (including \$3k per EPD registration + preparing the LCA report + data collection + verification + company registration)
Example in Australia & NZ	The Enlarged Cotter Dam (ACT)	-

6.2 Assessment criteria

Assessment criteria have been developed for the purpose of recommending the ESD pathway for the project. Figure 9 demonstrates our assessment criteria presented to the project stakeholders through a consultation session held on the 3rd February 2021 (see Annexure G for a list of participants).



Figure 9 Assessment criteria for the ESD pathway for the Dungowan Dam and pipeline project

The following describes the assessment criteria in more detail.

1. Benefits and costs associated with the implementation of the approach.

The preferred ESD approach should drive the development of the project towards achieving sustainability outcomes across multiple aspects of sustainability. It should also foster continuous improvement and trigger governance and management commitments. Price is not the sole factor when assessing value for money.

2. The approach selected addresses sustainability materiality issues identified by project stakeholders.

For this project, the following aspects were considered of equal importance:

- stakeholders,
- management and governance,
- resources and ecology,
- emission pollution and waste, and
- people and place.

It is important that the preferred approach addresses these sustainability materiality issues.

3. The approach selected meets the requirements of the ESD SEARs.

The preferred approach must have a minimum target level in accordance with the ESD SEARs Key Issue 67 *'an assessment against an accredited ESD rating system or an equivalent program of ESD performance should include a minimum rating scheme target level'*.

4. The approach selected aligns with the strategic direction of NSW Government.

Not only the preferred approach should meet the SEARs, but also align with the other NSW Government policy, guidelines, and strategic frameworks. These are, for example:

- NSW Sustainable Design Guidelines V3 (TfNSW, 2013)
- NSW Government Climate Change Policy Framework (2016)
- NSW Government Aboriginal Procurement Policy (2018)
- Office of Environment and Heritage NSW Government Resource Efficiency Policy (2019)

- NSW Circular Economy Policy Statement (2019)
- Net Zero Plan Stage 1: 2020–2030
- IS Rating Tool Scorecard relating to energy & carbon for large infrastructure projects, ISCA
- NSW Government Procurement Policy Framework (2020)

The findings based on the above criteria were presented and agreed at the consultation session. Table 7 summarises the results, using the legend shown below. It can be seen in Table 7 that the IS rating is the most applicable ESD pathway for the project.

	Very positive/ high impact
	Low/ medium impact
	Not favourable/ no impact

Table 7 Assessment of the ESD approaches for Dungowan Dam and pipeline project

	IS rating	EPD
Costs		
Challenges		
Benefits		
Social cultural issues		
Environmental issues		
Governance & Management issues		
Economic issues		
ESD SEARs		
WaterNSW SMP		
Other NSW policies and strategies		

7 Recommendations

7.1 Recommended ESD pathway and minimum target

Based on our assessment the most applicable ESD pathway for the project is the IS rating. **It is recommended that the project target an 'Excellent' rating under the IS Design and As-built rating tool (version 1.2).** A score of 51 is sufficient to achieve the 'Excellent' rating, however our recommendation is to include a 10-point buffer above the minimum of 51.

As outlined in Annexure H (Table 9), **a score of 61 is a minimum rating target for this project.** It is noted that efforts above 'business as usual' are required to meet this target.

Recommendations as to whether the project should or could register for IS rating is beyond the scope of this report. Further discussion among the project stakeholders will be required to determine the capability and commitment to a formal IS rating.

7.2 Incorporating ESD principles in the design, construction and operation phases of the project

ESD principles may be incorporated into the design and ongoing construction and operation of the project through focused design considering environmental impacts and through a gap analysis against IS ratings as a holistic sustainability rating tool.

This section describes how ESD principles (as defined in Part 8, Division 5, Section 193 of the *Environmental Planning and Assessment Regulation 2021*) can be incorporated in the design and ongoing construction and operation phases of the project. ESD principles and response to each are outlined below.

7.2.1 The precautionary principle

If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, any decisions should be guided by:

- i. Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- ii. An assessment of the risk-weighted consequences of various options.

Project response: Environmental assessments have been undertaken to understand the potential environmental impacts during the construction and operation of the project. The project has been designed to avoid environmental impacts where practicable, and mitigation measures are proposed to mitigate and manage the impacts where unavoidable. No mitigation measures have been deferred due to a lack of scientific certainty. Any project-related decisions would be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and assessment of the risk-weighted consequences of various options.

7.2.2 Inter-generational equity

The present generation should ensure that the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations.

Project response: Future generations would benefit from the improved security of the water supply to Tamworth and the surrounding area. Environmental assessments have been undertaken to understand the potential environmental impacts that may occur. Appropriate protection, mitigation and/or management have been identified to ensure the health, diversity and productivity of the environment would be maintained. Any project-related decisions would consider the efficient use of resources, waste minimisation, ecological and cultural heritage protection and low carbon emissions.

7.2.3 Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity should be a fundamental consideration.

Project response: The Biodiversity Development Assessment Report and Aquatic Impact Assessment (appended to the EIS) are prepared in accordance with relevant legislation and aim to minimise

significant effect on any threatened species, endangered communities, or their habitat as far as practical. For high or very high ecological values, an ecological management plan (or similar) would be developed and implemented that prioritises minimising ecological impacts and/or enhancing habitat connectivity. Any significant residual impacts on biodiversity would be offset.

7.2.4 Improved valuation, pricing, and incentive mechanisms

Environmental factors should be included in the valuation of assets and services, such as:

- (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
- (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
- (iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Project response: The project has been designed to minimise adverse environmental impacts through option selection process that includes the consideration of environmental factors and avoidance, mitigation or management of environmental impacts where impacts may potentially occur. Any project-related decisions would consider environmental factors in the cost-effective way and be guided by the whole of life costs of providing goods and services.

ESD principles should be embedded in the project through the scope of works and captured in a project Sustainability Plan, which will be publicly accessible.

7.3 Sustainability initiatives to improve resource efficiency and transition to net zero emissions

The ESD objectives encourage a balanced approach to designing infrastructure or assets to be resource efficient and cost-effective in construction and operation and to deliver enhanced sustainability benefits with respect to impacts on the environment and on the health and well-being of stakeholders involved. In this case, the balance should be achieved alongside providing the best possible services for water users.

A net zero future can be achieved through emission reduction pathways, resource efficiency and renewable energy generation. Key sustainability policy drivers for NSW government agencies are:

- The Net Zero Plan Stage 1 2020:2030 outlines the first stage of delivery on the NSW Government's commitment to reach net zero emissions by 2050.
- The NSW Government Resource Efficiency Policy (GREP) aims to reduce NSW government operating costs through improved resource efficiency.

