

5 August 2019

Dam Safety Consultation 2019  
Building System Performance  
MBIE  
WELLINGTON - By email: [damsafety@mbie.govt.nz](mailto:damsafety@mbie.govt.nz)

Dear Sir

## Introduction

Water New Zealand is a national not-for-profit sector organisation comprising approximately 2000 corporate and individual members in New Zealand and overseas. Water New Zealand is the principal voice for the water sector, focusing on the sustainable management and promotion of the water environment and encompassing the three waters: drinking water, waste and storm waters.

Many of our members are local authorities who, for the purposes of this consultation, own and operate water storage dams to supply municipal drinking water, and own and operate waste stabilisation ponds to treat effluent from wastewater systems.

We have attempted to answer the questions highlighted in the consultation document and our responses reflect your numbering of the questions.

## Proposed Definitions of Key Dam Safety Terms

### **1. Do you think the proposed definitions of key dam safety terms are appropriate?**

No.

### **2. If you do not think any of the proposed definitions are appropriate, can you make suggestions on how any of them can be improved?**

We suggest that a definition of “dam owner” for the purposes of the dam safety regulations should be added. For some dams, the land occupied by the reservoir, dam embankment/structure, and appurtenant structures, is owned by different organisations. Consents associated with the structure may also be held by different organisations. The structure may have multiple purposes, each associated with different stakeholders or owners, and only one of these purposes may relate to the structure’s function as a dam that stores, controls, or diverts water. There may be service agreements already in place between the organisations that do not account for the proposed dam safety regulations.

A classifiable dam is defined in MBIE’s consultation document as including either a large dam, or a dam of less than 4m in height and holding 30,000m<sup>3</sup>. A minimum height should be specified for the second category to avoid capturing low risk dams, such as excavated ponds.

The definition of “large” dam and “classifiable” dam should be aligned to provide a simpler, less confusing approach, and remove the apparent discrepancy between dams that require regulation in terms of building consents (“large” dams) versus post-construction dam safety management (“classifiable” dams). It is unclear why a different basis for regulation is warranted by the two activities.

The measured height and volume to identify classifiable dams needs to be consistently and clearly defined. Refer to further comments in the response to Question 11.

**3. *Do you have any comments on how these proposed terms will work in practice?***

Resolving complex ownership situations is expected to be one of the major challenges in implementing the proposed regulations. Thus, the recommendation above to include “dam owner” as a key definition.

**Proposed ‘Recognised Engineer’ Requirements**

**4. *Do you agree with the proposed qualification requirements for a ‘Recognised Engineer’?***

Yes, noting this may be affected by proposed changes to occupational regulation within the building sector. Much of the work by a Recognised Engineer is safety-critical and may be appropriately regulated under licensing.

**5. *Do you agree with the proposed competencies for a ‘Recognised Engineer’?***

No.

**6. *If you do not agree with the proposed qualifications and competencies, please comment on what they should be.***

The definition states that a Recognised Engineer must meet all or some of the competencies. Many of the listed competencies are essential to undertake the proposed activities of a Recognised Engineer, and should be compulsory, rather than optional.

Competencies should be described more specifically, i.e. “geotechnical principles” is too vague, and could be replaced by something more specific such as “geological and geotechnical principles that are relevant to dam design, construction, and management”.

**Market Availability of Recognised Engineers**

There are likely to be a limited number of Recognised Engineers, and this may have implications for implementation of the regulations in the proposed timeframes. An assessment of whether the timeframes are achievable should be made based on the estimated number of dams requiring a PIC and DSAP, the likely number of Recognised Engineers, and average timeframes to develop a PIC and DSAP. Based on this assessment, consideration should be given to the timeframes for implementation of the regulations, potential mechanisms to allow for unavoidable delay, support to the industry to build capacity in dam safety expertise, and support to owners for procuring services in a constrained market.

The register of Recognised Engineers needs to be established before the regulations are gazetted. There is a very short period (3 months) between the regulations coming into force and PIC needing to be notified for all classifiable dams. This timeframe will not be met unless the process of establishing PIC is complete for most classifiable dams before the regulations come into force. Thus, the 12-month period between the regulations being gazetted and coming into force will be critical for advancing PIC assessments.

