



Artist's Impression

Environmental Impact Statement – Chapter 1: Introduction

Warragamba Dam Raising

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1 Introduction

This chapter provides a brief outline of the Project including an introduction to the Project location, scope and planning approval process. It outlines the Secretary's Environmental Assessment Requirements (SEARs) and indicates where they have been addressed in this environmental impact statement (EIS).

1.1 Project background

The Hawkesbury-Nepean Valley (the valley) in western Sydney has the highest flood risk in New South Wales, if not Australia. The potential for significant flooding of the Hawkesbury-Nepean Valley was known by the local Aboriginal community before the first European settlement of the area in the 1790s. In the early years of European settlement, the risk of flooding was recognised and a series of proclamations were issued that warned of the risk of flooding. This high flood risk arises from the river being confined by narrow sandstone gorges, creating rapid deep backwater flooding over extensive floodplains (WMAwater 2019). The floodplains are home to a large existing population who would be impacted in a major flood.

During the 1980s and 1990s updated flood investigation techniques and new geological evidence predicted that floods significantly larger than any historically recorded could occur in the Hawkesbury-Nepean Valley. The dam was raised by five metres in the late 1980s to meet modern dam safety requirements. Further investigations into flooding and flood mitigation were undertaken and culminated in 1995 in a proposal to raise Warragamba Dam by 23 metres primarily for dam safety but also to provide for flood mitigation. The 1995 proposal did not proceed. In the late 1990s, major upgrades of Warragamba Dam were undertaken to prevent dam failure during extreme flooding events, to protect Sydney's water supply, and to prevent catastrophic downstream floods from dam failure. This resulted in the construction of the auxiliary spillway. However, these works only dealt with dam safety issues and did not address the major flood risks to the people and businesses in the Hawkesbury-Nepean Valley and the NSW economy.

In 2011, an approximately 1 in 100 chance in a year flood impacted Brisbane, resulting in significant damage, economic costs, and social disruption. The substantial impacts of the 2011 Brisbane flood led the NSW Government to recommence investigations into flood mitigation options for the Hawkesbury-Nepean Valley.

In 2013, the NSW Government in response to the State Infrastructure Strategy and community concerns, initiated the Hawkesbury-Nepean Valley Flood Management Review to consider flood planning, flood mitigation and flood response in the Hawkesbury-Nepean Valley. The review found that current flood management and planning arrangements could be improved, and no single mitigation option could address all the flood risks present in the Hawkesbury-Nepean Valley (Department of Primary Industries (DPI) 2014a). The review concluded that raising Warragamba Dam to capture inflows is the most effective infrastructure measure that could have a major influence on flood levels during those events, when most of the damages occur. Other complementary and non-infrastructure options were also identified to mitigate flood risks (DPI 2014a).

Under the direction of Infrastructure NSW (INSW), the Hawkesbury-Nepean Valley Flood Management Taskforce was established to investigate feasible flood options to reduce overall risk to the Hawkesbury-Nepean Valley. In June 2016, the former Premier and Minister for Western Sydney, Mike Baird MP, announced the NSW Government plan to raise Warragamba Dam to significantly reduce the risk of flooding in the Hawkesbury-Nepean Valley. The cost-benefit analysis demonstrated that the Warragamba Dam Raising would provide a 75 percent reduction in flood damages on average, and reduce current levels of flood damages from \$5 billion to \$2 billion (2016 dollars).

Raising Warragamba Dam would significantly reduce flood risk; however, it would not eliminate the risk completely. Regardless of the increase in the dam's height, flooding can be generated from catchments other than Warragamba Dam. The raising of Warragamba Dam would therefore be complemented with other non-infrastructure and policy actions. In May 2017, INSW released *Resilient Valley, Resilient Communities*, which outlines the Hawkesbury-Nepean Valley Flood Risk Management Strategy (the Flood Strategy) (INSW 2017). The Flood Strategy covers the geographic region between Bents Bridge and the Brooklyn Bridge, encompassing areas within the Local Government Areas (LGAs) of Liverpool City, Penrith City, Hawkesbury City, The Hills Shire Blacktown City, Central Coast, and Hornsby Shire.

The objective of the Flood Strategy is to reduce flood risk to life, property and social amenity from floods in the Hawkesbury-Nepean Valley. The strategy includes nine key outcomes; a combination of infrastructure and non-infrastructure initiatives to mitigate the flood risk to the Hawkesbury-Nepean Valley floodplain downstream of Warragamba Dam. Actions include:

- coordinated flood risk management across the Hawkesbury-Nepean Valley now and in the future
- strategic and integrated consideration of flood risk in land use and emergency planning

- engaging and providing flood risk information for an aware, prepared and responsive community.

The Flood Strategy provides the context and policy impetus to mitigate flood risk in the Hawkesbury-Nepean Valley.

A description of alternatives considered as feasible flood options to reduce risk to the Hawkesbury-Nepean Valley, as well as alternatives considered for the Warragamba Dam Raising Project, are provided in Chapter 4.

1.2 The Project

Warragamba Dam Raising is a project to provide flood mitigation to reduce the significant existing risk to life and property in the Hawkesbury-Nepean Valley downstream of the dam. This would be achieved through raising the level of the central spillway crest by around 12 metres and the auxiliary spillway crest by around 14 metres above the existing full supply level (FSL) for temporary storage of inflows. The spillway crest levels and outlets control the extent and duration of the temporary upstream inundation. There would be no change to the existing maximum volume of water stored for water supply.

The NSW Government announcement in 2016 proposed that the dam wall be raised by 14 metres. Subsequently, the then NSW Department of Planning and Environment Secretary's Environmental Assessment Requirements (SEARs) required the Project to be designed, constructed and operated to be resilient to the future impacts of climate change and incorporate specific adaptation actions in the design.

Peer reviewed climate change research found that by 2090 it is likely an additional three metres of spillway height would be required to provide similar flood mitigation outcomes as the current flood mitigation proposal. Raising the dam side walls and roadway by an additional three metres may not be feasible in the future, both in terms of engineering constraints and cost. The current design includes raising the dam side walls and roadway by 17 metres now to enable adaptation to projected climate change. Any consideration of raising spillway heights is unlikely before the mid to late 21st century and would be subject to a separate planning approval process.

The 17-metre raising height of the dam abutments (side walls) and roadway have been considered and accounted for in the EIS and design. The potential maximum height and duration of upstream inundation remains consistent with what was originally proposed in 2016.

