16 December 2021

Warragamba Dam Assessment Team
Planning and Assessment
Department of Planning, Industry and Environment
Warragamba.DamEIS@dpie.nsw.gov.au
CC: Nick.Hearfield@dpie.nsw.gov.au

RE: State Significant Infrastructure – Warragamba Dam Raising (SSI-8441)

Thank you for notifying Sydney Water of SSI-8441, which proposes the Warragamba Dam Wall raising. This raising is proposed to provide temporary inflow storage at Lake Burragorang to facilitate downstream flood mitigation. It comprises demolition or removal of parts of the existing Warragamba Dam, including the existing drum and radial gates, thickening and raising of the dam abutments and raising of the central spillway, new gates or slots for the discharge of water from the dam and modifications to the auxiliary spillway and other infrastructure and elements including new roads, bridges, ancillary facilities and installation of environmental flows infrastructure.

Sydney Water has reviewed the application based on the information supplied and provides the following comments.

E-flows and Water Quality at North Richmond

- Sydney Water notes that the project enables e-flows but does not assess their impacts (positive and negative fully) with a view that this was completed in the Metropolitan Water Plan, 2017 to some extent, and would recommend that it be reviewed as part of work associated with the future Water Sharing Plan.
- Currently, Sydney Water does not shut down North Richmond for anything except large flood events, so it is unlikely that the extra average releases will significantly impact the operation of North Richmond from a water quality perspective. Increased flows through the river are likely to reduce algae.

North Richmond and impact of release to manage flooding

- Please note the potential impact on the North Richmond water delivery system, such as a disruption in supply and the potential for additional upgrades and/or loss of water supply to customers.
- System storages are limited and could empty with a longer duration flood with reduced treatment plant production due to poor raw water quality and/or flooding of key infrastructure (e.g. pumps to the WFP, connecting pipework from the North Richmond plant across the bridge to the rest of the system). There is a heightened risk of loss of water supply to customers in the local area during an extended duration flood release event.
- These changes in flow regimes are an additional consideration to the e-flows changes that need to be assessed for impacts in terms of quality and may put extra strain on production capacity at North Richmond.

Prospect/Warragamba/Orchard Hills impacts

- Sydney is already exposed to risk of a boil water alert during high flow events through Warragamba, as seen in recent flood events. Generally, this is caused by high turbidity/colour in the dam resulting in an inability to treat water to the right standard and/or an impact on capacity of the plants due to the poor-quality water.
- Based on the understanding Sydney Water has of the release regime, the general intent is to release floodwater at a slower rate. Previously, overtopping the dam would rapidly discharge poorer quality water. This will now be held back with water stored in the dam for extended periods, risking a more prolonged exposure of the Water Filtration Plant (WFP) to poor quality feed water, impacting the treatment plant's ability to operate at capacity and increasing chances of failure to supply water and the need to boil water. It is very difficult to forecast the magnitude of the impacts as all events in the dam are specific and discharging water over the dam wall is just one mechanism used to manage poor quality water. Changes in water depth and impacts of stratification are difficult to quantify, but based on the approach outlined, the existing risks will likely be increased.
- There are potential opportunities to actively manage the water quality through more targeted release through the e-flows line. Modifying locations of take-off and selecting specific layers for river discharge via the e-flow line could be a way to manage poor quality events. This is recommended to be included in design and operation to ensure that the potential to manage water supply risk is maximised.