These frameworks help all NSW government agencies achieve their commitment to making NSW a more sustainable, liveable and resilient state. The Net Zero Plan Stage 1: 2020-2030 is the foundation for NSW's action on climate change and aims to deliver a 50% cut in emissions by 2030 and reach net zero emissions by 2050 compared to 2005 levels. The plan will support a range of initiatives targeting energy, electric vehicles, hydrogen, primary industries, technology, built environment, carbon financing and organic waste.

The GREP applies to NSW government agencies and requires agencies to implement resource efficiency measures and to report on their resource efficiency progress annually against GREP to the Department of Planning and Environment. GREP includes measures, targets and minimum standards to drive efficiency in four key areas i.e. water use, energy use, waste management and air quality.

Recommendations for key ESD initiatives for the development of the project are listed below:

Water

- A strong focus on the effective management of water for construction/capital works activities (e.g. rainwater harvesting, onsite reuse and recycling);
- Metering on water monitoring systems for efficiency during construction phase; and

- The sites landscaping to incorporate native, climate resilient and low maintenance vegetation.

Energy

- Energy efficiency considerations throughout the design development process as well as construction and operation phases of the development;
- An energy metering and monitoring strategy to be considered to effectively monitor the main energy uses within the project; and
- The installation of LED lighting and renewable energy sources be considered for all activities needed to support construction and operation.

Waste

- Procurement for civil works and construction to include preference for locally sourced recycled content where possible;
- Waste management plan which identifies waste quantities and types, and measures to minimise waste during construction and operation to be in place;
- Monitoring and reporting of waste to be considered to encourage improved recycling practice and waste reduction target; and
- The demolition and construction waste are reused or diverted to recycling rather than landfill.

Transport

- Effective transport and logistics system that reduces number of vehicles needed to deliver goods and to transport workers to site;
- Logistics management that leads to increased transport efficiency, labour productivity and cost reductions on site as well as down the supply chain; and
- Innovations in the field of logistics planning software, use of ICT, and handling hardware and equipment.

In addition to the above recommendations, the project can achieve this via the design intent of IS rating, specifically Ene-1, Ene-2, Wat-1 and Wat-2 credits.

Improving resource efficiency would help the project reduce operational costs, cut down carbon emissions and transition to a sustainable net zero future.

Bibliography

Infrastructure Sustainability Council of Australia. (2016). *IS Technical Manual Version 1.2*. Sydney, NSW: Infrastructure Sustainability Council of Australian Pty Ltd.

The International EPD System. (2020, January 5). *Environmental Product Declarations*. Retrieved from Envirodec: <https://www.environdec.com/all-about-epds>

Annexure A – Materiality Assessment Survey

The questionnaire consisted of five key questions – closed and opened ended and took no more than 15 minutes to complete. The survey was administered through survey monkey and opened from 19 November to 4 December 2020.

Internal stakeholder – EMM, SMEC and WaterNSW such as project director, planning manager, commercial manager, design manager, engineer, construction manager, environmental manager, stakeholder engagement manager, scientist, geologist and sustainability manager received an invitation to participate in the survey. A total of twelve people responded to the survey. The survey provided is as follows.

Cover page

Thank you for taking part in the materiality assessment for the Dungowan Dam.

As we progress in the planning stage of the Dungowan Dam for WaterNSW, it is important that we capture input from stakeholders on the environmental, social, management and governance related topics that should be actively addressed through project delivery. The benefit of a materiality assessment is around structuring and prioritizing the sustainability approach – what areas of sustainability to focus on throughout the entire life cycle of the assets. This then informs objectives, targets, indicators/metrics and reporting.

The survey consists of four key questions and should take no longer than 15 minutes to complete.

Your participation in this survey is greatly appreciated.

Question 1: What is your discipline area?
[check the most appropriate]

- | | |
|--|--|
| <ul style="list-style-type: none">○ Planning○ Hazard, risk and safety○ Sustainability○ Environment○ Commercial | <ul style="list-style-type: none">○ Design○ Construction○ Heritage○ Community and stakeholder engagement○ Other (please specify) |
|--|--|

Question 2: What organization do you belong to?

- WaterNSW
- SMEC
- EMM Consulting

Question 3: How important do you believe the following topics are to the delivery of sustainability outcomes for the Dungowan Dam?

Outlined below are a list of governance, environmental and social related issues (including both impacts and opportunities) relevant to the delivery of the Dungowan Dam. On a scale of 1-5, please rate each of the following topics based on its relative level of importance (1 not at all important, 2 somewhat important, 3 moderately important, 4 very important, and 5 extremely important).

Management, commercial and governance

Management and governance involve the establishment and oversight of the project or asset's purpose, systems, structure and processes, and their implementation for the effective delivery and operation of infrastructure.

	1	2	3	4	5	No opinion
Sustainability leadership and commitment (Influences that ensures the alignment and commitment to issues pertaining to sustainability e.g. binding policies and commitments linked to objectives and targets)						
Regular inspection, auditing, reporting, and review (Monitoring of systems and processes to ensure high standards are maintained throughout the project life cycle)						
Risk management, assurance, and continuous improvement						
Sustainable procurement and supply chain sustainability (Based on the entire life cycle of the goods and services required, taking into account associated financial consideration, environmental impacts and social risks or benefits)						
Whole-of-life approach to sustainability initiatives (Considering all aspects and potential impacts of the implemented sustainability initiative throughout the construction and operational phase of the project)						
Knowledge sharing activities (Building and expanding on current knowledge bases through the sharing of ideas and collaborating with others e.g. lessons learned session, training sessions, etc.)						
Environmental compliance (Adhering to environmental laws, regulations, standards, and other requirements such as maintaining an environmental license or permit to operate)						

Using resources

Infrastructure projects are large consumers of water, energy, and material resources that require careful consideration in order to ensure that they are optimally utilised.

	1	2	3	4	5	No opinion
Efficient use of water (Monitoring water use and undertaking measures to minimise or avoid water usage)						
Alternatives to potable water (Reducing the reliance on mains connected water e.g. site rainwater tanks installation where viable)						
Efficient use of energy (Monitoring energy use and undertaking energy saving measures to ensure that emission-related to creating energy are curbed)						
On-site renewable energy (e.g. use of PV panels at site offices)						
Off-site renewable energy (e.g. green power purchasing agreements)						
Use of low carbon materials (e.g. use of products with Environmental Product Declaration's and life cycle assessment consideration)						
Locally-sourced materials (Procuring resources required for the construction of the project as close as practically and feasibly possible to the asset)						

Emissions, pollution, and waste

Infrastructure projects have the potential to be large contributors to Greenhouse Gas (GHG) emission and pollution which may significantly impact the natural environment.