The Project also includes providing infrastructure to facilitate variable environmental flows to be released from Warragamba Dam.

The Project would include the following main activities and elements:

- demolition or removal of parts of the existing Warragamba Dam, including the existing drum and radial gates
- thickening and raising of the dam abutments
- thickening and raising of the central spillway
- new gates or slots to control discharge of water from the flood mitigation zone (FMZ)
- modifications to the auxiliary spillway
- operation of the dam for flood mitigation
- environmental flow infrastructure.

The Project would take the opportunity, during the construction period for the dam raising, to install the physical infrastructure to allow for management of environmental flows as outlined in the NSW Government's *2017 Metropolitan Water Plan*. However, the actual environmental flow releases themselves do not form part of the Project and are subject to separate administration under the *Water Management Act 2000*.

A detailed description of the Project including key elements of construction and operation for flood mitigation is provided in Chapter 5.

1.3 Project planning approval

WaterNSW is a New South Wales (NSW) state owned corporation and is the owner and operator of Warragamba Dam. WaterNSW was requested by the NSW Government to seek project planning approval for the Warragamba Dam Raising Project (the Project). As part of the Project, WaterNSW is also seeking approval for the installation of environmental flow infrastructure at Warragamba Dam. The approval is sought under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Project has been deemed to be a controlled action (ref 2017/7940) because it has the potential to impact on matters of national environmental significance (MNES), and as such requires assessment under the Commonwealth

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). In accordance with the bilateral agreement reached between the NSW and Commonwealth Governments, an EIS under the EP&A Act for State Significant Infrastructure (SSI) can also be used for an EIS under the EPBC Act for a controlled action, where directed by the Commonwealth Minister for the Environment. The direction was given for the Project to be assessed under the bilateral agreement on 17 July 2017. The Project will be assessed by relevant NSW agencies in the first instance followed by a decision by the Commonwealth Minister for the Environment.

1.4 Project location

The assessment areas for the Project have been described in the context of both the stage of the works (construction and operation) and geographic extent of possible effects and impacts.

The Project study area comprises the areas upstream and downstream of Warragamba Dam that could be affected by the future operation of the raised dam. For the purposes of the EIS, this has been defined by the probable maximum flood (PMF) as required in the NSW Government's *Floodplain Development Manual* (Department of Natural Resources 2005).

Upstream of Warragamba Dam, the study area includes Lake Burragorang (that is, the reservoir formed by Warragamba Dam) and its tributaries and areas of the Blue Mountains National Park, Burragorang State Conservation Area, Nattai National Park, Nattai State Conservation Area and Yerranderie State Conservation Area. About 1,360 hectares of the total Greater Blue Mountains World Heritage Area (GBMWH) occurs within the upstream study area which is about 0.13 percent of the total GBMWH area (1,032,649 hectares).

The upstream study area comprises the maximum extent of flood prone land estimated from the probable maximum precipitation. However, the actual area affected is likely to be much less and directly related to the frequency and magnitude of the rainfall events resulting in inflows to Lake Burragorang in turn resulting in an increase in water levels. Other factors, such as the 'dryness' of the upstream catchment will also influence the magnitude of inflow events, with inflow volumes being reduced to varying degrees depending on the amount of rainfall infiltrating into the soil.

It is important to note that the upstream area is already subject to flooding from inflows to Lake Burragorang, with the duration and extent of temporary inundation influenced by the water level of Lake Burragorang at the time of the inflow event. Due to ongoing drought conditions, inflows to Lake Burragorang had remained below average in the two years prior to 2019. For the significant inflow event in February 2020, the water level in Lake Burragorang rose from 19.34 metres below FSL on 7 February 2020 to 5.34 metres below FSL on 19 February 2020, equating to an inflow volume of about 778 gigalitres, or about 40 percent of the total volume at FSL. Warragamba Dam did not spill during this inflow event and downstream flooding was due to flows from the Nepean River and other downstream tributaries.

As a general comment, the influence of the Project diminishes moving upstream from Lake Burragorang. This is shown clearly through a detailed analysis of hydrographs and depth-duration curves (refer Chapter 15, Section 15.6) for a range of locations in the catchment above Warragamba Dam.

Downstream of Warragamba Dam, the study area includes the freshwater and estuarine reaches of the Hawkesbury-Nepean river system and its tributaries between Warragamba Dam where it joins the Nepean River near Wallacia (not including the reach of the Nepean River upstream of Wallacia) and Wisemans Ferry, as well as the adjacent riparian zone, floodplain and wetland/lagoon waterbodies. During flood events, there are backwater flooding impacts along South Creek and Eastern Creek which flow into the Hawkesbury River downstream of Windsor. Consequently, South Creek and Eastern Creek has been included in the study area. The general influence of the Project ceases at about Wisemans Ferry, this being identified based on analysis of downstream hydrological and water quality changes.

Figure 1-1 shows the location of the Project at Warragamba Dam and the related upstream and downstream study areas.

Figure 1-1. Study area



1.5 Secretary's Environmental Assessment Requirements

A preliminary environmental assessment was provided to the Secretary of the DPIE and Secretary's Environmental Assessment Requirements (SEARs) issued by DPIE on 30 June 2017. The SEARs were re-issued by DPIE on 13 March 2018, which included clarifications on assessment requirements. The SEARs are provided in Appendix A.

A summary of the SEARS and where they are addressed in the EIS is provided in Table 1-1 (SEARs) and Table 1-2 (SEARs Attachments). At the beginning of each EIS chapter, a table is provided of the relevant SEARs specific to the chapter and which includes detailed cross references to where specific matters are addressed in the chapter. A consolidated list of detailed cross references is provided in Appendix A.

