BUILDING PERFORMANCE

Dam Safety Guidance

GUIDANCE

Guidance for dam owners, technical practitioners and regional authorities

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government

Ministry of Business, Innovation and Employment (MBIE)
Hīkina Whakatutuki – Lifting to make successful

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

The Dam Safety Guidance document is produced by the Building System Performance branch.

This document is issued as guidance under section 175 of the Building Act 2004.

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First published May 2022

ISBN 978-1-99-102234-9 (online)

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Contents

1. Purpose

The purpose of this guidance document is to support understanding of the Building (Dam Safety) Regulations 2022 (the regulations) for dam owners, technical practitioners and regional authorities, and to provide guidance to assist preparing for and fulfilling the requirements of the regulations.

This guidance seeks to:

- act as a guide to the regulations and the Building Act 2004 (the Building Act) as it relates to post-construction dam safety
- clarify MBIE's role as a dam safety regulator
- provide a summary and outline the implementation timeframes for the regulations
- describe and explain what steps the owner of a classifiable dam must take to comply with the regulations, and what role recognised engineers and regional authorities play to support and administer these steps
- explain the roles and responsibilities of dam owners, regional authorities, and technical practitioners and recognised engineers
- provide information about the duties and functions of regional authorities around dangerous dams, earthquake prone dams, and flood prone dams; and measures to remove immediate danger
- outline what offences and penalties a dam owner may face if they do not meet their responsibilities under the Building Act and regulations
- provide definitions and explanations of key terms/concepts used in the regulations.

Limitations of this guidance

This document is a general guide to support dam owners and those involved in the implementation of the regulations. It covers the relevant aspects of the Building Act and the regulations and is not intended to replace them.

While the Ministry of Business, Innovation and Employment (MBIE) has taken great care in preparing this guide, it provides guidance only and should not be used to establish all the requirements of the Building Act and regulations on its own. Readers must refer to the Building Act and regulations as their primary source documents, and be aware that for specific situations or problems, it may be necessary to seek legal or professional advice.

The Building Act and regulations aim to provide a clear and comprehensive regulatory framework for post construction dam safety management for those dams that meet the height and volume thresholds (ie a classifiable dam[1]).

The New Zealand Dam Safety Guidelines published by New Zealand Society on Large Dams (NZSOLD) in 2015, provide recommended practices for the investigation, design, construction, commissioning, assessment, rehabilitation, and operation of all dams in Aotearoa New Zealand. The New Zealand Dam Safety Guidelines are referenced within this MBIE guidance as the key industry reference providing detailed guidelines to support implementation of the regulations.

Acknowledgements

This guidance has been prepared by the Building System Performance team at MBIE, with specialist support from an independent dam safety advisor and a technical working group of industry professionals.

We would like to acknowledge and thank those who have contributed to the development of this guidance.

[1] For a definition of **classifiable dam**, see the appendices.

2. Who is this guidance for?

- Dam owners who have a classifiable dam, and those who wish to understand if they have a classifiable dam, to determine whether they need to comply with the regulations.
- Technical practitioners (including recognised engineers) who specialise in the safe management of dams, supporting dam owners to fulfil the regulations.
- Regional authorities who are responsible for performing functions under the Building Act relating to a building that is a dam.

Section eight of this guidance has more information about the roles and responsibilities of these groups.

3. MBIE's role as a dam safety regulator

MBIE provides overall leadership of the building sector and is the central regulator for the oversight and stewardship of the regulations.

MBIE manages the system that regulates building work and monitors its effectiveness. Dams are classed as buildings for the purposes of the Building Act. The Building Act has a stated purpose to ensure that people who use buildings can do so safely and without endangering their health. The Building Act also contains requirements for dam owners relating to post-construction dam safety.

MBIE works closely with regional authorities to ensure compliance and investigate any breaches of the Building Act and the regulations.

Regional authorities administer and monitor the implementation of the Building Act and the regulations; this involves:

- considering and approving or refusing dam classifications
- considering and approving or refusing dam safety assurance programmes
- receiving annual dam compliance certificates
- adopting and implementing a policy on dangerous dams
- establishing and maintaining a register of dams in its region.

