

# MDBA ANALYSIS OF THE HATTAH NORTH FLOODPLAIN PROJECT BUSINESS

## CASE

### PROPONENT: VICTORIA

The MDBA's advice covers the following criteria in the Basin Officials Committee agreed *Phase 2 Assessment Guidelines for Supply and Constraint Measure Business Cases* (the Guidelines):

- Eligibility (3.1)
- Ecological values of the site (4.2)
- Ecological objectives and targets (4.3)
- Anticipated ecological outcomes (4.4)
- Hydrology of the area and environmental water requirements (4.5)
- Operating regime (4.6)
- Assessment of risks and impacts of the operation of the measure (4.7)
- Complementary actions and interdependencies (4.9)
- Project governance and project management arrangements - legal and regulatory requirements (4.11.2)

Business case assessments by the Department of the Environment will include advice from the MDBA on the technical feasibility and fitness for purpose of proposals as per section 4.8 of the Guidelines.

### Key points/summary

- The proposal meets the definition of a 'supply measure' under the Basin Plan and has adjustment potential.
- Information provided for ongoing operations and maintenance resourcing does not currently meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project. Decommissioning works is not a suitable risk management action as this would negate the SDL adjustment benefits. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.
- There is evidence that the project will provide ecological benefits, however there are issues where proposed hydrological targets exceed natural flows and are inconsistent with the Basin Plan. The operating regime set out in the business case must be amended in the detailed design phase of the project to avoid inundation at frequencies above natural levels. This will be required by no later than the end of August 2015 to allow sufficient time for the proposal to be modelled.

## 1. Eligibility (3.1)

The proposal meets the eligibility requirements under the Guidelines for further assessment and consideration in the SDL adjustment mechanism.

### 1.1 Supply measure requirements (3.1.1)

The proposal would meet the definition of 'supply measure' under the Basin Plan (cl.7.03 and (cl.7.15) to:

- operate to increase the quantity of water available to be taken in a set of surface water SDL resource units compared with the quantity available under the benchmark conditions of development;
- achieve equivalent environmental outcomes with a lower volume of held environmental water than would otherwise be required; and
- have no detrimental impacts on reliability of supply of water to holders of water access rights that are not offset or negated.

noting that a final determination will require MDBA modelling.

### 1.2 Measures not included in the benchmark conditions of development (3.1.2)

The MDBA confirms that the measure was not in the benchmark conditions of development (cl.7.02 of the Basin Plan).

## 2. Ecological values of the site (4.2)

A detailed description of the ecological values and features of the site is provided.

The ecological values of the site identified within the business case include the EPBC listed Murray cod as a species either recorded or expected to be in the site.

The Hattah North floodplain, and the Lake Boolca area in particular, is only intermittently flooded and its condition is severely degraded.

## 3. Ecological objectives and targets (4.3)

The description of the site's ecological values in the business case is generally consistent with the assessment criteria in the Guidelines. Some additional clarification would be helpful to understand the targets more fully. The issue of above natural flows needs to be addressed to meet Guideline criteria.

Ecological objectives and targets are specified in section 5 of the business case. Site specific targets for the site have been cross-referenced against the broad Basin Plan objectives, however their relationship with site specific objectives and targets in Appendix D of *The proposed Environmentally sustainable level of take for surface water of the Murray–Darling Basin: method and outcomes (November 2011)* (ESLT report) is not directly addressed. The MDBA's assessment is that the site specific targets are not inconsistent with those objectives.

Ecological targets have been quantified however further evidence/analysis is required to enable a determination as to whether the selected targets are adequate or meaningful. The specific

objectives of restoring floodplain productivity to maintain resident populations of vertebrate fauna including carpet python, lace monitor and bats are measured against a target that only represents bat abundance. The rationale is not clearly described although it is assumed that these measures are being used as proxies for other vertebrate fauna.

While ecological values of the site include the EPBC listed Murray cod, and inundation of River Red Gum woodland is expected to provide temporary habitat for vegetation fish such as gudgeon complex, rainbow fish and hardyhead, there are no objectives or targets for fish.

Further explanation is required on how recommended hydrological targets relate to the proposed operating regime where discrepancies exist. In a number of instances these do not appear to align directly e.g. different thresholds, and/or frequencies. This appears to have arisen at least in part because Ecological Associates (2014) refer to analysis of the frequency and duration of events under natural conditions which appears to have informed the recommended environmental water requirements. However, more recent hydrological analysis undertaken by Gippel (2014) shows that a number of these are overstated.