	1	2	3	4	5	No opinion
Impacts on upstream surface and groundwater resources						
Impacts on downstream surface and groundwater resources						
Water quality						
Water management						
Air emissions and dust reduction						
Pollution related to transport emissions						
Land contamination (including topsoil and subsoil)						
Groundwater contamination						
Noise generating activities						
Vibration generating activities						
Waste management, storage and disposal						
Waste from decommissioning of existing dam						
Diversion of waste to landfill						
Materials reuse and recycling						

Biodiversity, land and ecology

	1	2	3	4	5	No opinion
Soil and land capability of the site and surrounds (including stability, acid sulphate soils, salinity, erosion, acid drainage from waste rock, overburden, spoil, and excavated areas)						
Geotechnical stability						
Terrestrial biodiversity and habitats						
Aquatic and riparian biodiversity and habitats						
Downstream and environmental flows						
Upstream inundation						
Vegetation clearing						
Erosion and sedimentation						
Flooding						

Climate Change

	1	2	3	4	5	No opinion
Climate change related risks (e.g. bushfire, drought, flooding, heatwave etc)						
Climate change adaptation						
Climate change resilience						

People and place

People and Place looks at the relationship between people and their environments, and the effects that the construction and operation of the project might have on the local and broader community.

	1	2	3	4	5	No opinion
Aboriginal cultural heritage						

Construction and operational traffic impacts						
Temporary or permanent river closures						
Access to private property						
Resettlement						
Local livelihoods and economic displacement						
Visual impacts associated with the construction of infrastructure						
Community and stakeholder engagement						
Economic development of the local community						
Skills development and employment of a local workforce						
Human rights and modern slavery compliance						
Diversity, inclusion and equality						
Continual development and upskilling opportunities for employees						
Public domain areas and linkages						
Water Sensitive Urban Design						
Infrastructure Sustainability rating tools and guidance – e.g. ISCA						

Question 4: Are there any specific topics mentioned above that you believe will significantly decrease or increase in importance during the delivery of the Dungowan Dam over the next 3-5 years?

Question 5: Are there any other sustainability topics not mentioned above that you feel should be specifically addressed throughout the project life cycle?

Annexure B – Workshop attendance

Date: 9 December 2020

Time: 10-11.30am

Method: Zoom meeting

A list of workshop participants and their roles.

	Name	Roles	
1	Katherine Marshall	Major Infrastructure Delivery – Project Development Manager – Dungowan Dam	WaterNSW
2	Martin Hicks	Major Infrastructure Delivery – Planning and Environment Manager	WaterNSW
3	Clive Saunders	Major Infrastructure Delivery – Dams Engineer	WaterNSW
4	Marius Jonker	Major Infrastructure Delivery – Subject Matter Expert - Dams	WaterNSW
5	Peter Campbell	Maintenance Engineer Manager	WaterNSW
6	Mark Trudgett	Associate Environmental Scientist	EMM
7	Craig Wiltshire	Principal Engineer - Dams	SMEC
8	Daryl Brooks	Acting Regional Manager North, Asset Maintenance & Services	WaterNSW
9	Robert Cawley	Environmental Adviser	WaterNSW
10	Lara Hess	Major Infrastructure Delivery – Planning & Approvals Manager – Dungowan Dam	WaterNSW
11	Brian Mayhew		WaterNSW
	Edge Environment		
1	Prae Wongthong	Sustainability Consultant	Edge Environment
2	Charlotte Wang	Senior Sustainability Consultant	Edge Environment
3	Ben Hale	Senior Sustainability Consultant	Edge Environment
4	Viv Heslop	Head of Sustainability Delivery	Edge Environment

Annexure C – IS credits worksheet

This Annexure presents an example of worksheet that was used as part of the IS Strategy Development exercise at the workshop.

MANAGEMENT SYSTEMS

Man-1 Sustainability leadership and commitment

Aim

To reward a commitment to sustainability

Criteria

	Level 1	Level 2	Level 3
Benchmark	There are commitments to mitigating negative environmental, social and economic impacts. AND These commitments are embedded into sustainability objectives and/or targets.	The requirements for Level 1 are achieved AND The sustainability objectives and/or targets are reflected in project contracts.	The requirements for Level 2 are achieved AND The sustainability commitments go beyond mitigating negative impacts to restorative actions (i.e. net positive benefits for society and the environment). AND The sustainability commitments are publicly stated.
Evidence	Sustainability policy or equivalent. Management plans showing objectives and/or targets.	The evidence for Level 1. Project contracts.	The evidence for Level 2. Evidence that the policy (or equivalent) has been made public.

	Level	Comments & opportunities
Target - Achievable with minimal additional effort		
Stretch target - Achievable with significant additional effort		

BAU

Stretch

Annexure D – IS Weightings Assessment

Reference documents used for the weightings assessment include:

- Dungowan Dam and pipeline project Technical Report, Detailed Project Description version 1 (dated 8 April 2022)

Table 8 Weightings assessment and reference documentation

Credits	Question	Response	Reference document section / description
Man - 7	Is this a small project (<\$20 M) with no substantial issues to be decided upon?	No	The cost of this project will be over \$20 million.
Cli - 1 Cli - 2	What is the design or remaining asset life?	Long (>50 years)	100-year design life for key components
	Is the asset located in an area close to the sea, on a flood plain, prone to bushfires, prone to cyclones, or prone to droughts?	Yes	The asset is located in an area prone to bushfires, prone to droughts and on a floodplain.
Ene - 1	What is the infrastructure asset type?	Water (supply)	Dungowan Dam
Ene - 2	Does the construction/maintenance involve earthmoving, tunnelling and/or use of diesel plant and equipment (i.e. energy intensive)?	Yes	The construction involves land clearing and earthworks and use of construction plant and equipment, including vehicles required to transport staff and materials to the site. The works also involve full decommissioning of the existing dam.
Wat - 1 Wat - 2	Does the asset operation/ maintenance have high water use requirements, such as cooling, washing, public ablution facilities or other processes?	No	The operation/maintenance does not have high water use requirements. Only some routine washing down of equipment in the tower and tunnel.
	Does the asset/network have high water use requirements for construction/capital works activities such as dust suppression, washing, pavement compaction, concrete or other processes?	Yes	The asset/network have high water use requirements for construction/capital works activities.
	Is the asset located in an area subject to water scarcity (e.g. drought prone, or had previous water restrictions)?	Yes	The project is located in drought prone area.
Mat - 1	As a percentage of the capital value of the project, what is the percentage spend on materials in the construction phase?	Medium (10%-50%)	