4. Dam safety in Aotearoa New Zealand

Since 1960 there have been 25 known dam incidents in Aotearoa New Zealand, with at least 14 being considered serious. There have been no recorded fatalities to date. Recent incidents include the flood resulting from the Makirikiri Dam (Whanganui) failure in 2013, and severe silting of the Waiau River in 2015 after the Waihi Dam's sluice gates were damaged.

While Aotearoa New Zealand had industry recommended dam safety guidance provided by the New Zealand Dam Safety Guidelines, it did not have a consistent regulatory dam safety framework until the Building (Dam Safety) Regulations 2022. This contrasted with almost all other countries who are members of the Organisation for Economic Co-operation and Development. The absence of an operative post-construction dam safety regulatory framework meant that the risks posed by dams were poorly managed. This exposed people, property, and the environment to unnecessary risk.

4.1 Building (Dam Safety) Regulations 2022

The regulations pull together post-construction regulatory requirements into a single, consistent nationwide framework. The owners of dams are responsible for ensuring that their dams are being managed appropriately, proportionate to the potential impacts they pose.

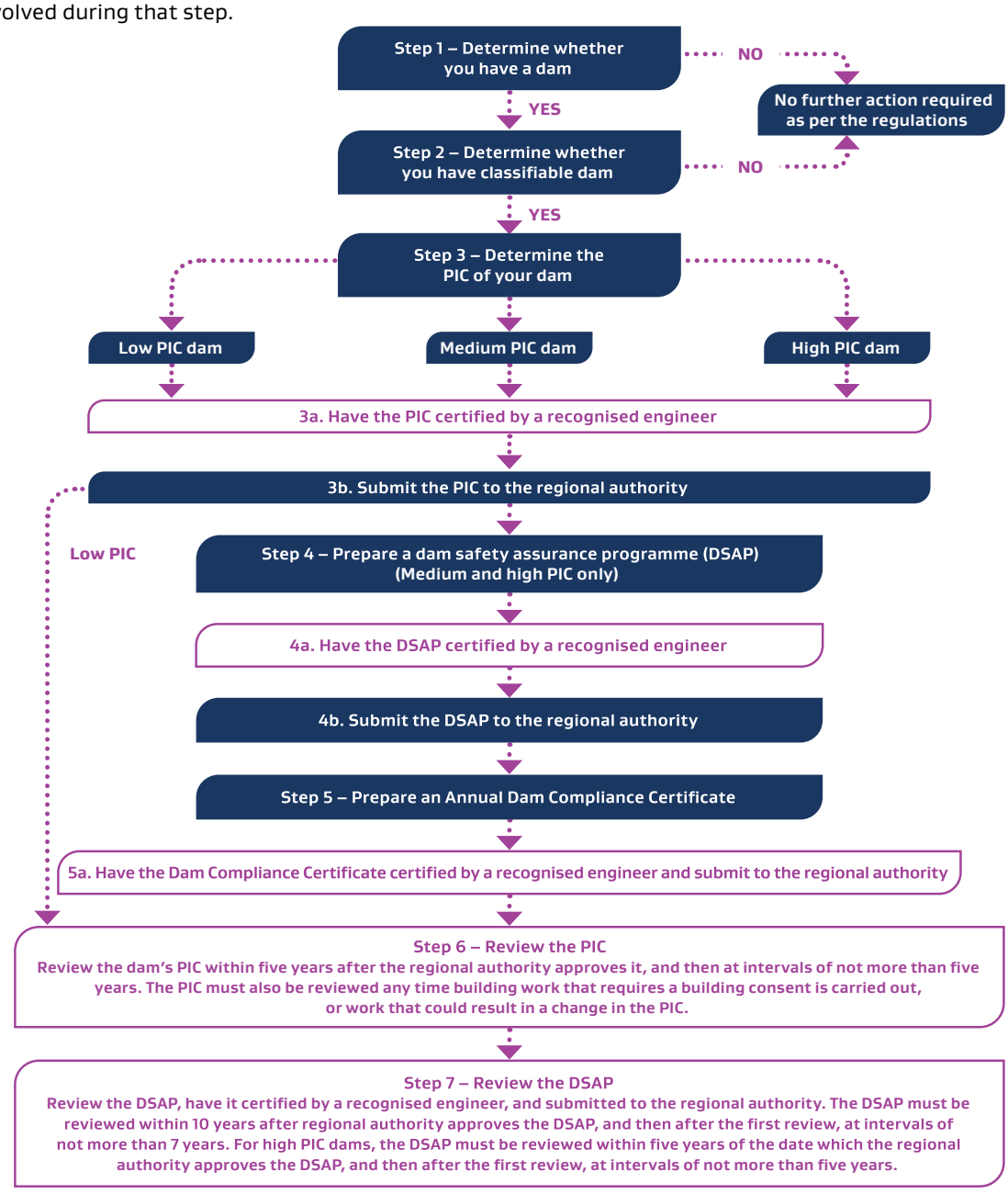
The regulations ensure that classifiable dams are well operated, maintained and regularly monitored, and that potential risks of dam incidents and failures are reduced.