Table 1-1. Secretary's Environmental Assessment Requirements (SEARs)

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
1. Environmental impact assessment process The process for assessment of the proposal is transparent, balanced, well focussed and legal.	1. The Environmental Impact Statement must be prepared in accordance with Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation). 2. The project requires approval under the EPBC Act and is being assessed under the Bilateral Agreement. The EIS should address the requirements of Attachment A, B and C. 3. The onus is on the Proponent to ensure legislative requirements relevant to the project are met.	Throughout EIS
2. Environmental impact statement The project is described in sufficient detail to enable clear understanding that the project has been developed through an iterative process of impact identification and assessment and project refinement to avoid, minimise or offset impacts so that the project, on balance, has the least adverse environmental, social and economic impact, including its cumulative impacts.	1. The EIS must include, but not necessarily be limited to, the following: (a) executive summary; (b) a description of the project, including all components and activities (including ancillary components and activities) required to construct and operate it; (c) a statement of the objective(s) of the project; (d) a summary of the strategic need for the project with regard to its critical State significance and relevant State Government policy (e) an analysis of any feasible alternatives to the project.; (f) a description of feasible options within the project.; (g) a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the project were selected;	Executive Summary Chapter 5 Chapter 3 Chapter 4
	(h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described;	Existing Environment sections of Chapters 7 to 29
	(i) a demonstration of how the project design has been developed to avoid or minimise likely adverse impacts both upstream and downstream of the dam wall;	Chapters 7 to 29
	(j) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome;	Chapters 7 to 29
	(k) a statement of the outcome(s) the proponent will achieve for each key issue;	Chapters 7 to 29
	(l) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact;	Chapters 7 to 29

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
2. Environmental impact statement (Cont'd)	(m) consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts;	Chapters 7 to 29
	(n) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed;	Chapter 28
	(o) statutory context of the project as a whole, including: how the project meets the provisions of the EP&A Act and EP&A Regulation; a list of any approvals that must be obtained under any other Act or law before the project may lawfully be carried out;	Chapter 2
	(p) a chapter that synthesises the environmental impact assessment and provides: <ul style="list-style-type: none"> a succinct but full description of the project for which approval is sought; a description of any uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project; a compilation of the impacts of the project that have not been avoided; a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts; a compilation of the outcome(s) the proponent will achieve; and the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts. 	Chapter 29, Sections 29.1, 29.4, 29.5, 29.6, 29.7 and 29.9
	(q) relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software.	As required throughout EIS and Appendices
	2. The EIS must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the EIS and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.	As required throughout EIS and Appendices

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
3. Assessment of key issues Key issue impacts are assessed objectively and thoroughly to provide confidence that the project will be constructed and operated within acceptable levels of impact.	1. The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the proposal location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts. 2. For each key issue the Proponent must: (a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue; (b) describe the legislative and policy context, as far as it is relevant to the issue; (c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts; (d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies); (e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); (f) detail how any residual impacts will be managed or offset, and the approach and effectiveness of these measures. 3. Where multiple reasonable and feasible options to avoid or minimise impacts are available, they must be identified and considered and the proposed measure justified taking into account the public interest.	Chapters 7 to 29 and relevant Appendices A risk assessment procedure is provided in Appendix C and residual risk analyses included in Chapters 7 to 29.
4. Consultation The project is developed with meaningful and effective engagement during project design and delivery.	1. The project must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. 2. The Proponent must document the consultation process, and demonstrate how the project has responded to the inputs received. 3. The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.	Chapter 6 and Appendix D
5. Air quality The project is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent practicable.	1. The Proponent must undertake an air quality impact assessment (AQIA) for construction and operation of the project in accordance with the current guidelines. 2. The Proponent must ensure the AQIA includes a demonstrated ability to comply with the relevant regulatory framework, specifically the <i>Protection of the Environment Operations Act 1997</i> and the <i>Protection of the Environment Operations (Clean Air) Regulation 2010</i> .	Chapter 7 and Appendix E

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
6. Biodiversity The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity. Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project construction and operation.	1. The Proponent must assess biodiversity impacts in accordance with the current guidelines including the Framework for Biodiversity Assessment (FBA), unless otherwise agreed by OEH, by a person accredited in accordance with s142B(1)(c) of the <i>Threatened Species Conservation Act 1995</i> . 2. The proponent must assess the downstream impacts on threatened biodiversity, native vegetation and habitats resulting from any changes to hydrology and environmental flows. This assessment should address the matters in Attachment B. 3. The Proponent must assess impacts on the following: endangered ecological communities (EECs), threatened species and/or populations, and provide the information specified in s9.2 of the FBA. Specific environmental requirements are provided in Attachment C. 4. The Proponent must identify whether the project as a whole, or any component of the project, would be classified as a Key Threatening Process in accordance with the listings in the <i>Threatened Species Conservation Act 1997</i> (TSC Act), <i>Fisheries Management Act 1994</i> (FM Act) and <i>Environment Protection and Biodiversity Conservation Act 2000</i> (EPBC Act).	Chapters 8 to 13 and Appendices F1 to F5
7. Climate change risk The project is designed, constructed and operated to be resilient to the future impacts of climate change.	1. The Proponent must assess the risk and vulnerability of the project to climate change in accordance with the current guidelines. 2. The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10 km resolution (or lesser resolution if 10 km projections are not available) and incorporate specific adaptation actions in the design.	Chapter 14 and Appendix G
8. Flooding The project minimises adverse impacts on existing flooding characteristics. Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.	1. The Proponent must quantify what flood events can be mitigated by the dam. 2. The Proponent must assess and model the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (accounting for sea level rise and storm intensity due to climate change) including: (a) any detrimental increases in the potential flood affectation of other developments, land, properties, assets and infrastructure. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories; (b) quantify the benefits of reducing flood affectation to developments, land, properties, assets and infrastructure; (c) consistency (or inconsistency) with applicable Council floodplain risk management plans; (d) compatibility with the flood hazard of the land; (e) compatibility with the hydraulic functions of flow conveyance in flood ways and storage areas of the land; (f) downstream velocity and scour potential; (g) impacts the development may have upon existing community emergency management arrangements for flooding. These matters must be discussed with the State Emergency Services (SES) and relevant Councils; and	Chapter 15 and Appendix H Chapter 21 and Appendix M