Related to the above, hydrological targets for River Red Gum forest and woodland and black box woodland in Appendix C appear to exceed the frequency and/or duration of flows which would have occurred under natural conditions. However, this is difficult to assess as analysis of the hydrological targets under different modelling scenarios is not presented.

Hydrological targets for red gum forest and woodland states that flows exceeding 80,000 ML/d inundate red gum woodland in Hattah North yet the recommended water requirement is a flow of 75,000 ML/d. The reason for this inconsistency is not explained. The recommended frequency of watering is six flood events in ten years yet the hydrological analysis presented in Table 5-2 of the business case and Gippel (2014) shows that under natural conditions these events occurred in less than five in ten years.

Similarly, the business case states that Lake Boolca would be inundated three to five times in 100 years however the operating regime for episodic wetlands is 15 per cent of years, up to five times more frequent. There is also inconsistency within the business case regarding the flows required to inundate black box woodlands which range from 100,000 to 140,000 ML/d.

Victoria has provided additional information which indicates that the operating regime in the business case, in which above natural frequencies are proposed, is not how the project will actually be run. The operating regime set out in the business case must be amended as per the additional information when developing the detailed design of the project, to avoid inundation at rates above natural levels. In the interim, the MDBA will pursue discussion with Victoria to resolve the issue, and to ensure that any modelling undertaken is consistent with the intent of the additional information. The amended regime will be need to be settled by the proponent as soon as possible, and certainly no later than the end of August 2015, to allow sufficient time for the proposal to be modelled.

## **4. Anticipated ecological outcomes (4.4)**

### **4.1 Anticipated ecological benefits (4.4.1)**

Anticipated ecological benefits are adequately described in the business case and Appendix C. Additional information on benefits as noted below should be provided at the detailed design stage.

A monitoring program is proposed to test outcomes against assumptions and adaptively manage works operations.

The Expert Peer Review Panel, which Victoria engaged to review the submitted supply measure proposals, highlighted in their summary report that principal ecological outcomes of each project are focused on enhancing vegetation and bird habitat. Benefits to other organisms are assumed to accrue collaterally from changes to the regime or as a result of habitat-related improvement from better vegetation condition. This appears to be particularly the case for the Hattah North project where no targets for fish have been specified and benefits are only anticipated for small bodied fish.

The business case identifies seven inundation dependent ecological vegetation classes of conservation significance. The percentage of each of these classes which benefits from the improved inundation regime should be specified.

#### 4.2 Potential adverse ecological impacts (4.4.2)

Potential adverse ecological impacts are covered to an acceptable level for the business case, noting that responsibility for actioning these strategies (including funding to adequately resource) must be incorporated into the detailed design and implementation of the proposal.

Risks assessed include the matters raised by the MDBA during the feasibility phase.

The residual risk rating is assessed as moderate for a number of key risks (low dissolved oxygen levels, blackwater events, increased carp populations) despite proposed mitigation measures. It is noted a risk management strategy will be developed for these. Three risks of particular concern where mitigation measures and monitoring will be essential are:

- Low DO levels – Ning et al 2014 assessed potential blackwater risks (unclear if assessment was undertaken using the two blackwater models developed by MDFRC as this is not presented). The report provided general recommendations for minimising risks while also acknowledging that the works can offer benefits in mitigating the impacts of hypoxic blackwater. Specifically, the operation of the Chalka North works is identified as a potential risk in the accumulation of high loads of bioavailable carbon. Similarly, hypoxic conditions are identified as a risk for the Bitterang North works. In addition the aggregated risk posed by multi-site watering is also raised although robust data does not exist. Managing the timing of flows/inundation and minimisation of pooling of water are two key mitigation strategies recommended along with a monitoring and evaluation program. It should be noted that the risks of negative watering impacts are not assessed in the SDL adjustment method.
- Increased carp populations – Recent carp population modelling undertaken by ARI highlight the significant risk of works sites providing conditions favourable to carp.
- Permanent removal or disturbance of flora and fauna habitat during construction – identified as a potentially very high risk after mitigation measures. This will require careful consideration during both the design and construction phases.