The regulations also recognise that the dam safety requirements need to be regularly reviewed because the potential impacts of dam failure can change over time due to factors such as site conditions, downstream development, or population growth. The Dam Safety Regulations are intended to provide a minimum, consistent and effective risk-based regulatory framework for dam safety.

5. Summary of a dam owner's responsibilities as outlined in the regulations

Only dams that meet the classifiable dam thresholds are subject to the regulations. Dams that are classifiable but are assessed as having a low potential impact classification require no further action when it comes to the regulations, other than to review the potential impact classification (PIC) every five years. Only dams with a medium or high PIC are required to have a dam safety assurance programme (DSAP).

For more information about how to navigate the regulations, see section seven of this document. In the process map below, the boxes outlined in purple indicate that a recognised engineer must be involved during that step.



6. Implementation timeframes

The following table shows the activities that owners of dams covered by the regulations will need to undertake, and the implications of low, medium, and high potential impact classification.

Activity	Low potential impact dams	Medium potential impact dams	High potential impact dams	Section of the Building Act or regulations
Regulations are made	**12 May 2022**			
Regulations commence	**13 May 2024**			
Submit a potential impact classification (PIC) to regional authority	Up to three months after regulations commence or the dam is commissioned (whatever is later).			Section 135(2) of the Building Act
Submit a dam safety assurance programme (DSAP) to regional authority. There are seven DSAP elements, but only elements four and five have timeframes within which they must be completed as specified in the regulations	Not required	Up to two years after the regional authority approves the PIC.	Up to 12 months after the regional authority approves the PIC.	Section 142(2) of the Building Act
Carry out an intermediate dam safety review (element four).	Not required	Within 12 months of the regional authority approving the DSAP.	Within 12 months of the regional authority approving the DSAP.	Regulation 15 of the regulations
Carry out a comprehensive dam safety review (element five).	Not required	Within five years of the regional authority approving the DSAP.	Within five years of the regional authority approving the DSAP.	Regulation 16 of the regulations
Submit an annual compliance certificate	Not required	On the anniversary of the regional authority approving the DSAP.		Section 150 of the Building Act
Review the dam's PIC	Within five years of the regional authority approving the classification, and then not more than every five years.			Section 139 (1) of the Building Act
Review the DSAP	Not required	Within ten years after the date which the regional authority approves the DSAP, and then after the first review, at intervals of not more than seven years.	Within five years of the date which the regional authority approves the DSAP, and then after the first review, at intervals of not more than five years.	Sections 140 and 146 of the Building Act