Credits	Question	Response	Reference document section / description
Mat -2	As a percentage of the annual operational expenditure of the asset, what is the percentage spend on materials, including maintenance?	Low (<10%)	
Dis -1	Does the project/asset discharge to a waterway/ waterbody/ groundwater?	Yes	The project/asset discharge to a waterway and could adversely impact water users, aquatic and terrestrial ecology downstream.
	Is there a risk of pollution to waterways from discharges (including groundwater)?	Yes	There is a risk that sediments infiltrated with agrichemical residue may enter surface water runoff and ultimately contaminating nearby waterways.
	Are the receiving waters sensitive and/or highly valued?	Yes	Dungowan Creek is waterway that is classified as Key Fish Habitat and contains threatened aquatic species and other value species including platypus.
Dis - 2	What is the infrastructure asset type?	Water (supply)	Dungowan Dam
	Does the construction/ maintenance/ operation involve noisy activities (piling, grinding, rock hammering, demolition, blasting, tunnelling)?	Yes	The primary noise impacts would occur during construction as a result of construction plant and equipment, construction activities and increased vehicle movements.
	How close are noise receivers?	Close (<100 m)	Noise receivers to the proposed pipeline works are within 100 m.
Dis - 3	Does the construction/ maintenance/ operation involve piling, grinding, rock hammering, demolition, blasting, tunnelling (vibratory activities)?	Yes	The construction involves vibratory activities.
	How close are vibration receivers?	Distant (>20 m)	Nearest residences will be >1 km away from the key vibration intensive earthworks. There would be some minor vibration activities associated with the pipeline and road construction that will be 10-100 m away, but vibration will be manageable to avoid property damage.
Dis - 4	What is the infrastructure asset type?	Water (supply)	Dungowan Dam
	Does the construction involve significant earthmoving, tunnelling and/or use of diesel plant and equipment (i.e. air emission)?	Yes	The construction involves significant earthmoving, tunnelling and use of diesel plant and equipment and could have impacts on air emission.
	Is the asset located in a densely populated area?	No (non-urban)	The land either side of Dungowan Creek is sparsely populated and is largely used for agriculture and pastoral activities.
Dis – 5	What is the infrastructure asset type?	Water (supply)	Dungowan Dam
	Does the construction/ maintenance/ operation involve nightworks which requires lighting?	Yes	The construction involve nightworks which requires lighting.

Credits	Question	Response	Reference document section / description
	How close are light receivers?	Distant (>100 m)	The sensitive receivers appear to be over 1 km away from the proposed light spill areas (including new dam construction area, construction compound and accommodation camp), and no sensitive receives have line of sight to these areas
Lan - 2	Is there uncontaminated topsoil and/or subsoil present that will be disturbed by construction/ maintenance?	Yes	Soils would be disturbed following the de-watering of the existing dam, revegetation works, during construction of the pipeline and excavation of the new dam wall embankment foundation.
Lan - 3	What is the contamination risk associated with the project/asset?	Present and low	There are no known contaminated land issues within the project footprint. The low level contamination risk associated with the project/asset relate to agrichemical residue and sediments entering surface water runoff.
Lan - 4	Is the asset located on or near a flood plain or is stormwater drainage a known issue?	Yes	The asset is located on a floodplain.
	Are there sensitive land uses upstream or downstream of the asset?	Yes	There are sensitive land uses upstream and downstream of the new Dungowan Dam and pipeline alignment.
Was - 1	As a percentage of the capital value of the project, what is the percentage spend on materials in the construction phase?	Medium (10%-50%)	
Was - 2	As a percentage of the annual operational expenditure of the asset, what is the percentage spend on materials, including maintenance?	Low (<10%)	
	Does the construction/ maintenance involve earthmoving, tunnelling, demolition, spoil removal or vegetation cleaning (i.e. waste generating activities)?	Yes	The construction involves waste generation activities from earthmoving, tunnelling, demolition, spoil removal and vegetation cleaning.
Was - 3	What is the design or remaining asset life?	Long (>50 years)	
	Percentage of spend on materials (across the infrastructure lifecycle)	Medium (10%-50%)	
	Is the asset likely to be adapted/upgraded or decommissioned during its life?	Yes	
Eco - 1	Percentage of construction land take that is ecological habitat.	High (>30%)	Construction land take that is ecological habitat is more than 30%
Eco - 2	Proximity to nearby ecological habitat.	Adjacent	
Hea - 2	Is there public interaction around the project construction site?	Yes	The dam and compound is >1 km from the nearest residence but the pipeline will run through many private properties.

Credits	Question	Response	Reference document section / description
Her - 1 Her - 2	Are there heritage sites or objects (indigenous or non-indigenous) within or nearby to the asset?	Yes	A number of non-indigenous heritage sites have been identified within and surrounding the project footprint. A Statement of Heritage Impact (SOHI) has been developed to describe and minimise potential impacts. An Aboriginal Cultural Heritage Assessment (ACHA) has been developed for the project that identifies a number of heritage sites within the project footprint
	Are there heritage sites or objects that are highly valued by stakeholders?	Yes	A number of sites and areas have been identified as highly valued by stakeholders. The SOHI and ACHA detail the measure to avoid impacts where possible and also to mitigate any unavoidable impacts. Both have been developed in consultation with relevant stakeholders.
Sta – 1 Sta – 2 Sta – 3 Sta – 4	Is there stakeholder interest in the project/asset?	Yes	The broad stakeholder groups identified are: <ul style="list-style-type: none"> • Land holders; • Aboriginal groups, including Local Aboriginal Land Councils and other traditional owners; • industry and interest groups, including business, tourism, recreation, utilities and other interests; • government, including local, state and Commonwealth Members of Parliament and regulatory authorities; • general public; and • media
Urb – 1	What is the infrastructure asset type?	Water (supply)	Dungowan Dam
Urb – 2	Is the asset located in a densely populated area?	No (non-urban)	The land either side of Dungowan Creek is sparsely populated and is largely used for agriculture and pastoral activities.

Annexure E – Workshop notes

This Annexure presents notes from the workshop.

Credit	BAU comments / workshop notes	Stretch target comments / workshop notes
Total		
Man-1	Corporate policies - environmental? principles. Objectives and targets document. PMO developing policies that underpin all projects. Overlay of EIS, legislative requirements. Principles in design, do in construction contract.	No comment
Man-2	No comment	No comment
Man-3	No comment	No comment
Man-4	Construction managers do this on small projects. For project of this scale, it would be built in.	No comment
Man-5		Limited to environmental – so would need to expand.