When considered in total, implementation of the mitigation measures for all the risks represents a large commitment of resources. As the supply measure is assessed on the basis that the risk mitigation strategies are put in place, it is important to ensure that responsibility for implementation of these strategies (including funding to adequately resource) is clearly defined in the detailed design in the event that the risk materialises. These include for example:

- additional monitoring (e.g. organic matter loads, dissolved oxygen levels, temperature salinity levels)
- additional on-ground actions (e.g. eradicate new infestations of pest plants, control pest animal populations, revegetate construction sites)
- additional planning and management functions (e.g. integrate water management with other sites in seasonal water planning process, develop a ‘fish exit strategy’ to inform regulator operation during the drawdown phase to maintain fish passage)
- additional operational requirements (e.g. tailor watering regimes to provide a competitive advantage for native fish over carp, agitate water using infrastructure to increase aeration, time water manipulations to drown seedlings)

Lloyd Environmental (2014) identify a number of ecological risk knowledge gaps across all proposal sites (presence and distribution of threatened species, threats from episodic reduction in hydrodynamic diversity, stranding/isolation of native fish). Given this uncertainty, these risks require further consideration throughout the life of the project i.e. detailed design, construction and operation and a monitoring and evaluation program will be essential to mitigate these risks.

As noted above, there is the potential for adverse impacts on species through the implementation of above natural flows, which needs consideration.

## 5. Hydrology of the area and environmental water requirements (4.5)

### 5.1 Current hydrology and proposed changes to the hydrology (4.5.1)

The business case and supplementary information provide sufficient information to explain the project’s current hydrology, and changes associated with the supply measure proposal. This meets the requirements of the Guidelines. To assist the proposal’s integration into the MDBA’s model-based assessment framework further clarification and refinements are likely to be required.

A hydraulic model was developed for the project using the MIKE-FLOOD modelling suite and was assessed by the Expert Peer Review Panel. The Panel’s report indicates that the hydraulic model developed is fit for providing critical information to assess the business case. This model was originally developed for TLM investigation decisions and the 2D component has been expanded to develop the business case. Uncertainties around unknown data, especially seepage and soil profiles may change the inundation extent significantly.

Notwithstanding these issues, the assumptions used to represent the measure have been documented and the models and information provided appear sufficient for the proposal to be integrated in the assessment framework at this stage.

An estimate of the volume of environmental water used at the site is given for one of the operating strategies, noting losses and return flows were not taken into account. This volume appears reasonable.

### 5.2 Environmental water requirements (4.5.2)

Information on environmental water requirements has been provided to the appropriate level of detail to meet the Guidelines criteria. The basis for the information would be strengthened by linking requirements with scientific literature on the water requirements of flood dependent communities.

Environmental water requirements are described in Appendix C. Discussion on the frequency at which different vegetation types will be inundated, with reference to environmental water requirements, is discussed in the ecological objectives and targets section.

## 6. Operating regime (4.6)

The business case does not provide a detailed operating regime, however the initial proposal of potential operating regimes is at a level of detail appropriate for concept design stage and is sufficient for initial modelling purposes. It is anticipated that further modelling to support a more detailed operating plan will be undertaken as this project is progressed. Noted below are areas in which further work should be carried out in the development of detailed designs.

The business case sets out the role of each key asset for the range of operating scenarios, taking into account flexibility for mitigating water quality issues or whether the landholder is willing to partake in the watering event, and whether the conditions are adequate (seasonality, frequency, duration and extent) to match the natural inflows and vegetation requirements.

The risks associated with operation of the works are addressed to an appropriate level for a concept design. It is anticipated that further modelling to support a more detailed operating plan will be undertaken as this project is progressed.

### Monitoring

There is not enough information about the monitoring activities to determine if there is sufficient monitoring planned to support operations and water accounting. Information about water entering, flowing within and exiting the site is necessary for the effective management of environmental watering events and their co-ordination with other river operations activities.

### Accounting for the delivery and use of environmental water

All watering sites will need fully-developed water accounting arrangements supported by well-resourced monitoring to account for water entering and exiting the site.

Accounting arrangements are not detailed in the business case, however we expect accounting will be integrated with the existing Hattah Lakes works under TLM, noting that there are some accounting issues still to be resolved regarding losses and the reliability of monitoring equipment.

An additional measuring point may be required at the Bitterang levee and regulator in order to account for water used by stage 1 and stage 2 separately.

### Use of environmental water

There is the potential for interaction between the proposed project and constraints, which may reduce, although not remove the benefits. The project allows for a directed, efficient delivery of environmental water and targeted inundation under dry conditions.

Additional water is not required to be pumped into the Hattah system because the water is re-used from TLM works watering. However, less water will be returned to the Murray, noting this will only be every ten years.

