

Resilient Valley, Resilient Communities Hawkesbury-Nepean Valley Flood Risk Management Strategy

Frequently asked questions

Assessing the options



Why was an options assessment carried out for flood risk in the Hawkesbury-Nepean Valley?

The drivers for the Hawkesbury-Nepean Valley Flood Management Taskforce options assessment date back to 2012 and relate to:

- the 2011 Brisbane floods which demonstrated the consequences of major flooding in urban areas
- the long history of flooding in the Hawkesbury-Nepean Valley
- significant growth in the valley since the last major floods in the early 1990s
- the large population needing to evacuate in a flood, and the constrained evacuation network
- the 2012 State Infrastructure Strategy, which, recognising the above issues and concerns, recommended:
‘the NSW Government review all the major flood mitigation options available, including raising the Warragamba Dam wall, to significantly reduce the potential economic and social impact of flooding in the Hawkesbury Nepean Valley.’

What is the Taskforce Options Assessment Report?

The Taskforce Options Assessment Report brings together data and analysis from investigations and reports undertaken over four years. It synthesises into one document the approach, methodology, processes and outcomes of the assessments undertaken by the Taskforce (2014-2016), building on the work of the 2013 Hawkesbury-Nepean Valley Flood Management Review.

The analysis underpins the *Resilient Valley, Resilient Communities - Hawkesbury Nepean Valley Flood Risk Management Strategy (Flood Strategy)*, released by the NSW Government in 2017.

The Taskforce Options Assessment Report has been prepared to support ongoing engagement for the environmental impact statement (EIS) currently being prepared for the proposal to raise Warragamba Dam for flood mitigation and scheduled for public exhibition in 2019. It also addresses requests from stakeholders for more detailed information on the options assessment that informed the Flood Strategy.

What types of options are included in the report?

The Taskforce Options Assessment Report contains information about the broad range of options investigated in developing the Flood Strategy.

The options fall into two main categories, infrastructure and non-infrastructure options. Infrastructure options included new flood mitigation dams, river diversion channels, river dredging, local levees, and regional evacuation road upgrades. Non-infrastructure measures included land use planning and development controls, voluntary house purchase, flood mapping and forecasting, community awareness and floodplain governance.

As part of this work, detailed investigations into options related to Warragamba Dam included:

- operating the dam differently (pre-releasing water ahead of a flood, or ‘surcharging’ the gates)
- lowering the full supply level by five or 12 metres (the lowest possible with the existing dam gates)
- raising the dam wall by 14 or 20 metres to create a flood mitigation zone.

Why assess so many options?

The 2013 Flood Management Review for the Hawkesbury-Nepean Valley confirmed there is no simple solution to reduce flood risk. A mix of actions is needed to reduce risk now and into the future.

Infrastructure options can significantly reduce flood risk by lowering the chance of a flood event, reducing the exposure of homes and business to flood, and by increasing the certainty of time for evacuation. Options such as dams, regional road upgrades and drainage works were assessed in terms of the cost and benefit impacts.

Non-infrastructure options were assessed largely in relation to how they contributed to the prevent, prepare, response and recovery aspects of flood risk management, as well as the extent to which they contributed to the maintenance of flood mitigation benefits over time.

What methods were used to assess the options?

The Taskforce Options Assessment Report details the methods used to assess options. These include:

- detailed technical analysis of options to create a shortlist of feasible options
- a new regional flood model and extensive flood modelling using the 'Monte Carlo' technique¹
- mapping all existing and permissible development in already identified precincts in the floodplain
- a new 'agent-based' evacuation model used to run thousands of evacuation scenarios²
- assessment of flood damages and risk to life under multiple flood scenarios
- preliminary environmental, cultural and social impact assessment of shortlisted options
- cost benefit analysis of shortlisted options, including sensitivity analysis.

What were the results of the options assessment?

Based on the evaluations, raising Warragamba Dam by around 14 metres for flood mitigation was selected as the most effective infrastructure option. It provided the largest net benefits - balancing the significant reduction in risks to people's lives and homes downstream, with the impacts of temporary increased upstream inundation.

However, as the dam raising would not eliminate flood risk entirely, the Flood Strategy includes a range of non-infrastructure measures essential to mitigate and manage the ongoing flood risk. These include: new regional frameworks for land use and evacuation road planning; new flood risk mapping and information; building the capacity of the community to prepare for and respond to flood; improved rainfall and flood forecasting; and new evacuation road signage. Phase One of the Flood Strategy (2016-2020) is currently being implemented across state and local government, businesses and the community - coordinated by Infrastructure NSW.

What is the current status of the options assessment?

Some material in the Taskforce Options Assessment Report will be superseded by ongoing work under the Flood Strategy. Population, risk to life, flood damages and relevant cost estimates are being updated for the Warragamba Dam Raising Environmental Impact Statement and preparation of a final business case to the NSW Government.

How can I find out more about the Taskforce Options Assessment Report?

The Taskforce Options Assessment Report is available at www.insw.com/flood-strategy. If you have trouble accessing the electronic version please email floodstrategy@insw.com to request a printed copy of the document.

¹ Monte Carlo simulation performs risk analysis building models and possible results by substituting a range of values for any factor that has inherent uncertainty. Using this method, around 19,500 flood scenarios were run to reflect the significant uncertainty around catchment conditions, rainfall frequency and pattern, dam storage levels, and timing of inflows from the tributary rivers and creeks.

² The 'agent base' (individual car) model was purpose-built for the Taskforce by NICTA (now Data61 with CSIRO). The model simulated more than 12,500 evacuations involving a broad range of variables related to: current and expected future population, road networks, evacuation procedures, potential infrastructure upgrades, and 46 flood events ranging in probability. This model is currently being upgraded to support the environmental impact assessment for the Warragamba Dam Raising Proposal, as well as emergency, road and land-use planning as part of the implementation of Phase One of the Flood Strategy.