Sydney Water requests several clarifications:

- **EIS Executive Summary**
    1. On Page 15, it is noted that "during most of the construction phase, the maximum water level of the dam will need to be maintained at around five metres below full supply level to allow construction activities to operate safely".
        - Sydney Water notes that a 5 metre reduction in full supply level (FSL) is equivalent to an estimated 18% dam capacity. Depending on the duration of construction, this could have an impact on yield for Sydney Water's drinking water supply. Construction is expected to take about 5 years. This could substantially increase operation of the Sydney Desalination Plant or accelerate major bulk water upgrades. Reflections of this cost impact will need to be assessed.
- **EIS Chapter 5 Project Description**
    1. Chapter 5 notes there may be a 30% drop in volume for Greater Sydney storage dure to the lowering of FSL by 12 metres.
        - Sydney Water would welcome a detailed comparison between the options, including the option to reduce the FSL, and assist Water NSW in informing and normalising any alternative options that are being considered from a resilient and reliable water supply perspective.
- **EIS Chapter 27 Water Quality**
    1. Currently Sydney Water can source select from the top to the bottom of the dam. With the raised wall, does this mean Sydney Water will not be able to extract from the top when we have water stored for flood attenuation (i.e. current outlets will/will not change)?

- During some events, the flood water skims across the surface of the dam and is released. In others, the flood water enters the dam lower in the storage and the better quality water is above the flood layer. Will water be released from the surface (i.e. top % of the dam, or what level will it be released from?)
- Sydney Water is heavily dependent on adjusting the offtake to Prospect/Orchard Hills/Warragamba water filtration plants to manage water quality. It is critical that this is provided for.
- Sydney Water understands the e-flows release will allow for release from 17 layers of the dam. It would be beneficial if these release layers could be adjusted with the function of releasing poor quality water as required from the dam to protect the water supply.
- A further improvement would be to enable connection of the Warragamba pipelines to the e-flows 17-layer offtake arrangement.
- Can it be confirmed that the proposed offtakes to Prospect WFP will remain the same as the current?

2. In **Section 27.5.3** which discusses upstream water quality, Sydney Water recommends that where adjustments to treatment processes are referenced, it should be noted that there are additional costs, potential customer impacts (e.g. temporary changes in taste) and even likely to be additional treatment plant upgrades required where the cost would ultimately have some impact on customer's bills. It may be beneficial *(changed from necessary)* to modify operation of the dam wall raising until such time as suitable treatment upgrades can be implemented.
3. **Table 27-8** summarises key finding and outcomes over the past 15 years. Adding known Sydney Water treatment plant incidents such as extended issues at Prospect WFP after 2012/13 and after February 2020 would be a useful addition to the table.

Full details of our comments can be found in the attached appendix 1. Sydney Water welcomes continuing engagement with Water NSW to work towards mutually beneficial outcomes. If you require any further information, or would like to meet with Sydney Water to discuss in more detail, please contact the Growth Planning Team at urbangrowth@sydneywater.com.au who can arrange this.

Yours sincerely,

Wayne Jackson
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Attached: Appendix 1 Sydney Water submission comments

Appendix 1 – Sydney Water Submission Comments (SSI-8441 Warragamba Dam Raising)

No.	Document	Section	Page No.	Comment Type	SW Comment
1	EIS Chapter 27 Water Quality	General note		Clarification	1. Currently we are able to source select from the top to the bottom of the dam – with the raised wall, does this mean we will not be able to extract from the top when we have water stored for flood attenuation (i.e. current outlets will not change). 2. During some events the flood water skims across the surface of the dam and is released. In others, the flood water enters the dam lower in the storage and the better quality water is above the flood layer. Will water be released from the surface (i.e.. top % of the dam, or what level will it be released from?) 3. Sydney Water is heavily dependent on adjusting the offtake to Prospect / Orchard Hills/Warragamba water filtration plants to manage water quality. It is critical that this is provided for. 4. We understand the e-flows release will allow for release from 17 layers of the dam. It would be beneficial if these release layers can be adjusted with the function of releasing poor quality water as required from the dam to protect the water supply. 5. A further improvement would be to enable connection of the Warragamba pipelines to the e-flows 17-layer offtake arrangement, for increased flx 6. Notes that the current offtakes to Prospect WFP will remain the same as current - SWC would like this confirmed.
2	EIS Executive Summary	Operation of the dam with flood mitigation zone	39	Amendment request	1. Please note the potential impact on the North Richmond water delivery system (e.g. disruption in supply and potential for additional upgrades and/or loss of water supply to customers) 2. System storages are limited and could empty (i.e. loss of water supply to customers) with a