7. Navigating the regulations

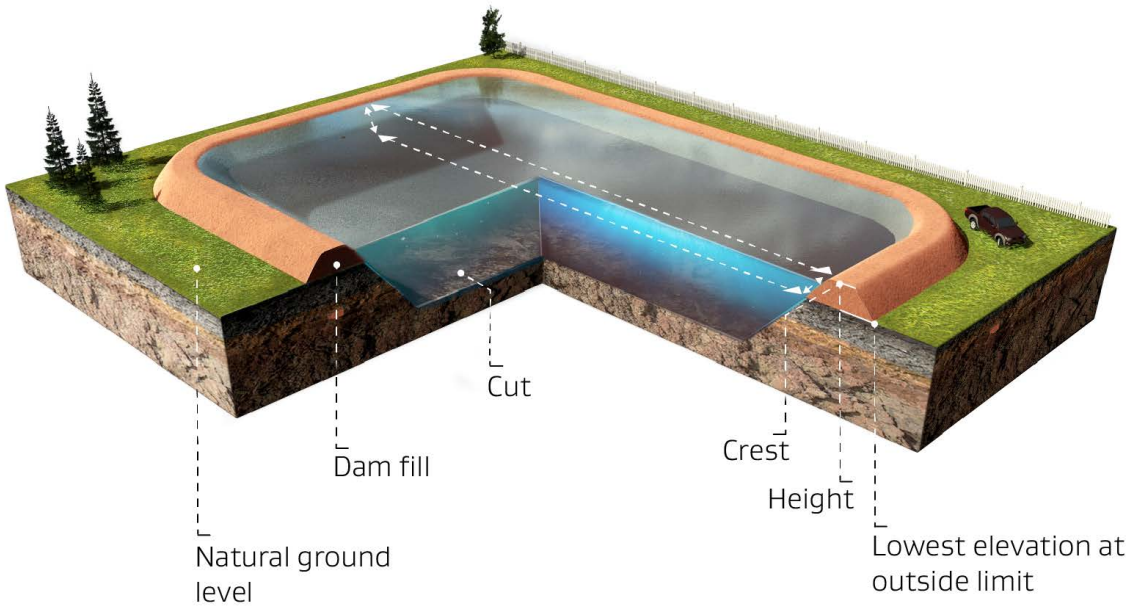
The purpose of this section is to help dam owners, technical practitioners, recognised engineers, and regional authorities understand their responsibilities under the regulations. This section provides examples of the different types of dams, detail on how to comply with the regulations, and the interaction between historical resource consents and the new regulations is outlined.

For a summary of a dam owner's responsibilities as outlined in the regulations, see section 6 of this guidance.

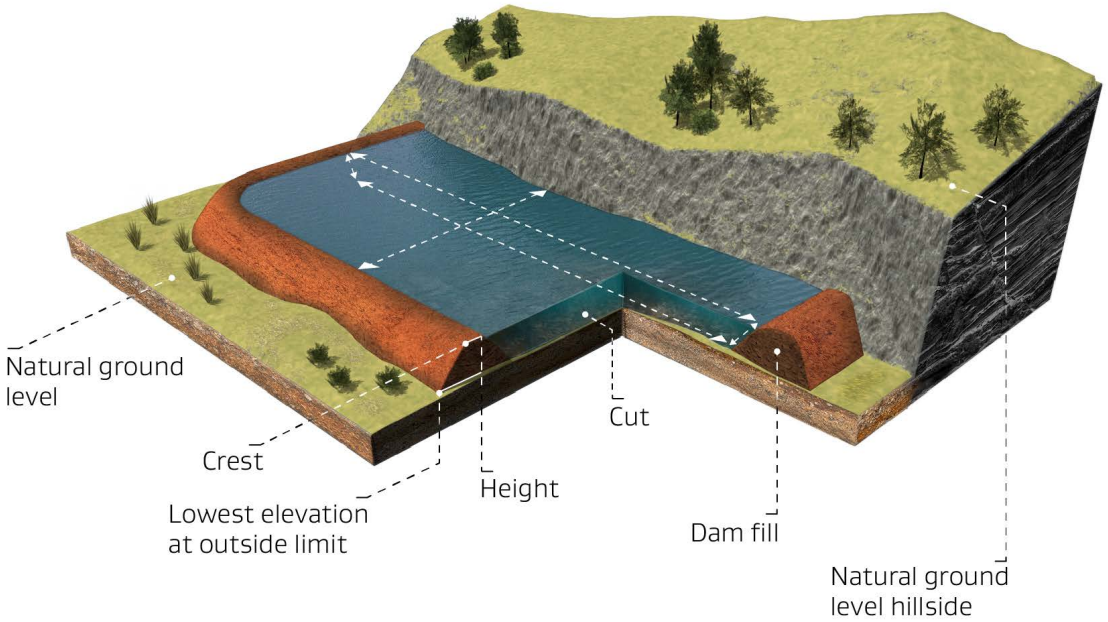
7.1 Types of dams (diagrams)