**Role of the Recognised Engineer**

The regulations should clearly identify whether a Recognised Engineer can audit and certify a PIC or DSAP that they have also prepared, or whether they should have an independent review function and thus must be separate from the party that has prepared the PIC or DSAP.

**8. The proposed timeframe for regulations to come into force is 12 months after they are gazetted. Do you think this timeframe is adequate?**

Unclear – see comment below.

**9. If you do not think the timeframe is adequate, please tell us how much time you would prefer.**

The 12 months between the regulations being gazetted and coming into force appears reasonable. Several recommendations are made in relation to other timeframes embedded in the dam safety framework:

- The timeframe between the regulations coming into force and dam owners submitting PIC for all classifiable dams should be reviewed for the number of dams that are likely to require a PIC and the likely number of Recognised Engineers. Three months seems likely to be optimistic. One year seems more likely to be achievable.
- The timeframe for review of DSAPs for Medium PIC dams should be increased from 7 to 10 years to avoid inefficiencies and costs due to not aligning with the typical 5-year period between Comprehensive Dam Safety Reviews and PIC reviews.
- Concerns regarding the cost and benefit of an annual dam compliance certificate, certified by a Recognised Engineer.
- In terms of implementing the regulations in the proposed timeframes, one of the major challenges is the time required to work through complex ownership situations.
- Another challenge for implementing the regulation in the proposed timeframes, is the time required to engage with stakeholders to obtain information as inputs to dam safety reviews and to work collaboratively on operation, maintenance, surveillance, and emergency response activities as part of a DSAP.
- Consideration could be given to enabling some staging of implementation where a dam owner has a number of dams, where ownership is complex, and where obtaining inputs from stakeholders is outside of the dam owner's control.

**10. Do you agree with the proposed classification threshold to determine if a dam is a classifiable dam?**

No.

**11. If you do not agree, what other measure could be used?**

As previously noted in the section on “key dam safety terms”:

- (1) A classifiable dam is defined in MBIE's consultation document as including either a large dam, or a dam of less than 4m in height and holding 30,000m<sup>3</sup>. A minimum height should be specified for the second category to avoid capturing low risk dams, such as predominantly excavated ponds.
- (2) The definition of “large” dam and “classifiable” dam should be aligned to provide a simpler, less confusing approach, and remove the apparent discrepancy between dams that require regulation in terms of building consents (“large” dams) versus post-construction dam safety management (“classifiable” dams).

The measured height and volume to identify classifiable dams needs to be consistently and clearly defined. We recommend the following:

- (1) The regulations should clarify whether the volume below the upstream “heel” of the dam should be included in the volume measurement or not.

The regulations should state more clearly and consistently that both height and volume should be measured from the crest of the dam. For example, Page 27 of MBIE's consultation document refers to **height and volume** based on measurement from the "**peak operating level**". Page 28 refers to measuring **height** based on the Building Act, which is based on measurement from the **crest of the dam**. Page 29 refers to measuring **volume** based on Module 1 of the New Zealand Dam Safety Guidelines, which is also based on measurement from the **crest of the dam**. The definition of "peak operating level" is potentially more complex to identify and subject to interpretation compared with the "crest of the dam". For example, for "peak operating level", it may be necessary to identify a design flood, and consider if any blockage should be allowed for. Therefore, measurement of height and volume based on the crest of the dam is supported.

**12. Do you agree that it is unnecessary to have a separate category for referable dams (considering the proposed classification threshold and regional authorities' powers under section 157 of the Building Act)?**

Removing the referable dam category is supported, given the latest proposed definition of classifiable dam.

**13. Do you agree with the proposed Potential Impact Classification system in Step 2?**

Yes, but some guidance is recommended to support consistency, i.e. benchmark examples of PIC assessments. Refer further discussion under the "Guidance and forms for compliance" subheading.

**15. Do you agree with the proposed content of a Dam Safety Assurance Programme?**

DSAP based on recommended practice versus "bottom line" requirements

There is a difference between recommended industry practice as represented in the New Zealand Dam Safety Guidelines (NZSOLD 2015), and "bottom line" requirements below where fines and legal action are appropriate.