Credit	BAU comments / workshop notes	Stretch target comments / workshop notes
Man-6	Knowledge sharing is happening within 3 dams already.	
Man-7	Social impact assessments, benefits realisation, needed for SBC, gateways with INSW.	No comment
Pro-1	No comment	No comment
Pro-2	No comment	No comment
Pro-3	No comment	No comment
Pro-4	No comment	No comment
Cli-1	No comment	No comment
Cli-2	No comment	No comment
Ene-1	Should be a clause requiring plant and equipment being well maintained and good performance. Could be requested (audit of fuel use)	Potential for embankment slope optimisation (dependent on rock quality)
Ene-2	Some equipment would need stable power source. Lighting might be possible (e.g. offices during construction). Not much night works (preferably to be avoided, specified working hours constrain).	No comment
Wat-1	Water source is likely to be the existing dam (non-potable) for building the embankment and also ready-mix concrete batch plant (water quality requirements). Haul road dust suppression.	Additives can be used to suppress the dust. Fill material needs to be optimised anyway. At site, water treatment works to treat surface water and runoff (sewage will be carted offsite). Worker accommodation.
Wat-2	Construction can use non-potable. Drinking water will be brought in by tanker. Operational.	
Mat-1	No comment	As long as it doesn't reduce quality or longevity. Materials drawn from the basin (minimise materials from outside the basin). There will be an investigation into sands and gravel in the basin to determine whether they can be used. Use of crushed glass as a replacement sand material (in road applications). Use of shredded tires as filter material and wearing coarse aggregate for roads.
Mat-2	There are quarries that SMEC have been talking to	
Dis-1	Construction impacts and project's aim is to reduce impacts. Flooding assessment are being finalised.	Confirmation of environmental flow releases will feed into water quality understanding.
Dis-2	N&V plans and EIS entries are being finalised currently.	
Dis-3	Reports are likely to be a contractual requirement for the contractors. N&V Assessment will id sensitive receivers and structures.	Assumption is that Level 3 will be scoped out.
Dis-4	Management controls on construction timing, etc. EIS will prescribe basic dust management requirements but they will then be left to the contractor to implement and strengthen.	No comment
Dis-5	No comment	No comment
Lan-1	Some trees will be knocked down – are they considered previously grazed? Assuming 25% of land previously disturbed.	No comment
Lan-2	Will be reusing topsoil as need to rehabilitate the upstream (existing) dam. The soil would be ameliorated. Would make maximum use of whatever topsoil can. Will remove topsoil from whole area of the dam. Will also take topsoil off the borrow areas. Any organic material won't go back into the dam. Area: 400 m x 300 m = 120,000 m ² . Area to be rehabilitated is 600,000 m ² (import likely)	No comment

Credit	BAU comments / workshop notes	Stretch target comments / workshop notes
Lan-3	Limited exposure onsite (ASS and PAS). Would advise the contractor of the risk of encountering on site. They would need to test for it and provisions in the spec to treat on site. <i>There is potential for sediment contamination in the basin of the existing dam. In the design of the decommissioning of the dam keeping a pool that would contain the (potential) sediment (Note: No longer relevant. Recent studies demonstrate no sediment contamination in the basin of the existing dam).</i>	No comment
Lan-4	No comment	Technically the new dam will provide better flood risk mitigation in the downstream area.
Was-1	No comment	No comment
Was-2	No comment	No comment
Was-3	No comment	No comment
Eco-1	Assessment is underway – offsets are being discussed and have yet to be finalised.	Rehabilitation of original dam site and offsets.
Eco-2	No comment	Awaiting confirmation from Ecological Assessment. Offset investigation might highlight possible connectivity gains.
Hea-1	No comment	No comment
Hea-2	No comment	No comment
Her-1	Heritage assessment has been undertaken with community involvement. Plans are in place to minimise heritage.	Impact assessment to try to find further mechanisms.
Her-2	No comment	No comment
Sta-1	No comment	No comment
Sta-2	No comment	No comment
Sta-3	No comment	No comment
Sta-4	No comment	No comment
Urb-1	Limited access to the public. Might engage architect for camp.	No comment
Urb-2	No comment	No comment
Inn-1		

Annexure F – Scorecard

Credit	Name of credit	Materiality Score	Score Possible	No. Levels	Target Level	Target Score	Working Level	Working Score	Assessed R1 Level	Assessed R1 Score
Σ	Total		110 pts			42.1 pts		0.0 pts		67.1 pts
8	Rating		Leading			Commen		Ineligible		Excellent
Man	Man-1 Sustainability leadership and commitment	2	0.82	3	2	0.55	0	0.00	2	0.55
	Man-2 Risk and opportunity management	2	0.82	2	2	0.82	0	0.00	2	0.82
	Man-3 Organisational structure, roles and responsibilities	2	0.82	2	1	0.41	0	0.00	2	0.82
	Man-4 Inspection and auditing	2	0.82	2	1	0.41	0	0.00	2	0.82
	Man-5 Reporting and review	2	0.82	3	0	0.00	0	0.00	1	0.27
	Man-6 Knowledge sharing	2	1.85	3	1	0.62	0	0.00	2	1.23
	Man-7 Decision-making	2	2.68	3	2	1.79	0	0.00	2	1.79
Pro	Pro-1 Commitment to sustainable procurement	2	1.03	3	1	0.34	0	0.00	2	0.69
	Pro-2 Identification of suppliers	2	1.03	3	1	0.34	0	0.00	3	1.03
	Pro-3 Supplier evaluation and contract award	2	1.03	3	2	0.69	0	0.00	2	0.69
	Pro-4 Managing supplier performance	2	1.03	3	1	0.34	0	0.00	2	0.69
Cli	Cli-1 Climate change risk assessment	4	4.12	3	1	1.37	0	0.00	2	2.75
	Cli-2 Adaptation options	4	4.12	3	1	1.37	0	0.00	2	2.75
Ene	Ene-1 Energy and carbon monitoring and reduction	2	7.42	3	1.0	2.47	0.0	0.00	1.5	3.71
	Ene-2 Renewable energy	2	1.24	3	0.0	0.00	0.0	0.00	1.0	0.41
Wat	Wat-1 Water use monitoring and reduction	3	5.56	3	1.0	1.85	0.0	0.00	2.0	3.71
	Wat-2 Replace potable water	3	3.09	3	2.7	2.78	0.0	0.00	2.7	2.78
Mat	Mat-1 Materials footprint measurement and reduction	2	4.95	3	1	1.65	0	0.00	2	3.30
	Mat-2 Environmentally labelled products and supply chains	2	0.82	3	0	0.00	0	0.00	1	0.27
Dis	Dis-1 Receiving water quality	3	2.94	3	2	1.96	0	0.00	3	2.94
	Dis-2 Noise	2	1.96	3	2	1.31	0	0.00	3	1.96
	Dis-3 Vibration	1	0.98	3	2	0.65	0	0.00	2	0.65
	Dis-4 Air quality	1	0.98	3	2	0.65	0	0.00	2	0.65
	Dis-5 Light pollution	Scoped Out								
Lan	Lan-1 Previous land use	2	2.06	3	1.0	0.69	0.0	0.00	1.0	0.69
	Lan-2 Conservation of on site resources	2	0.82	3	3	0.82	0	0.00	3	0.82
	Lan-3 Contamination and remediation	2	1.65	3	1	0.55	0	0.00	1	0.55
	Lan-4 Flooding design	3	1.85	2	1	0.93	0	0.00	2	1.85
Was	Was-1 Waste management	2	1.65	2	1	0.83	0	0.00	2	1.65
	Was-2 Diversion from landfill	2	2.89	3	1	0.96	0	0.00	3	2.89
	Was-3 Deconstruction/ Disassembly/ Adaptability	1	0.62	3	3	0.62	0	0.00	3	0.62
Eco	Eco-1 Ecological value	4	12.36	3	1	4.12	0	0.00	2	8.24
	Eco-2 Habitat connectivity	4	4.95	3	1	1.65	0	0.00	2	3.30
Hea	Hea-1 Community health and well-being	2	2.06	3	0	0.00	0	0.00	0	0.00
	Hea-2 Crime prevention	2	2.06	2	0	0.00	0	0.00	0	0.00
Her	Her-1 Heritage assessment and management	4	4.12	3	1	1.37	0	0.00	2	2.75
	Her-2 Monitoring and management of heritage	4	4.12	3	2	2.75	0	0.00	2	2.75
Sta	Sta-1 Stakeholder engagement strategy	3	1.55	3	2	1.03	0	0.00	3	1.55
	Sta-2 Level of engagement	3	1.55	3	2	1.03	0	0.00	2	1.03
	Sta-3 Effective communication	3	1.55	2	2	1.55	0	0.00	2	1.55
	Sta-4 Addressing community concerns	3	1.55	2	1	0.78	0	0.00	2	1.55
Urb	Urb-1 Urban design	1	1.65	3	0	0.00	0	0.00	0	0.00
	Urb-2 Implementation	Scoped Out								
Inn	Inn-1 Innovation	2	10.00	10	0	0.00	0	0.00	0	0.00