Water retention structures that are dams, and may be affected by the regulations

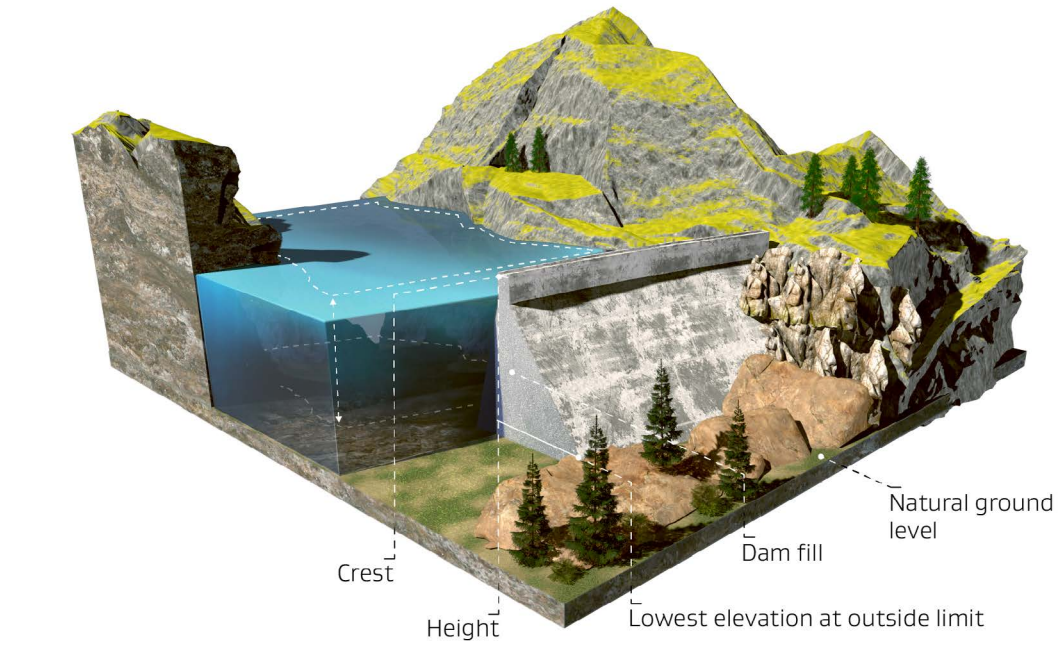
There are a variety of dams which potentially could be affected by the regulations, including, but not limited to, the following illustrations:



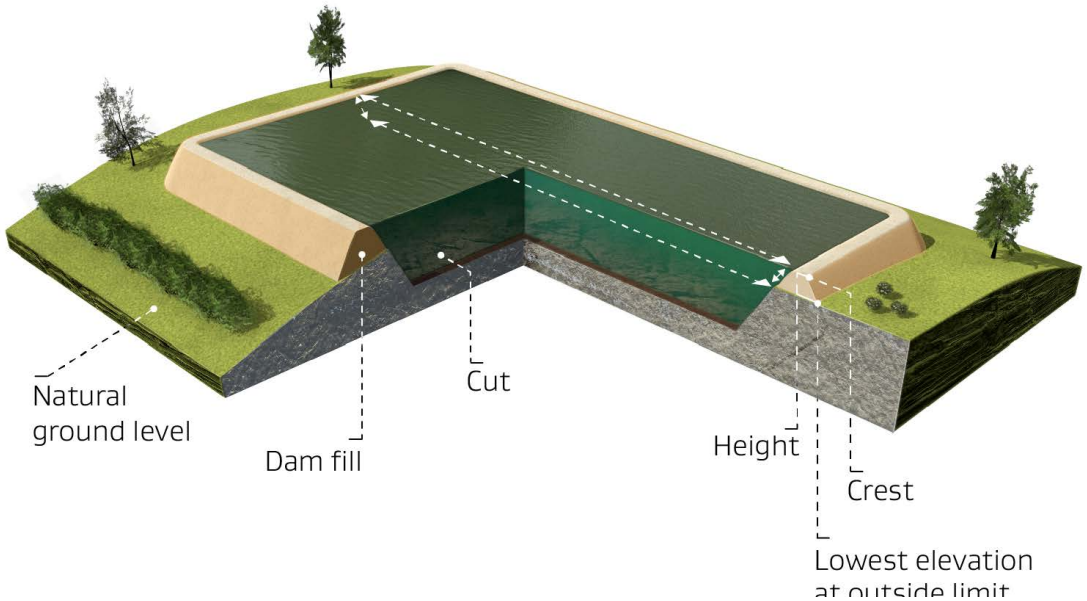
› **Typical dams – embankment dam – turkey's nest / ring dam / offstream storage**



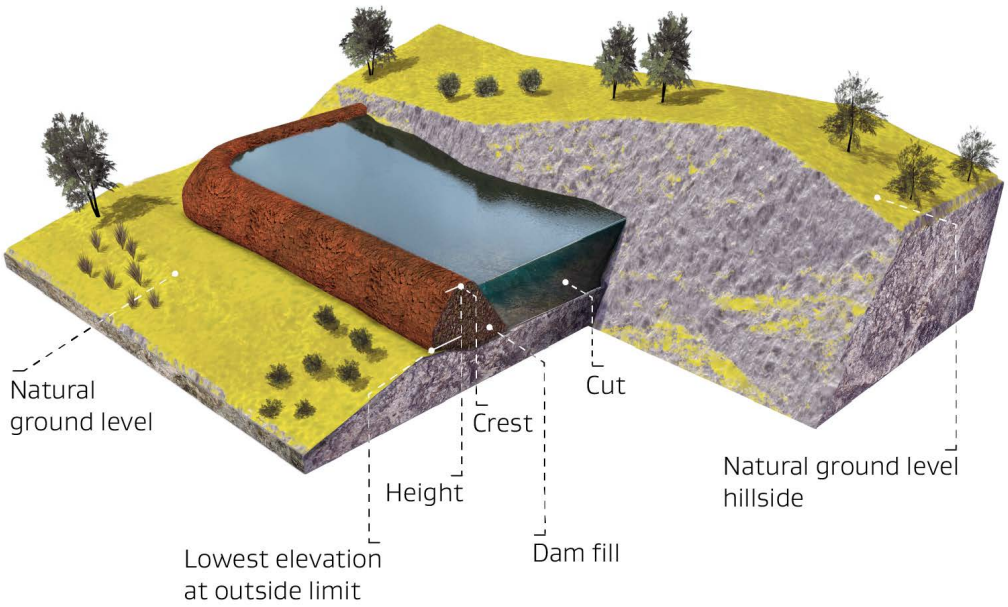
› **Typical dams – hillside dam / partial ring dam/ partial turkeys nest**