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
8. Flooding (Cont'd)	<p>(h) any impacts the development may have on the social and economic costs to the community as consequence of flooding. Specifically, events at a minimum must be assessed for the 1 in 5 year, 1 in 10 year, 1 in 20 year, 1 in 100 year and the probable maximum flood. Modelling should include flood characteristics such as extent, level, velocity, and rate of rise at a minimum. Discussion and an assessment of the flood management zone also needs to be included.</p> <p>3. The Proponent must model the effect of the proposed project on the flood behaviour of the broader catchment under the following scenarios:</p> <p>(a) Current flood behaviour for a range of design events as identified in point 2 above;</p> <p>(b) The 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change or modelling of the 1 in 100 year flood with the range of climate change scenarios recommended in Australian Rainfall and Runoff 2016.</p> <p>4. The Proponent must identify and address any impacts the project may have upon existing emergency management arrangements for flooding. These matters are to be discussed with the SES and relevant councils downstream and upstream of the Dam.</p> <p>5. The assessment must discuss emergency management, evacuation and access, and contingency measures for the construction and operational stages of the project considering the full range of flood risk including the probable maximum flood.</p> <p>These matters are required to be discussed with the SES and relevant councils.</p> <p>6. Discussion in the assessment of the consequences of flooding on social and economic costs to the community and in the broader catchment, including up to the probable maximum flood level.</p>	
9. Health and safety The project avoids or minimises any adverse health impacts arising from the project. The project avoids, to the greatest extent possible, risk to public safety.	<p>1. The Proponent should demonstrate that the proposed works shall comply with Dam Safety Committee Guidance.</p> <p>2. The Proponent must assess the potential health impacts of the project, in accordance with the current guidelines.</p> <p>3. The assessment must:</p> <p>(a) describe the current known health status of the affected population;</p> <p>(b) assess health risks associated with exposure to environmental hazards;</p> <p>(c) assess the effect of the project on other relevant determinants of health such as the level of physical activity and access to social infrastructure;</p> <p>(d) assess opportunities for health improvement;</p> <p>(e) assess the distribution of the health risks and benefits; and</p> <p>(f) discuss how, in the broader social and economic context of the project, the project will minimise negative health impacts while maximising the health benefits.</p> <p>4. The Proponent must assess the likely risks of the project to public safety, paying particular attention to flood risk, subsidence risks, bushfire risks, and the handling and use of dangerous goods.</p>	Chapter 16

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
	5. The Proponent needs to address whether the project incorporates specific measures to manage risk to life from flood, with these matters to be discussed with the SES and relevant Councils.	
10. Heritage The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.	<p>1. The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:</p> <ul style="list-style-type: none"> (a) Aboriginal places and objects, as defined under the <i>National Parks and Wildlife Act 1974</i> and in accordance with the principles and methods of assessment identified in the current guidelines; (b) Aboriginal places of heritage significance, as defined in the <i>Standard Instrument – Principal Local Environmental Plan</i>; (c) environmental heritage, as defined under the <i>Heritage Act 1977</i>; and (d) items listed on the National and World Heritage lists. Investigations including surveys and identification of cultural heritage values should be conducted in consultation with OEH regional officers. <p>2. Where impacts to State or locally significant heritage items are identified, the assessment must:</p> <ul style="list-style-type: none"> (a) include a statement of heritage impact for all heritage items (including significance assessment); (b) consider impacts to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant) (c) outline measures to avoid and minimise those impacts in accordance with the current guidelines; and (d) be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed, the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria). <p>3. Where archaeological investigations of Aboriginal objects are proposed, these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010). Consultation with Aboriginal people must be undertaken prior to investigations. Significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the EIS.</p> <p>4. Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.</p> <p>5. Any objects recorded as part of the assessment must be documented and notified to OEH.</p> <p>6. Where land is declared wilderness under the <i>Wilderness Act 1987</i> or on the World Heritage List as part of the Greater Blue Mountains World Heritage Area (GBMWH) and lands declared as Wild Rivers under the NPW Act the Proponent:</p> <ul style="list-style-type: none"> (a) must define the area and extent of impact on such lands; (b) provide evidence that the proposal is consistent with the <i>Wilderness Act 1987</i> and the management principles for wilderness areas; 	Non-Aboriginal Heritage – Chapter 17 and Appendix I Aboriginal Heritage – Chapter 18 and Appendix K World Heritage Areas – Chapter 12 and Appendix J

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
	(c) assess impacts on land to be included on the National Heritage List.	
11. Noise and vibration - amenity Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity. Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.	1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers including small businesses, and include consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (for example, low frequency noise). 2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required	Chapter 19 and Appendix L
12. Noise and vibration - structural Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage. Increases in noise emissions and vibration affecting environmental heritage as defined in <i>the Heritage Act 1977</i> during operation of the project are effectively managed.	1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage). 2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	Chapter 19 and Appendix L

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
13. Protected and sensitive lands The project is designed, constructed and operated to avoid or minimise impacts on protected and sensitive lands.	1. The Proponent must assess the impacts of the project on the water catchment and processes (and the impact of processes on the project) including, but not limited to: (a) protected areas (including land and water) managed by OEH and/or DPI Fisheries under the <i>National Parks and Wildlife Act 1974</i> and the <i>Marine Estate Management Act 2014</i> ; (b) Key Fish Habitat as mapped and defined in accordance with the <i>Fisheries Management Act 1994</i> (FM Act); (c) waterfront land as defined in the <i>Water Management Act 2000</i> ; (d) land or waters identified as Critical Habitat under the TSC Act, FM Act or EPBC Act; and (e) biobank sites, private conservation lands and other lands identified as offsets. 2. Maps should be included that clearly indicate the proposed high water mark line and current high water mark line, as well as protected area boundaries.	Chapter 20
14. Socio-economic, land use and property The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities. The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	1. The Proponent will undertake a comprehensive Social Impact Assessment, prepared by a suitably qualified and experienced expert, supported and informed by a comprehensive, inclusive, and participatory program of community engagement, actively seeking input from the affected community and other stakeholders, paying particular attention to engaging vulnerable groups. 2. The Social Impact Assessment will be informed by work conducted to inform the Hawkesbury-Nepean Flood Risk Management Strategy, comprising the following components: <ul style="list-style-type: none"> ▪ identification of the affected community and other interested stakeholders, specifying in what way each might be affected or interested, and paying particular attention to vulnerable groups and potential impacts on them; ▪ assistance for these people and communities in understanding the proposal; ▪ a quantitative and qualitative community profile, including values and aspirations; ▪ identification of any diversity of views/concerns that might exist in the community/ies; ▪ relevance of any previous, current, and anticipated relevant developments and resultant cumulative impacts. 3. Underpinned by the work at point 2 above, the Social Impact Assessment will identify potential impacts (positive and negative), considering the following matters: <ul style="list-style-type: none"> ▪ way of life (how people live, work, play, and interact) ▪ culture (including values, heritage, and customs) ▪ community (including cohesion and sense of place) ▪ decision-making systems (people's capacity and power to influence decisions that affect them) 	Chapter 21 and Appendix M