Annexure G – Consultation attendance

Date: 3 February 2021

Time: 9.30-11.00am

Method: Microsoft Teams meeting

A list of participants.

	WaterNSW	Edge Environment
1	Katherine Marshall	Prae Wongthong
2	Martin Hicks	Viv Heslop
3	Stepanka Halilk	
4	John Hart	
5	Jonas Ball	EMM Consulting
6	Lara Hess	Mark Trudgett
7	Maria McElvenny	Alex Frolich
8	Leanne Martin	
9	Iain McGregor	

Annexure H – Recommended IS levels and requirements

Table below provides detail around IS levels, the recommendations and internal responsibilities associated with the delivery of each credit to achieve the minimum score of 61 (should the project proceed with IS rating into the future).

Table 9 Credit by credit requirements to achieve BAU, stretch, and recommended target levels

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
Score	42	67	61		
Man-1	2	2	2	<ul style="list-style-type: none"> - Commitments to mitigate negative environmental, social and economic impacts are embedded into sustainability objectives and/or targets. - The policy must: <ul style="list-style-type: none"> o cover environmental, social and economic aspects o apply to the asset/network being rated o have been in place for the entire duration of the relevant Rating phases o be endorsed by senior management. - Every policy commitment must have at least one objective and/or target linked to it. - The sustainability objectives and/or targets must be reflected in the major project contracts (e.g. for designer, constructor, operator etc.). 	Management
Man-2	2	2	2	<ul style="list-style-type: none"> - Environmental, social and economic risks and opportunities are assessed. - Risk register(s) include environmental, social and economic risks (at least one of each) and cover the whole asset/network scope being rated. - The risk assessment is updated at least annually. 	Management
Man-3	1	2	2	<ul style="list-style-type: none"> - Ensure that a senior decision maker in the management team has central responsibility for managing sustainability. This can be reflected through an organisation chart and a job description. - A principal participant in the team is an IS Accredited Professional whose role is to provide sustainability advice. - Proof that an IS Accredited Professional (ISAP) participated throughout the relevant rating phases. - An independent sustainability professional is engaged to monitor and review sustainability performance. 	Management
Man-4	1	2	2	<ul style="list-style-type: none"> - Internal inspections must be undertaken by a manager, a sustainability or environmental professional, at least weekly during construction. - At least 90% of scheduled inspections must be completed during construction. Where works have ceased, inspections are not required but this must be clearly documented in the inspection schedule. - Environmental audits of the management system are conducted. At least one external review or audit is conducted during design. - Internal audits must be conducted by a suitably qualified auditor who is part of the project or asset management team. 	Management

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
				<ul style="list-style-type: none"> - External audits must be conducted by a suitably qualified auditor who is not part of the project or asset management team. - Audit reports demonstrate that these requirements have been fulfilled. - For the construction phase, at least four audits per year must be undertaken where at least one is external. 	
Man-5	0	1	1	<ul style="list-style-type: none"> - Sustainability performance is reported at least annually to senior management throughout the project delivery (design and construction). Reporting must include objectives and targets and identify areas for improvement. - Sustainability reporting must be specific to the project and has not been 'rolled up' into a parent organisation corporate sustainability report except where relevant project details (including objectives or targets, and indicators) are reported as a separable subset. 	Management
Man-6	1	2	2	<ul style="list-style-type: none"> - Sustainability knowledge is shared beyond project boundaries to parent organisations and/or other key stakeholders. At least example of knowledge sharing is provided. - The knowledge sharing examples include at least 1 simple cost benefit case study associated with applying the rating scheme or one simple cost benefit case study for a sustainability related initiative. - Sustainability knowledge is also shared from outside the project/asset onto the project. 	Management
Man-7	2	2	2	<ul style="list-style-type: none"> - Significant decisions have been identified through risk/opportunities assessment, cost trigger or similar. - The options analysed must include at least a business as usual (BAU) option and proven approaches taken in comparable situations. If one or more of these options simply cannot be identified, then suitable justification must be provided. - Options must be evaluated by considering environmental, social and economic aspects through the use of multi-criteria analysis or other scored means. - The evaluation must consider the forecast useful life of the infrastructure, rather than take a narrow view of just operating or capital costs and benefits. 	Design
Pro-1	1	2	2	<ul style="list-style-type: none"> - Commitments to require sustainability aspects to be considered in the procurement process. - The procurement policy, objectives or similar must demonstrate that environmental and other sustainability aspects (i.e. social and economic) are considered in the procurement process. - Policies must be in place for the entire duration of the relevant rating. 	Commercial
Pro-2	1	3	2	<ul style="list-style-type: none"> - Potential suppliers requested to provide details of their sustainability policy and its implementation. Must be made clear that sustainability incorporates environmental, social and economic aspects. 	Commercial
Pro-3	2	2	2	<ul style="list-style-type: none"> - Supplier evaluation considers environmental aspects through use of qualitative criteria. Where the evaluation criteria vary between different responses, at least three examples of criteria must be provided. - Supplier evaluation considers sustainability aspects through use of qualitative criteria. Must be made clear that sustainability incorporates environmental, social and economic aspects. - Supplier contracts incorporate sustainability objectives and/or targets. 	Commercial
Pro-4	1	2	2	<ul style="list-style-type: none"> - Suppliers have sustainability objectives and/or targets - Supplier sustainability performance must be monitored for the duration of contracts. - Performance monitoring reports for at least three example contracts must be provided as evidence. At least one example showing how a non-compliance was managed must be provided. 	Commercial