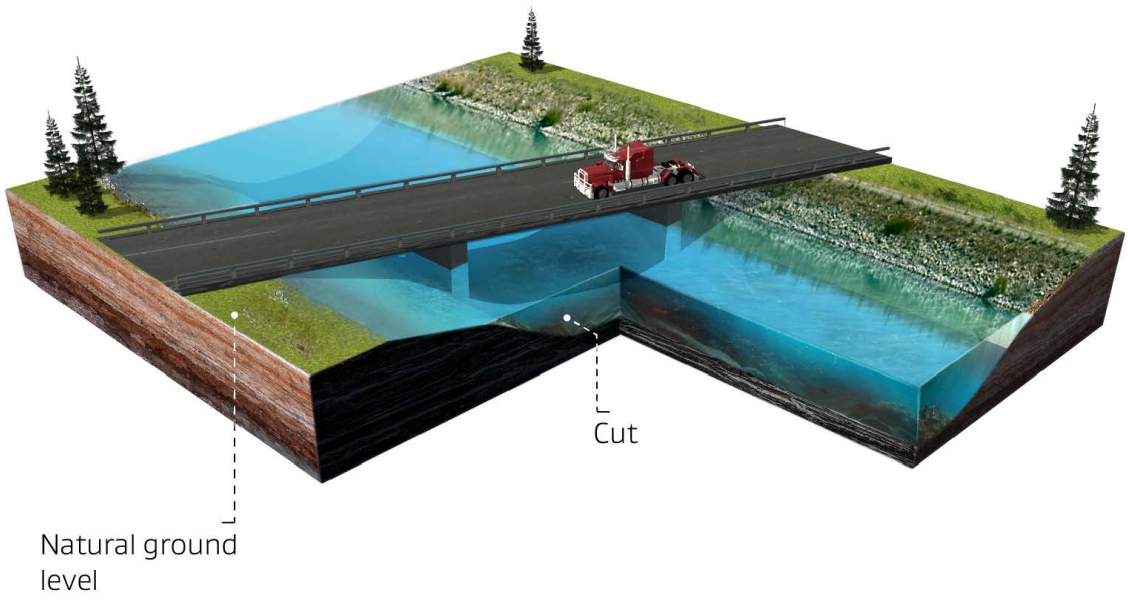
› **Typical dams – concrete/masonry dam**



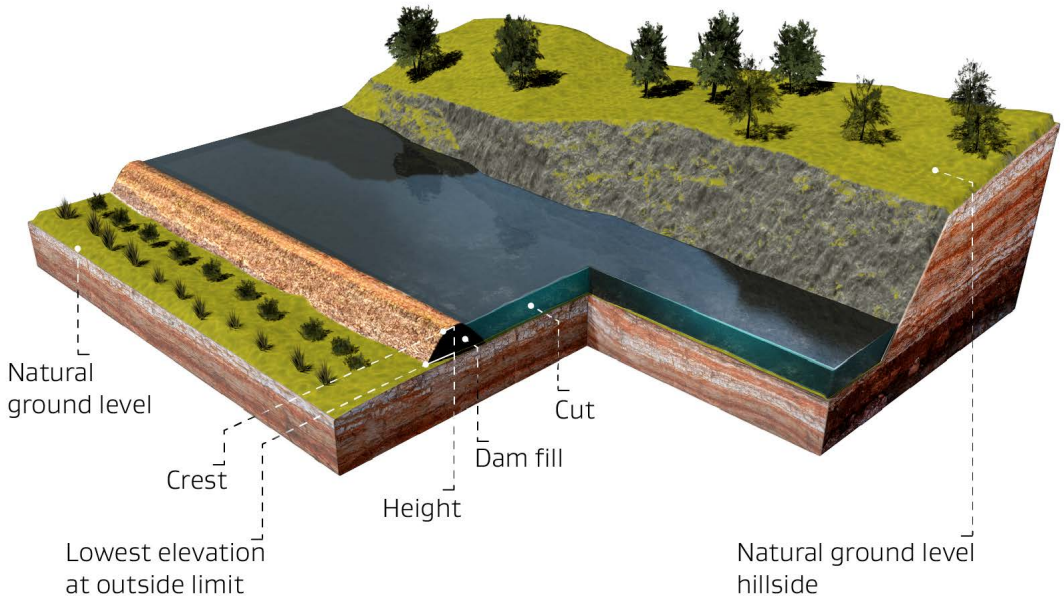
› **Hilltop dams – hilltop dam turkey's nest**