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
14. Socio-economic, land use and property (Cont'd)	<ul style="list-style-type: none"> ■ environment (including amenity, aesthetics, and access) ■ wellbeing and health (physical and mental) ■ personal and property rights ■ justified fears and aspirations about any of the above matters. <p>4. The Social Impact Assessment will assess significance of each impact based on duration, extent, sensitivity (vulnerability to change and capacity to adapt), severity, and level of community concern.</p> <p>5. The Social Impact Assessment will propose mitigation actions for significant negative social impacts that cannot be avoided, and strategies to secure and maximise beneficial impacts, and monitoring, management, and reporting arrangements, including discussion of how the applicant will respond to unanticipated social impacts as part of operational community consultation procedures.</p> <p>6. Where land is reserved or acquired under the <i>National Parks and Wildlife Act 1974</i> (NPW Act), the EIS must detail:</p> <p>(a) effects of accurately predicted intermittent inundation regime, and predictions of habitat, biodiversity and cultural heritage loss or change within the OEH estate;</p> <p>(b) expanded consideration of indirect effects of inundation, especially in the context of land reserved under the NPW Act;</p> <p>(c) consider impacts of the project on visual amenity and visitor experience in land reserved under the NPW Act;</p> <p>(d) identification of any proposed infrastructure (including roads) proposed within the OEH estate. Additional access and recreational opportunities that may be provided by proposed roads must be considered and discussed with NPWS;</p> <p>(e) predictions of the time and degree of disruption to recreational and management access during construction and the mitigation measures that will be undertaken. Changes to management and visitor access and infrastructure should be identified including walking track easements and access to heritage;</p> <p>(f) consideration of alternative options to avoid reserved lands and justification;</p> <p>(g) if on-park impacts are considered unavoidable and revocation/de-listing is required, consideration of the issues identified in Revocation, Recategorisation and Road Adjustment Policy (OEH 2012) is required, along with justification</p>	<p>Chapter 21 and Appendix M</p> <p>Chapters 8 to 13 and Appendices F1 to F5</p> <p>Chapter 25 and Appendix P</p> <p>Chapter 4</p>
15. Soils The environmental values of land, including soils, subsoils and landforms, are protected.	<p>1. The Proponent must verify the risk of acid sulphate soils (Class 1, 2, 3 or 4 on the Acid Sulphate Soil Risk Map) within, and in the area likely to be impacted by the project.</p> <p>2. The Proponent must assess the impact of the project on acid sulphate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.</p> <p>3. The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past,</p>	Chapter 22 and Appendix N1

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulphate soils and site contamination.	<p>existing and future land uses. Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.</p> <p>4. The Proponent must assess whether salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the project area.</p> <p>5. The Proponent must assess the impacts of the project on soil salinity and how it may affect groundwater resources and hydrology.</p> <p>6. The Proponent must assess the impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.</p> <p>7. Attention must also be given to direct and indirect increase in erosion, siltation, impact on riparian vegetation of increased sediment loads and reduction in stability of river banks or water courses both upstream and downstream in the event of a flood. Consideration must be given to the amount of time areas are inundated and the impact of soil during and after these events.</p> <p>8. Consideration should also be given to areas inundated by probable maximum flood levels and the potential for the project to impact how siltation remains deposited in these areas, as well as the potential impact on existing vegetation and changes in soil characteristics. The Proponent should detail, in the event that a probable maximum flood level event occurs, how soil and areas affected by changed hydrological regimes as a result of the project will be managed and/or remediated.</p> <p>9. The Proponent must detail the capacity of the site to support the increased size of the structure.</p>	Chapter 22 and Appendix N2
<p>16. Sustainability</p> <p>The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources.</p> <p>Conservation of natural resources is maximised.</p>	<p>1. The Proponent must assess the sustainability of the project in accordance with the Infrastructure Sustainability Council of Australia (ISCA) <i>Infrastructure Sustainability Rating Tool</i> and recommend an appropriate target rating for the project.</p> <p>2. The Proponent must assess the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.</p>	Chapter 23
<p>17. Transport and traffic</p> <p>Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts.</p>	<p>1. The Proponent must assess construction transport and traffic (vehicle, pedestrian and cyclists) impacts. The assessment should consider existing and planned developments, as well as upgrades around the Wollondilly Shire area. Consideration should be made to the structure and suitability of proposed access routes.</p> <p>2. The Proponent must assess the operational transport impacts of the project.</p> <p>3. The Proponent must provide consideration of the effects of extended inundation of downstream transport infrastructure, and of the effects on the road network of any alternate routes required where that transport</p>	Chapter 24 and Appendix O

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
<p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p> <p>Works are compatible with existing infrastructure and future transport corridors.</p>	<p>infrastructure is inundated for prolonged periods. This should include assets such as Yarramundi, Richmond and Windsor road bridges and vehicular ferries at Lower Portland, Sackville and Wisemans Ferry.</p> <p>4. The Proponent must consider contingency plans for management of traffic during construction in the event of:</p> <ul style="list-style-type: none"> (a) emergency closures due to flood, fire and road accidents; (b) significant pavement failures due to some roads needing repair within the Wollondilly Shire area; and (c) load limits of bridges in the area. 	
<p>18. Visual amenity</p> <p>The project minimises adverse impacts on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.</p>	<p>1. The Proponent must assess the visual impact of the project and any ancillary infrastructure on:</p> <ul style="list-style-type: none"> (a) views and vistas; (b) streetscapes, key sites and buildings; (c) heritage items including Aboriginal places and environmental heritage; and (d) the local community. <p>2. The Proponent must assess the visual impact associated with the proposed maximum flood level both upstream and downstream within the catchment area.</p> <p>3. The Proponent must provide artist impressions and perspective drawings of the project to illustrate how the project has responded to the visual impact through design and landscaping.</p>	Chapter 25 and Appendix P
<p>19. Waste</p> <p>All wastes generated during the construction and operation of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.</p>	<p>1. The Proponent must assess predicted waste generated from the project during construction and operation, including:</p> <ul style="list-style-type: none"> a) classification of the waste in accordance with the current guidelines; b) estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance; c) handling of waste including measures to facilitate segregation and prevent cross contamination; d) management of waste including estimated location and volume of stockpiles; e) waste minimisation and reuse; f) lawful disposal or recycling locations for each type of waste; and g) contingencies for the above, including managing unexpected waste volumes. <p>2. The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust. This extends to the removal and replacement of concrete and associated dust during construction works of the wall, and an assessment of potential for concrete dust to run off into water and potentially enter downstream areas.</p>	Chapter 26