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
Cli-1	1	2	2	<ul style="list-style-type: none"> - A number of readily available climate change projections are identified and adopted for the asset region over the forecast useful life of the asset. - A multi-disciplinary team participated in identifying climate change risks and issues. - The selection of the emissions scenario and climate change projections used has been justified. - The climate change risk assessment must be broadened to cover indirect risks 	Design
Cli-2	1	2	2	<ul style="list-style-type: none"> - Adaptation options to treat 25-50% of all medium priority climate change risks are identified, assessed and appropriate measures implemented. - After treatment there are no extreme priority residual climate change risks. - Adaptation measures to treat all medium priority risks must be incorporated into designs and/or management plans (Design Rating) or constructed and/or incorporated into operational plans (As-Built Rating). 	Construction
Ene-1	1	1.5	1	<ul style="list-style-type: none"> - Energy use and GHG emissions have been monitored and modelled. - Monitoring has been undertaken during construction. - Modelling of energy use and GHG emissions has been undertaken for the operation phase based on the as-built infrastructure to give a total footprint across the infrastructure lifecycle. - The estimate of energy use and GHG emissions has covered at least Scope 1 and Scope 2 emissions, plus emissions from land clearing or land use change. - Any source of energy use or GHG emissions that is likely to account for more than 5% of the footprint from Scope 1 and 2 and land clearing is considered significant and is included. - The monitoring and modelling of energy and GHG emissions have been either managed by, reviewed by, or audited by a suitably qualified person. - The suitably qualified person has a formal qualification and a minimum of five years' experience in energy or GHG management. - The verified Base Case must be used for all relevant credits in the Assessment. 	Design and Construction
Ene-2	0	1	1	<ul style="list-style-type: none"> - Opportunities for use of renewable energy are fully investigated. - Opportunities for the use of renewable energy across the infrastructure lifecycle have been comprehensively investigated. 	Design and Construction
Wat-1	1	2	2	<ul style="list-style-type: none"> - Monitoring and modelling of water use is undertaken during construction and operation. - Monitoring and modelling demonstrates a reduction in water use compared to a base case footprint. - The verified Base Case must be used for all relevant credits in the Assessment. 	Design and Construction
Wat-2	2.7	2.7	2	<ul style="list-style-type: none"> - Monitoring and modelling demonstrates that some proportion of total water use is from non-potable sources (substituting for potable). - This can be demonstrated as design reports, management plans or monitoring reports. - Water reuse is undertaken at a sensible location and scale - that is, in a way that has the least detrimental impact, and possibly even a positive impact. - The verified Base Case must be used for all relevant credits in the Assessment. 	Design and Construction
Mat-1	1	2	1	<ul style="list-style-type: none"> - The materials lifecycle impacts are monitored and modelled. - For the As-Built rating, monitoring must be undertaken during construction - Modelling of energy use and GHG emissions has been undertaken for the operation phase based on the as-built infrastructure to give a total footprint across the infrastructure lifecycle. - Documentation is in the form of a completed copy of the Materials Calculator, dated and signed as a true record by the 'engineer of record' or other suitably qualified professional. 	Design and Construction
Mat-2	0	1	1	<ul style="list-style-type: none"> - One material/product has an ISCA approved environmental label. 	Management

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
				<ul style="list-style-type: none"> - EPDs (if used) must be third-party verified to be compliant with both ISO 14025 and EN 15804. - The evidence includes a report describing: the major materials used on the project and their value; for those products with environmental labels, the products used, their labels and their value; the proportion of the total material value of the project made up by products with environmental labels; and the certificates for the products - The materials or products with environmental labels must be used on the permanent infrastructure which makes up the project or asset. 	
Dis-1	2	3	2	<ul style="list-style-type: none"> - Measures to minimise adverse impacts to receiving water environmental values during construction and operation have been identified and implemented. - Monitoring of water discharges and receiving waters is undertaken at appropriate intervals and at times of discharge during construction and operation. - Monitoring and modelling of water discharges and receiving waters demonstrates no adverse impact on local receiving water environmental values. - The infrastructure does not increase peak stormwater flows for rainfall events of up to a 1.5 year ARI event discharge. 	Environment
Dis-2	2	3	2	<ul style="list-style-type: none"> - Measures to mitigate noise during construction and operation have been identified and implemented. - Noise goals are limits that must not be exceeded or noise levels that projects aim to keep within. - Monitoring of noise is undertaken at appropriate intervals and in response to complaints during construction and operation. - For construction, modelling and monitoring demonstrates no recurring or major divergences from the noise management process in ISCA approved noise guidelines - There must be evidence to show that the requirements of the guideline have been met. 	Environment
Dis-3	2	2	2	<ul style="list-style-type: none"> - Measures to mitigate vibration during construction and operation have been identified and implemented. Vibration goals are limits that must not be exceeded or vibration levels which the project aims to keep within. - Monitoring of vibration is undertaken at appropriate intervals and in response to complaints during construction and operation. - For construction, modelling and monitoring demonstrates no exceedances of vibration goals for structural damage to buildings and structures. - For operation, modelling and monitoring demonstrates no recurring or major exceedances of vibration goals for human comfort criteria. - No physical damage has been caused to any buildings or structures by vibration caused by construction or operation. - Integrate ISCA requirements into vibration management plan 	Environment
Dis-4	2	2	2	<ul style="list-style-type: none"> - Measures to minimise adverse impacts to local air quality during construction and operation have been identified and implemented. Air emission or air quality goals are limits that must not be exceeded or levels that the project aims to keep within. - Monitoring of air emissions and/or air quality is undertaken at appropriate intervals and in response to complaints during construction and operation. - Monitoring and modelling demonstrates no recurring or major exceedances of air emission or air quality goals. - Integrate ISCA requirements into air quality management plan. 	Environment
Dis-5				Scoped out	