The regulations should support (though not necessarily require) development of a DSAP based on recommended practice to best reduce dam safety risks, rather than minimum requirements before fines are incurred. Compliance against this DSAP will then be assessed on an ongoing basis through the Annual Dam Compliance Certificate process, which may discourage dam owners from adopting a more stringent DSAP at the outset.

To avoid this conflict, the Annual Dam Compliance Certificate should explicitly allow for non-compliance with elements of the DSAP that go beyond minimum legal requirements. Guidance on minimum legal requirements would also be valuable to support consistency when Recognised Engineers are assessing compliance with a DSAP.

Who should undertake dam safety reviews?

More clarity should be provided on who should undertake dam safety reviews. Table 5 of MBIE's consultation document notes that IDSRs should be undertaken by an external technical advisor but is less clear what is required for CDSRs. It is noted that requiring IDSRs to be undertaken externally, even by experienced dam owners, will increase compliance costs that needs to be justified against the benefit of such a requirement.

There are recommendations in the New Zealand Dam Safety Guidelines (NZSOLD 2015) regarding who should undertake dam safety reviews, but these are recommendations only, which allow some flexibility to suit the specific dam and dam owner.

**16. Do you think there are any elements in the Dam Safety Assurance Programme that are missing or are too onerous?**

Managing dam safety issues

Table 5 of MBIE's consultation document specifies that a DSAP should include systems for dam safety deficiency investigation, assessment and resolution. This is a challenging element with potentially substantial costs for compliance.

Guidance on timeframes to address dam safety deficiencies that are proportionate to risk, recognising any interim risk reduction measures would be valuable to provide a consistent approach in this difficult area.

Certification of compliance with a DSAP should be on the basis of demonstrating progress to resolve deficiencies within "reasonable" timeframes as per guidance point above, recognising that progress may be constrained by cost, lack of information, and external factors such as resource consent processes.

**17. Do you agree that it is unnecessary to have an accreditation regime at present?**

The cost associated with an annual Dam Compliance Certificate from a Recognised Engineer is considered especially onerous. The Building Act includes provision to remove the requirements for an annual dam compliance certificate for an accredited dam owner (Section 150A), which could be beneficial in reducing compliance costs associated with the annual Dam Compliance Certificate.

**18. Do you agree with the proposed definition of 'moderate earthquake'?**

No.

**20. If you do not agree with the proposed definitions of 'moderate earthquake' and 'moderate flood', what definitions do you consider more appropriate, and why?**

Some flexibility should be provided for flood detention dams in terms of the return period for a "moderate earthquake". Many flood detention dams are dry most of the time, so the exposure time for an uncontrolled release of water due to an earthquake is much lower than for a dam with a permanent water depth. Even if a flood detention dam failed in a moderate earthquake, there may be minimal downstream consequences if the dam is dry at the time and if it is reasonable to expect the dam can be made safe before a subsequent flood occurs.

**25. If you do not agree with the proposed definitions of 'earthquake threshold event' or 'flood threshold event' what definitions do you consider more appropriate and why?**

Some flexibility should be enabled for flood detention dams in terms of the return period for an "earthquake threshold event".

**29. For owners of dams: What information would you need to ensure the regulations are implemented effectively?**

The regulations are heavily dependent on Recognised Engineers. Decisions by Recognised Engineers under the framework will be complex, based on experience and judgement, and potentially have significant financial and legal implications for dam owners. Regional

authorities have limited grounds to refuse to approve a PIC or DSAP provided the certification is by a Recognised Engineer.

As such, guidance for Recognised Engineers may be beneficial to provide consistency in critical areas involving subjective judgement, for example, benchmark examples of PIC assessments, specific guidance for DSAPs for flood detention dams, minimum legal requirements for certifying compliance with DSAP, and reasonable timeframes to address dam safety deficiencies that are proportionate to risk.

Guidance on resolving complex ownership situations would also be valuable for potential dam owners to help implement the regulations within the proposed timeframes.