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
<p>20. Water - hydrology</p> <p>Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised.</p> <p>The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved).</p> <p>Sustainable use of water resources.</p>	<p>1. The Proponent must consider potential alternatives for managing flood waters and justify the selection having regard to the relative environmental impacts.</p> <p>2. The Proponent must describe (and map) the existing hydrological regime for any surface and groundwater resource (including reliance by users and for ecological purposes) likely to be impacted by the project, including stream orders, as per the FBA. Mapping must include upstream and downstream tributaries that may potentially be impacted, including:</p> <ul style="list-style-type: none"> (a) the extent of regional flood up to the probable maximum flood; (b) flood planning area, the area below the flood planning level (area below the 100 year ARI plus freeboard); (c) hydraulic categorisation (floodways and flood storage areas); and (d) hazard categorisation. <p>The extent of mapping/modelling used needs to be identified and rationalised.</p> <p>3. The Proponent must prepare a detailed water balance for ground and surface water including the intake and discharge locations, where relevant, volume, frequency and duration of flooding events (1 in 5 year, 1 in 10 year, 1 in 20 year, 1 in 100 year, and probable maximum flood) and at times of non-flood.</p> <p>4. The Proponent must assess (and model if appropriate) the impact of the construction and operation of the project and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including:</p> <ul style="list-style-type: none"> (a) natural processes within rivers, wetlands, estuaries, marine waters and floodplains that affect the health of the fluvial, riparian, estuarine or marine system and landscape health (such as modified discharge volumes, durations and velocities), aquatic connectivity and access to habitat for spawning and refuge; (b) impacts from any permanent and temporary interruption of groundwater flow, including the extent of drawdown, barriers to flows, implications for groundwater dependent surface flows, ecosystems and species, groundwater users and the potential for settlement; (c) changes to environmental water availability and flows, both regulated/licensed and unregulated/rules-based sources; (d) direct or indirect increases in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses; (e) minimising the effects of proposed stormwater and wastewater management during construction and operation on natural hydrological attributes (such as volumes, flow rates, management methods and re-use options) and on the conveyance capacity of existing stormwater systems where discharges are proposed through such systems; and (f) water take (direct or passive) from all surface and groundwater sources with estimates of annual volumes during construction and operation. <p>5. The Proponent must identify any requirements for baseline monitoring of hydrological attributes.</p>	<p>Chapter 15 and Appendix H1 and H2</p>

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
	<p>6. The Proponent must detail a framework for managing water releases from the dam that are capable of meeting the objectives of the project (in terms of flood mitigation), ensures impacts to upstream and downstream areas and ecosystems are minimised. The framework shall include consideration of the potential rates of rise and fall in the river, timing of water releases. These shall include consideration of antecedent, conditions within the river, flooding impacts, and transparent and translucent flows.</p> <p>7. The Proponent must assess the potential impact on groundwater and surface water users, details of how existing water rights will be protected, including with respect to availability, quantity and quality of the water, noting the interjurisdictional users within the potentially impacted area. This would include an assessment of environmental availability, both regulated and unregulated use, licenced and rules-based sources of such water.</p> <p>8. The Proponent must consider and discuss the rate at which flood waters would potentially recede following a probable maximum flood event, the impact on vegetation both upstream and downstream from the flood and the impact on water quality over time as flood waters are released from the dam throughout the catchment. Geomorphology and river management should be taken into account.</p>	
<p>21. Water - quality</p> <p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).</p> <p>The project should not adversely affect drinking water quality.</p>	<p>1. The Proponent must:</p> <p>(a) state the ambient NSW Water Quality Objectives (NSW WQO) and environmental values for the receiving waters relevant to the project, including the indicators and associated trigger values or criteria for the identified environmental values;</p> <p>(b) identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point and describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of nontrivial harm to human health and the environment;</p> <p>(c) identify the rainfall event that the water quality protection measures will be designed to cope with;</p> <p>(d) assess the significance of any identified impacts including consideration of the relevant ambient water quality outcomes;</p> <p>(e) assess cumulative water quality and connective flow impacts on upstream and downstream areas and provide mitigation measures;</p> <p>(f) demonstrate how construction and operation of the project will, to the extent that the project can influence, ensure that:</p> <ul style="list-style-type: none"> ▪ where the NSW WQOs for receiving waters are currently being met they will continue to be protected; and ▪ where the NSW WQOs are not currently being met, activities will work toward their achievement over time; ▪ identify how potential concrete, dust and other by products of the construction phase will be managed during construction activities, to ensure that water quality is maintained throughout the works. Mitigation measures should be discussed for stormwater and wastewater management during and after construction; 	Chapter 27 and Appendix Q

Desired performance outcome	Secretary's Environmental Assessment Requirements	Where addressed
	<p>(g) justify, if required, why the WQOs cannot be maintained or achieved over time;</p> <p>(h) demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented;</p> <p>(i) identify sensitive receiving environments (which may include estuarine and marine waters downstream) and develop a strategy to avoid or minimise impacts on these environments; and</p> <p>(j) identify sensitive upstream environments that become 'receivers' during times of flood and may become inundated. Develop a strategy to avoid or minimise impacts on these environments.</p>	

Table 1-2. Secretary's Environmental Assessment Requirements (SEARs): Attachments

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
Attachment A – EPBC Assessment Requirements (AR)		
Introduction AR1 to AR3	<p>AR1: These guidelines provide information on assessment requirements in relation to matters of national environmental significance (MNES) in accordance with the New South Wales Bilateral Agreement relating to environmental assessment (February 2015). To meet requirements, the project must be assessed in the manner specified in Schedule 1 to that agreement including that the assessment documentation contains:</p> <ul style="list-style-type: none"> i. An assessment of all impacts that the action is likely to have on each matter protected by a provision of Part 3 of the EPBC Act. ii. Enough information about the proposal and its relevant impacts to allow the Commonwealth Minister to make an informed decision on whether or not to approve iii. Information addressing the matters outlined in Schedule 4 of the <i>Environment Protection and Biodiversity Conservation Regulations (2000)</i>. 	Throughout document and specific Chapters address MNES
	<p>AR2: In the circumstance that a proposal has been determined to be a 'controlled action' requiring full assessment, the decision will identify which MNES protected under the EPBC Act have triggered for assessment. These are called the controlling provisions. Proponents are only required to provide an assessment of protected matters under the controlling provisions that have been triggered. Following is the list of controlling provisions:</p> <ul style="list-style-type: none"> ▪ World Heritage Properties (sections 12 and 12A) ▪ National Heritage Places (sections 15B and 15C) ▪ listed threatened species and communities (sections 18 and 18A). 	Chapter 1, Section 1.6 Chapter 2