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
Lan-1	1	1	1	- The land used for the project is previously disturbed	Design
Lan-2	3	3	3		
Lan-3	1	1	1	<ul style="list-style-type: none"> - Contamination reports demonstrate how the guidance in the National Environment Protection (Assessment of Site Contamination) Measure (1999) was followed. - Where remediation was required, an appraisal of remedial options has been undertaken in accordance with the sustainability hierarchy. - If an option less favourable than the first option was selected, then justification has been provided. 	
Lan-4	1	2	2	<ul style="list-style-type: none"> - The run-off, flood risk, and potential increased flood risk elsewhere as a result of the project have all been assessed over their expected working life, in line with the requirements of 'Flood plain management in Australia: best practice principles and guidelines' and appropriate flood resilience measures have been included in the design so that there is no increase in flood risk. - It must be demonstrated that there is significant reduction in flood risk as a result of the project. - Climate change predictions must be considered in applying this credit. 	
Was-1	1	2	2	<ul style="list-style-type: none"> - Predictions for waste quantities and types have been developed for construction and operation. - Measures to minimise waste during construction and operation have been identified and implemented. - A Waste Management Plan (or similar inclusion in the Asset Management Plan) demonstrates that the waste hierarchy has been applied. - Monitoring of all waste is undertaken during construction and operation. - Waste monitoring and management has been managed, reviewed or audited by a suitably qualified professional. - Auditing to final destination has been undertaken at least 6 monthly for construction and annually for operation. 	Environment
Was-2	1	3	2	<ul style="list-style-type: none"> - All of the following targets for landfill diversion have been achieved or bettered: <ul style="list-style-type: none"> o 80-100% by volume of spoil o 50-90% by volume of inert and non-hazardous waste o 40-60% by volume of office waste - Hazardous wastes including asbestos and contaminated soil are excluded. 	Environment
Was-3	3	3	3	<ul style="list-style-type: none"> - A deconstruction plan is developed based on good practice. - The deconstruction plan is reviewed and updated. Reviews should consider changes to technology and infrastructure planning. 	Design
Eco-1	1	2	2	<ul style="list-style-type: none"> - The ecological value of the infrastructure site is enhanced. - If the project, including land used for temporary works, includes, uses or potentially may impact, habitat that has been identified as ecologically sensitive (per TM definition), then an ecological management plan (or similar) must be developed and implemented that prioritises minimising ecological impacts, and is managed, reviewed or audited by a suitably qualified professional. - An Ecological Impact Assessment must be used where the Ecology has high or very high materiality. - It has been demonstrated that it is "probable" (at least a 50% chance) that the enhancement can be achieved. - Offsets used under this credit must be calculated and assessed, as a priority, in accordance with any existing regional policy that sets out specific measurement criteria. 	

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
				<ul style="list-style-type: none"> - It must be demonstrated that the offsets are permanent and that management regimes are in place to ensure stated outcomes are achieved or maintained 	
Eco-2	1	2	2	<ul style="list-style-type: none"> - There is a high degree of existing habitat connectivity identified and this is maintained (offsetting allowed). - The degree of habitat connectivity before and after infrastructure development must be based on ecological assessment. - It has been demonstrated that it is “probable” (at least a 50% chance) that the enhancement can be achieved. - Offsets used under this credit must be calculated and assessed, as a priority, in accordance with any existing regional policy that sets out specific measurement criteria. - It must be demonstrated that the offsets are permanent and that management regimes are in place to ensure stated outcomes are achieved or maintained. 	
Hea-1	0	0	0		
Hea-2	0	0	0		
Her-1	1	2	2	<ul style="list-style-type: none"> - Community heritage values have been identified through consultation and integrated into studies. - Heritage aspects relevant to this credit must be managed, reviewed or audited by a suitably qualified professional. - Measures to minimise adverse impacts to heritage during construction and operation have been identified and implemented. 	
Her-2	2	2	2	<ul style="list-style-type: none"> - Monitoring of heritage is undertaken at appropriate intervals during construction and operation. - Monitoring and modelling demonstrates maintenance of heritage values 	
Sta-1	2	3	3	<ul style="list-style-type: none"> - A comprehensive stakeholder engagement strategy is developed. It must be demonstrated that engagement strategies, mapping and or baseline information considered the registered package project as part of the overall project scope. The strategy must be managed, reviewed or audited by a suitably qualified professional. - The strategy is implemented and formal monitoring, evaluation and corrective action is undertaken. - The community is informed of the draft strategy and provided an opportunity to give feedback. Community feedback is documented and used to guide completion of the final strategy. - Stakeholders, including the community, have input to the strategy by way of a facilitated workshop(s) or the strategy is independently reviewed. Independent reviewer/s must not work directly on the project or asset and must be engaged to act independently of the project or asset. 	Communication
Sta-2	2	2	2	<ul style="list-style-type: none"> - Negotiable issues are identified and the level of participation on these issues is at least 'involve' or higher on the IAP2 spectrum. - Stakeholders are informed about non-negotiable issues. 	Communication
Sta-3	2	2	2	<ul style="list-style-type: none"> - The community has been provided with information that: <ul style="list-style-type: none"> o was provided in a timely manner o supported community participation o was meaningful and relevant o was accessible - Where the duration of the phase is less than two years, then at least one community feedback survey must be undertaken. 	Communication

Credit	BAU Level	Strategic target level	Recommended Level	Sustainability requirements under IS rating credit descriptions	Responsibility
				<ul style="list-style-type: none"> - If alternatives to stakeholder surveys are used, their suitability must be justified. - This has been verified by independent reviews/audits or community feedback with >80% support. 	
Sta-4	1	2	2	<ul style="list-style-type: none"> - The community believe their concerns have been considered and addressed. - Where the duration of the phase is less than two years, then at least one community feedback survey must be undertaken. The same survey may be used for this credit and Sta-3. - This has been verified by internal management/reviews/audits, or community feedback with >80% support. - If an independent review is used, the person(s) must be engaged to act independently of the asset/network 	Communication
Urb-1	0	0	0		
Urb-2				Scoped Out	
Inn-1	0	0	0		Design and construction