**30. *Do you have any comments on the proposed content of the forms for a Dam Classification Certificate, Dam Safety Assurance Programme or Annual Dam Compliance Certificate?***

DSAP based on recommended practice versus “bottom line” requirements

The Annual Dam Compliance Certificate should explicitly allow for non-compliance with elements of the DSAP that go beyond minimum legal requirements. This would support the initial development of a DSAP that reflects recommended practice rather than just minimum requirements.

Guidance on minimum legal requirements would also be valuable to support consistency when Recognised Engineers are assessing compliance with a DSAP.

Annual Dam Compliance Certificate

The wording of the Annual Dam Compliance Certificate in the bullet points on page 46 should be revised to reflect that minor items of non-compliance are acceptable.

Benchmark examples of PIC assessments

The assessment of PIC is critical for the balance between managing the potential risks of dam while avoiding undue compliance costs. There is a difference in compliance costs between a Low and Medium PIC dam, so the selection of PIC will be important to dam owners and compliance costs across New Zealand. There is also acknowledged subjectivity inherent in some aspects of PIC assessment, such as potential loss of life estimates.

The regulations should retain flexibility for Recognised Engineers to make complex decisions regarding PIC, recognising the situation for each dam is unique. Benchmark examples may help support consistency, focussed on those aspects of the assessment that are heavily dependent on subjective judgement, such as potential loss of life estimates.

Specific, comprehensive guidance for DSAPs for flood detention dams

Unlike many other dams that retain a significant permanent depth of water, flood detention dams can have a fundamentally different risk profile because they may be dry or close to dry most of the time. The period of exposure, when a dam failure could potentially occur, is limited to when reservoir levels are temporarily elevated during a storm. Lowering reservoir levels is a relatively standard interim risk reduction measure if a dam safety deficiency is identified, and for flood detention dams, this is typically the situation by default.

It is acknowledged that if damage or progressive deterioration occurs between storm events, and is not detected or not able to be “made safe” before a storm occurs, then the risk reduction due to the limited period of exposure to high reservoir levels may be forfeited. At the same time, lowering water levels for inspections or repair is typically achieved by default

for flood detention dams rather than being a difficult decision for dams used for other purposes such as irrigation, water supply or hydroelectric power generation.

Furthermore, dam safety management should potentially be focussed on different risks for flood detention dams. For example, flood detention dams may have a higher risk of culvert blockage, and inlet scour, and a lower risk of failure due to an earthquake, or internal erosion (the latter depending on storm duration and embankment permeability).

Based on the above we recommend additional guidance is provided for developing a DSAP specifically for flood detention dams. There is some specific guidance in the New Zealand Dam Safety Guidelines (NZSOLD 2015), such as for routine visual inspection frequency. Given the large number of flood detention dams in New Zealand and their special characteristics, comprehensive and specific guidance is warranted to support a consistent approach to dam safety.

#### Minimum legal requirements for certifying compliance with DSAP

Refer also to the responses to Question 15 and 30 above. Guidance on minimum legal requirements would be valuable to support consistency when Recognised Engineers are certifying compliance with a DSAP. There is a difference between recommended industry practice as represented in the New Zealand Dam Safety Guidelines (NZSOLD 2015), and “bottom line” requirements below which fines and legal action are appropriate.

#### Timeframes to address dam safety deficiencies that are proportionate to risk

Table 5 of MBIE’s consultation document specifies that a DSAP should include systems for dam safety deficiency investigation, assessment and resolution. This is a challenging element with potentially substantial costs for compliance. Progress may also be constrained by cost, lack of available information, and external factors such as resource consent processes.

The regulations should retain flexibility for Recognised Engineers to assess compliance with a DSAP in terms of this element given the unique constraints for each dam. Guidance (as opposed to firm rules) on reasonable timeframes may help support consistency of practice.

#### Resolving complex ownership

For some dams, the land occupied by the reservoir, dam embankment/structure, and appurtenant structures, is owned by different organisations. Consents associated with the structure may also be held by different organisations. The structure may have multiple purposes, each associated with different stakeholders or owners, and only one of these purposes may relate to the structure’s function as a dam that stores, controls, or diverts water. There may be service agreements already in place between the organisations that likely do not account for the proposed dam safety regulations.

Resolving complex ownership situations is expected to be one of the major challenges in implementing the proposed regulations.