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
	AR3: The proponent must consider each of the protected matters under the triggered controlling provisions that may be significantly impacted by the development. The Department of the Environment has provided a list of threatened species and communities that are considered to be at risk of impact from the proposal at Attachment 1. Note that this may not be a complete list and it is the responsibility of the proponent to undertake an analysis of the significance of the relevant impacts and ensure all protected matters that are likely to be significantly impacted are assessed for the Commonwealth Minister's consideration.	Chapter 12, Chapter 13, Chapter 20 Appendix F5, Appendix F6, Appendix J
Relevant regulations AR4	AR4: Assessment documentation prepared for the purposes of approval under the EPBC Act must, in addition to providing sufficient information for a decision, address the matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The following includes requirements that have been identified as additional to the requirements prescribed in Schedule 2 of the NSW Environmental Planning and Assessment Regulations 2000. Proponents are advised to check that requirements in Schedule 4 of the EPBC Regulations have been appropriately addressed.	Chapter 2
Project Description AR5 to AR9	AR5: The title of the action, background to the development of the action and current status. AR6: The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on MNES. AR7: How the action relates to any other actions that have been, or are being taken in the region affected by the action. AR8: How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.	Chapter 5 and Chapter 28
Impacts AR9	AR9: The EIS must include and assessment of the relevant impacts of the action on the matters protected by the controlling provisions: i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts; ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible; iii. analysis of the significance of the relevant impacts; and iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	Chapter 12, Chapter 13, Chapter 17 Appendix F5, Appendix F6, Appendix I
Avoidance, mitigation and offsetting AR10 to AR12	AR10: For each of the relevant matters protected that are likely to be significantly impacted by the development, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures	Chapter 12, Chapter 13, Chapter 17

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
	<ul style="list-style-type: none"> ii. any statutory policy basis for the mitigation measures; iii. the cost of the mitigation measures; iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program. <p>AR11: Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.</p> <p>AR12: For each of the relevant matters likely to be significantly impacted by the development the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any:</p> <ul style="list-style-type: none"> i. conservation advice or recovery plan for the species or community ii. relevant threat abatement plan for a process that threatens the species or community iii. wildlife conservation plan for the species iv. management plan for Ramsar wetland v. management plan for a World Heritage property or National Heritage place vi. Marine Bioregional Plan vii. any strategic assessment. <p>AR13: Specific information is required with respect to each of the determined controlling provisions outlined in AR14 to AR19</p>	Appendix F5, Appendix F6, Appendix J
<p>Key issues</p> <p>Biodiversity (threatened species and communities)</p> <p>AR14 to AR 16</p>	<p>AR14: The EIS must identify <i>each</i> EPBC Act listed threatened species and community likely to be significantly impacted by the development. Provide evidence why other threatened species and communities likely to be located in the project area or in the vicinity will not be significantly impacted in accordance with the <i>Matters of National Environmental Significance - Significant impact guidelines 1.1</i> (2013) EPBC Act.</p> <p>AR15: For each of the EPBC Act listed threatened species and communities likely to be significantly impacted by the development the EIS must provide a separate:</p> <ul style="list-style-type: none"> (a) description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans; 	<p>Chapter 8, Chapter 9, Chapter 10, Chapter 11, Chapter 12, Chapter 13 and</p> <p>Appendix F1, Appendix F2, Appendix F3, Appendix F4</p>

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
	<ul style="list-style-type: none"> (b) details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements; (c) description of the relevant impacts of the action having regard to the full national extent of the species or community's range (d) description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action (e) identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account (f) a description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established (g) details of how the current published NSW Framework for Biodiversity Assessment (FBA) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts (h) details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the development in accordance with the FBA and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites. <p>AR16: Any significant residual impacts not addressed by the FBA may need to be addressed in accordance with the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy.</p>	
<p>Key issues</p> <p>World Heritage Area and National Listed heritage item impacts</p> <p>AR17 to AR19</p>	<p>AR17: The EIS must identify and describe the characteristics and values, including Outstanding Universal values, of any World Heritage property(s), and/or any National Heritage places that are likely to be impacted by all stages of the proposed development with appropriate reference to relevant management plans.</p> <p>AR18: The assessment of impacts should include information on:</p> <ul style="list-style-type: none"> i. the modification, destruction, fragmentation, isolation, disturbance of an important or substantial area of habitat; ii. impacts on other users of the area; iii. the potential impacts on important amenities, navigation, culturally or historically significant sites, threatened or migratory species or sensitive habitat; iv. the potential visual impacts; v. a description of any specific mitigation and management measures proposed to protect or enhance the affected values of the World Heritage property or National Heritage place. <p>AR19: Where a significant residual adverse impact to a World Heritage property and/or a National Heritage place is</p>	<p>Chapter 17</p> <p>Appendix J</p>

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
	<p>considered likely the EIS must provide information on the proposed offset strategy including:</p> <ul style="list-style-type: none"> i. Include a discussion and supporting evidence of the conservation benefit associated with the proposed offset strategy. The conservation benefit must demonstrate, at a minimum, how the proposed offset will improve the integrity and resilience of the heritage values of the impacted heritage place or property ii. be consistent with the <i>Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (2012)</i> 	
Other approvals and conditions AR20	AR 20: Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations 2000	Chapter 2
Environmental record of person proposing to take the action AR21	AR21: Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations 2000.	Appendix R
Information sources AR22	AR22: For information given in an EIS, the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.	Throughout EIS and Appendices
ATTACHMENT B - DOWNSTREAM ASSESSMENT REQUIREMENTS		
	<ol style="list-style-type: none"> 1. A field survey of the potentially impacted areas downstream should be conducted and documented in accordance with relevant guidelines 2. The assessment should contain the following information as a minimum: <ul style="list-style-type: none"> (a) The requirements set out in the <i>Guidelines for Threatened Species Assessment</i> (Department of Planning, July 2005). (b) Description and geo-referenced mapping of study area (and spatial data files), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and method used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area. (c) Description of survey methods used, including timing, location and weather conditions. (d) Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the assessment. (e) Identification of national and state listed threatened biota known or likely to occur and their conservation status. 	Chapter 9 Appendix F2