## 7. Assessment of risks and impacts of the operation of the measure (4.7)

The risk management approach adopted is consistent with the AS/NZS ISO 31000:2009 standard and the level of detail is appropriate for application at the concept design stage. However, a number of risks have not been mitigated in the current business case to a level which meets Guideline criteria, as noted below.

### Operation and maintenance

Information provided for ongoing operations and maintenance resourcing does not meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project.

The risk assessment of potential operation impacts lists lack of funding for ongoing operation, maintenance and management as a high risk to project success. The proposed mitigation actions aim to reduce the residual risk to low and include maintaining strong relationships with funding bodies and suspending operations if there are insufficient resources. Decommissioning works and/or suspending operations are not suitable risk management actions as they would negate the SDL adjustment benefits. In addition, a lack of resources for maintenance would result in asset impairment quite quickly. Should resourcing be reinstated at some later point, operation of those assets may not be possible. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.

This assessment does not consider the risk of insufficient resourcing for operations and maintenance from the perspective of being able to operate works into the future to achieve the benefits upon which the SDL adjustment is based. A failure to operate due to lack of funding would result in the intended ecological equivalent outcomes not being achieved, in effect a project in which the adjustment is not delivered on an ongoing basis. As such, this risk is not adequately mitigated without a clear funding source.

The MDBA considers that funding of operations and maintenance of these assets must be assured by the relevant state.

### Ownership and governance

While the business case outlines the issues to be taken into consideration for determining governance arrangements, it does not provide information on important issues such as the ownership of the assets created as part of this project and responsibility for on-ground operation of the works.

There is a risk that the works could become impaired if the organisation responsible for operating the works does not have an experienced engineering crew to promptly undertake repairs, especially following high flows.

### Water quality

Risks associated with water quality parameters outlined in chapter 9, part 2 of the Basin Plan have been addressed for the most part and have followed the AS/NZS ISO 31000:2009 Risk management—Principles and Guidelines.

The salt assessment has triggered the BSMS monitoring, however the peer review suggests the salt assessment could be refined further and will most likely reduce the salt impact.

## 8. Complementary actions and interdependencies (4.9)

The business case partly meets the Guidelines criteria for complementary actions and interdependencies.

Other supply measures are mentioned, particularly the Hattah Lakes TLM environmental works upon which this project builds. However no investigation of the interactions and interdependences between measures is provided on the stated basis that this can only be done once the package of measures is known. Careful consideration will need to be given as to how these works are best co-ordinated in order to achieve whole-of-system outcomes, and further details should be provided as to how best to manage co-ordinated watering to achieve outcomes as part of the next phase.

The operation of these works is independent of the existing TLM works but functions well together.

Linkages between constraints and the supply measure have not been addressed in the business case and should be considered where relevant in the assessment of the project.

## 9. Project governance and project management arrangements (4.11)

### 9.1 Legal and regulatory requirements (4.11.2)

The business case has provided most of the required legal and regulatory requirements and an appropriate management strategy for each. This criteria will be further reviewed in the Department of the Environment's assessment.

Some limitations to the information provided are:

- a possible need for legislative change for securing native vegetation offsets has been identified, but a management strategy for this change is not provided – however non-legislative options are also being explored;
- the business case flags that no new agreements need to be created with water holders in the Basin. This conclusion has been provided without any context around the consideration of the project's requirements for environmental water. It is noted that the Reference Group to assist and advise on the commissioning and operation for each project will include the CEWH and VEWH, providing opportunities for input at this stage. However consideration of how the timings and volumes of environmental water required might be accessed is not readily apparent; and
- while the business case identifies that no changes to water sharing frameworks and river operations rules and practices are required, consideration of how the implementation of the project will be reflected in the Victorian Murray Water Resource Plan should be considered in the future.

#### Easements and rights of access

In order to guarantee the ability to operate project works into the future, the owner of the asset or its agent will need to obtain and hold:

- the right to construct, operate and maintain the assets and the specific land required for these assets including land needed to gain access to the assets; and

- rights of access to all land impacted by a project for purpose of implementing the operating regime in order to achieve the intended ecologically equivalent outcomes upon which the SDL adjustment is based.

Although the business case includes some information about the need for easements and access rights, there is insufficient information on who is responsible for ensuring that they are obtained, or who the beneficiary of the rights will be.

The MDBA's experience with similar infrastructure suggests that not addressing these issues early can impact the effective operation of the assets. The business case should include a commitment by the proponent relevant state that they will obtain and hold these rights.