					longer duration flood with reduced treatment plant production due to poor raw water quality and/or flooding of key infrastructure (e.g. pumps to the water filtration plant, connecting pipework from the North Richmond plant across the bridge to the rest of the system etc) 3. Amendment recommended: please note that there is a heightened risk of loss of water supply to customers in the local area during an extended event but that this is offset by the reduced damage to property and loss of life (please clarify if this is the case) and efforts would be made to limit the impact of flood waters on key crossings (including connections for essential services such as water) and control the quality of discharge from Warragamba Dam to help Sydney Water to maintain supply to customers in the North Richmond delivery system
3	EIS Chapter 27 Water Quality	27.2.4.1	8	Recommendation	1. The impact of inundation is covered in a lot more detail in section 27.5.3 - could we reference the later chapter for more detail re NOM etc so that readers know that the impact of inundation (as opposed to runoff) has been considered in addition to the surrogate events.
4	EIS Chapter 27 Water Quality	27.2.4.1	9	Recommendation	1. Expanding on the above comment - the report only considers degradation in water quality in terms of the effects of inundation. An additional impact is the increased need to store water in the dam for an extended period, potentially prolonging the impact of degraded water quality on treatability of dam water, and therefore prolonging the risk of a boil water alert for Sydney. Additional attention is needed with respect to the ability to offtake water of different quality either for river discharge or for supply to the Warragamba Pipelines.

5	EIS Chapter 27 Water Quality	Table 27-8	27-19 to 27-26	Recommendation	1. Known Sydney Water treatment plant incidents (e.g., extended issues at Prospect WFP after 2012/13 and after Feb 2020) would be a useful addition to this table
6	EIS Chapter 27 Water Quality	27.5.3 Upstream water quality	27-42 to 27-48	Recommendation	1. Where adjustments to treatment processes are referenced it should be noted that there are additional costs, potential customer impacts (e.g. there may be temporary changes in taste etc.) and even likely to be additional treatment plant upgrades required where the cost would ultimately have some impact on customers' bills.
7	EIS Chapter 27 Water Quality	27.5.3 Upstream water quality	27-42 to 27-48	Recommendation	1. Expanding on the above comment - it may be necessary to modify operation of the dam wall raising until such time as suitable treatment upgrades can be implemented.
8	EIS Chapter 5			Clarification	1. We would welcome a detailed comparison between the options including the option to reduce the FSL and assist WaterNSW in informing and normalising any alternative options that are being considered - from a resilient & reliable water supply perspective
9	EIS Executive Summary	page 15 comment	15	Clarification	1. 5m reduction in FSL is equivalent to an estimated 18% of dam capacity.... depending on the duration of construction this could have an impact on yield for Sydney's drinking water supply .... construction appears to take about five years from the start (reference note on p14 above figure 11 in Exec Summary) ... this could substantially increase operation of the Sydney Desal Plant or necessitate the need to accelerate major bulk water upgrades and it would be good to reflect the cost impact of this. 2. Please also reference the sections where construction controls are captured to minimise the risk of contamination of the dam (e.g. runoff

					through construction site, management of spills, leaching of concrete etc.)
10	EIS Executive Summary; EIS Chapter 29	Figure 13; Figure 29-2 Project operation	16;7	Clarification	1. This is throughout each of the relevant diagrams in the EIS. It does not seem that there should be change to dry weather inundation level, however the diagram implies this would be the case. I assume it relates to the role of the drum gates but we request that this be clarified.
11	EIS Executive Summary	Page 30	30	General comment	1. Given that more rainfall events would be retained by the project, and for longer, we do not think the area from FSL to 2.8m above FLS is unaffected. The maximum duration of inundation changes from 4 to 10 days, thus the impacts of inundation in this range would differ from current state.