Desired performance outcome	Secretary's Environmental Assessment Requirements Attachments	Where addressed
	<p>(f) Description of the likely impacts of the proposal on downstream biodiversity and wildlife corridors, including direct, indirect, construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor.</p> <p>(g) Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on downstream biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 6 below).</p> <p>(h) Provision of specific Statement of Commitments relating to biodiversity.</p> <p>3. Where an offsets package is proposed by a proponent for any downstream impacts to biodiversity this packageshould:</p> <p>(a) Meet OEH's <i>Principles for the use of biodiversity offsets in NSW</i></p> <p>(b) Identify the conservation mechanisms to be used to ensure the long-term protection and management of the offset sites.</p> <p>(c) Include an appropriate Management Plan (such as vegetation or habitat) that has been developed as a key amelioration measure to ensure any proposed compensatory offsets, retained habitat enhancement features and/or impact mitigation measures (including proposed rehabilitation and/or monitoring programs) are appropriately managed and funded.</p> <p>4. Where appropriate, likely impacts (both direct and indirect) on any downstream OEH estate reserved under the <i>National Parks and Wildlife Act 1974</i> should be considered.</p>	
ATTACHMENT C - BIODIVERSITY MATTERS FOR FURTHER CONSIDERATION		
	<p>1. Biodiversity – Matters for Further Consideration</p> <p>2. Entities which are specifically excluded from matters for further consideration</p>	<p>Chapters 8 to 10</p> <p>Appendix F1 to F3</p>

1.6 Environment Protection and Biodiversity Conservation Act 1999

The Project was referred to the former Commonwealth Department of the Environment and Energy (DoEE)¹ by WaterNSW. It was subsequently deemed to be a controlled action under the EPBC Act on 17 July 2017 for its potential impacts on three Matters of National Environmental Significance (MNES). Table 1-3 identifies the relevant MNES and where the Commonwealth assessment requirements are addressed in the EIS.

Table 1-3. MNES requiring assessment

Commonwealth assessment requirements	Where addressed
World Heritage properties	Appendix J – World Heritage assessment report Chapter 20 – Protected and sensitive lands
National Heritage places	Appendix I – Non-Aboriginal heritage assessment report Chapter 17 – Heritage (non-Aboriginal)
Listed threatened species and communities	Appendix F5 – Matters of national environmental significance – biodiversity Chapter 12 – Matters of national environmental significance – biodiversity Appendix F6 – Biodiversity Offset Strategy Chapter 13 – Biodiversity offset strategy

Attachment A to the SEARs provided additional information on the assessment requirements for the EPBC Act. Attachment A is presented in Appendix A.

1.7 Structure of this Environmental Impact Statement

This EIS has been prepared to address the SEARs issued by DPIE on 13 March 2018, the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and the Commonwealth assessment requirements.

The structure of the EIS is shown in Table 1-4. Supporting appendices are listed in Table 1-5.

Table 1-4. EIS chapters

Chapter	Description
Executive summary	Summary of Project description, assessment requirements, key EIS outcomes and management recommendations.
Table of Contents and EIS Certificate	Table of Contents and EIS Certificate
Glossary	Annotated list of terms used in the EIS
1. Introduction	Provides a broad overview of the Project and where it is located
2. Statutory and planning framework	Outlines the statutory requirements and explains the steps in the assessment and approval process
3. Strategic justification and Project need	Provides the strategic context, explains the need for the Project and identifies Project objectives
4. Project development and alternatives	Reviews the alternatives and options considered in developing the Project including the consequences of not proceeding

¹ The Environment portfolio within DoEE was transferred to the new Department of Agriculture, Water and the Environment (DAWE) which commenced operation on 1 February 2020.

Chapter	Description
5. Project description	Provides a detailed description of the Project including the design standards, key design features, and construction methodologies and staging
6. Consultation	Outlines the consultation activities carried out in relation to the Project, issues raised and how these have been addressed
7. Air quality	Describes the existing environment, assesses potential project impacts, proposes environmental management measures and assesses residual risks.
8. Biodiversity upstream	
9. Downstream ecological assessment	
10. Biodiversity construction area	
11. Aquatic ecology	
12. Matters of national environmental significance - biodiversity	
13. Biodiversity offset strategy (BOS)	
14. Climate change risk	
15. Flooding and hydrology	
16. Health and safety	
17. Heritage (non-Aboriginal)	
18. Aboriginal cultural heritage	
19. Noise and vibration	
20. Protected and sensitive land	
21. Socio-economic, land use and property	
22. Soils	
23. Sustainability	
24. Transport and traffic	
25. Visual amenity	
26. Waste	
27. Water - quality	
28. Cumulative impacts and interactions	
29. EIS synthesis, Project justification and conclusion	Collates environmental management measures for the Project identified through the impact assessment process, and presents the justification for the Project, including consideration of the principles of ecologically sustainable development and objectives of the EP&A Act.
30. References	A list of references used in preparing the EIS

Table 1-5. EIS appendices

Appendix	Description
Appendix A	Secretary's environmental assessment requirements (SEARs), including Commonwealth assessment requirements and checklist
Appendix B	Environmental Planning and Assessment Regulation 2000 checklist
Appendix C	Risk assessment procedure
Appendix D	Community consultation report
Appendix E	Air quality assessment
Appendix F1	Biodiversity assessment report – upstream
Appendix F2	Downstream ecological assessment
Appendix F3	Biodiversity assessment report - construction area
Appendix F4	Aquatic ecology assessment
Appendix F5	Matters of national environmental significance – biodiversity
Appendix F6	Biodiversity Offset Strategy
Appendix G	Climate change assessment
Appendix H1	Flooding and hydrology assessment
Appendix H2	Flood risk analysis
Appendix H3	Warragamba Dam environmental flows scenarios assessment
Appendix I	Non-Aboriginal heritage assessment
Appendix J	World Heritage assessment
Appendix K	Aboriginal cultural heritage assessment
Appendix L	Noise and vibration assessment
Appendix M	Socio-economic, land use, and property assessment
Appendix N1	Soils and contamination assessment
Appendix N2	Geomorphology assessment
Appendix O	Traffic and transport assessment
Appendix P	Landscape character and visual impact assessment
Appendix Q	Water quality statistical analysis
Appendix R	Proponent's environmental record

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SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.