We have recommended that a definition of “dam owner” for the purposes of the dam safety regulations should be added to the key definitions. (Refer also to the response to Question 2 above.) Furthermore, it may be beneficial to provide specific guidance on resolving complex ownership situations.

### **31. Can you describe any other costs and benefits not discussed in Table 6?**

The regulations will provide greater emphasis and clearer requirements for dam safety management, which will provide a better basis for funding these activities.

The example costs in Section 8 of the consultation document are supported as helpful for budgeting for dam owners. As an added benefit, the costs also provide a rough indication of the scale of assessment that is intended, which supports consistency of assessments.

The following additional costs are not clearly identified in Table 6:

- Managing communications with stakeholders, public, and downstream residents.
- Investigations and physical works to address dam safety issues. These may be quite substantial costs.
- Updating LIMs.
- Processes and physical works associated with emergency preparedness, i.e. consulting residents, training and drills with civil defence and external parties, and installation of warning systems.

Engaging with Maori as partners where there are customs and protocols in connection to a waterway with a dam.

**34. *If you are following the NZSOLD dam safety guidelines, please tell us about any additional costs you may incur from implementing a Dam Safety Assurance Programme?***

There are costs for staff to set up and administer a dam safety management system across a portfolio of dams, costs for survey, costs of external consultants for technical assessments and ongoing certification (PIC, dam safety reviews, DSAPs), costs for operation, maintenance and emergency preparedness activities, costs of projects to investigate and address dam safety issues.

## **Further Responses (Outside of Discussion Paper Questions)**

### **Responsibilities for Stakeholders**

The proposed regulations place responsibilities on dam owners to ensure that their dams are maintained to an acceptable level of safety. As previously noted, establishing ownership of the dam may not be clear cut. For example, the land on which the dam, reservoir and appurtenant structures are situated may be owned by multiple organisations. The dam may also have multiple consents and multiple purposes, each associated with different stakeholders/owners. We recommend that a key definition is added for “dam owner”, and that some guidance is provided on resolving complex ownership situations.

It appears that stakeholders are not allocated any legal responsibilities under the regulations. A dam owner may need to obtain information from a stakeholder or work with a stakeholder collaboratively to fulfil obligations under the regulations. For example, a stakeholder could comprise a separate organisation with a utility buried in the dam embankment, and it may be necessary to obtain information on the utility and monitor its condition as part of a DSAP. This would be even more complicated if the dam owner, does not own the land on which the dam embankment is positioned. There may be existing service agreements in place that likely do not account for the proposed dam safety regulations.

It is recommended that a mechanism is identified in the regulations for dam owners to engage with stakeholders, where the stakeholder influences dam safety directly.

### **Heritage Dams**

Consideration should be given to how the proposed regulations apply in relation to heritage dams. These dams may have special challenges for compliance relating to available design and construction information, and tensions between protecting a heritage structure and modern dam safety practice.



## Costs of Resolving Conflicts with Maintenance Conditions in Existing Resource Consents

MBIE's consultation document identifies two mechanisms for revising consent conditions where they conflict with requirements in the proposed dam safety regulations. These two mechanisms will require substantial time and cost to implement. A more efficient approach that would avoid undue administration costs would be for the dam safety regulations to include an overriding single statement that, where in direct conflict, the requirements in the dam safety regulations override maintenance requirements in consent conditions.

## Managed Process to Resolve Non-compliances

It may be valuable to have a managed process to resolve non-compliances, separate from the penalty-based system in the Building Act. This process would focus on support and collaboration to resolve non-compliances in reasonable timeframes. In some cases, a dam owner may be making every effort to resolve a non-compliance but may be constrained by factors outside their control, for instance a lack of available Recognised Engineers. As an additional benefit, there may be learnings from this managed process that feed back into the review process for the dam safety framework itself.

## Special Challenges where a Dam has been Vested in a Council

In some cases, a dam owner may have limited information on a dam and be making every effort to obtain information, for example where a dam has been historically vested by a developer in a council. This may also be the case where there has been a change in dam ownership for other reasons. The limited information may make compliance with the regulations more challenging, and also add to compliance costs if information must be obtained by survey and physical investigations rather than drawings and records.

Yours sincerely

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Chief Executive