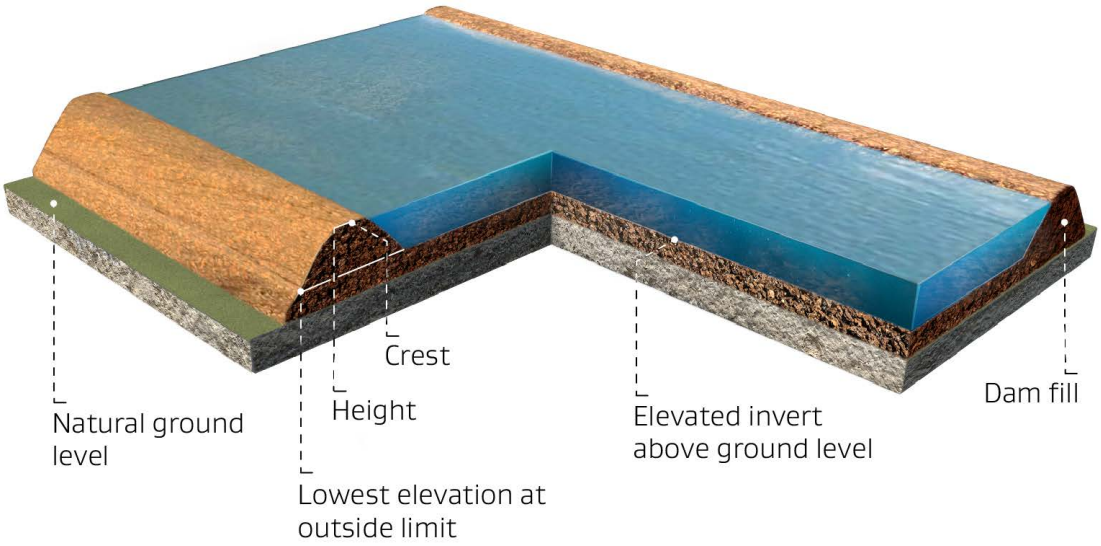
› **Hilltop dams – hilltop dams close to the edge**



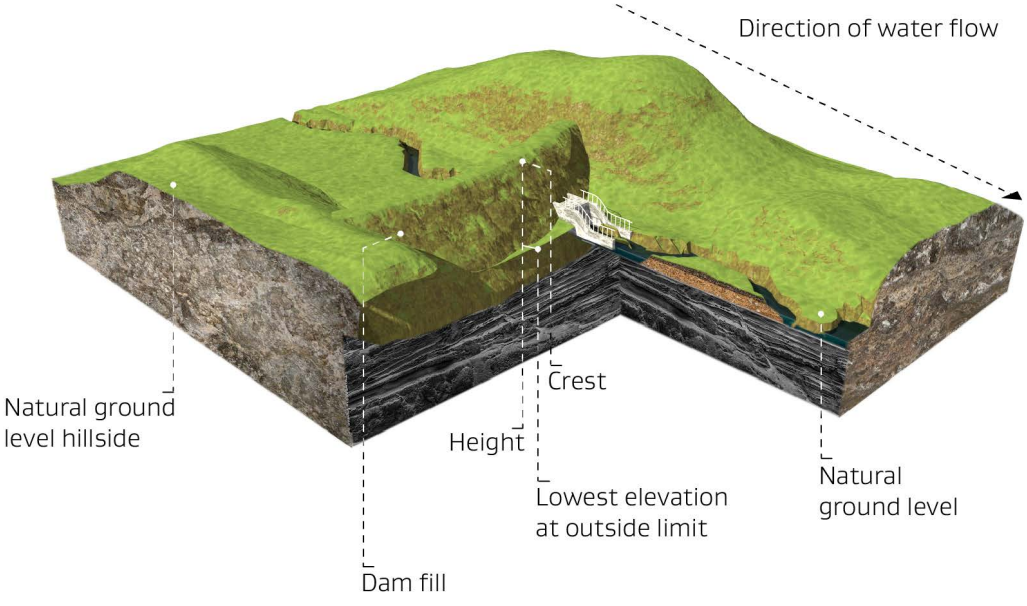
› Dams within canal systems – canal in cut



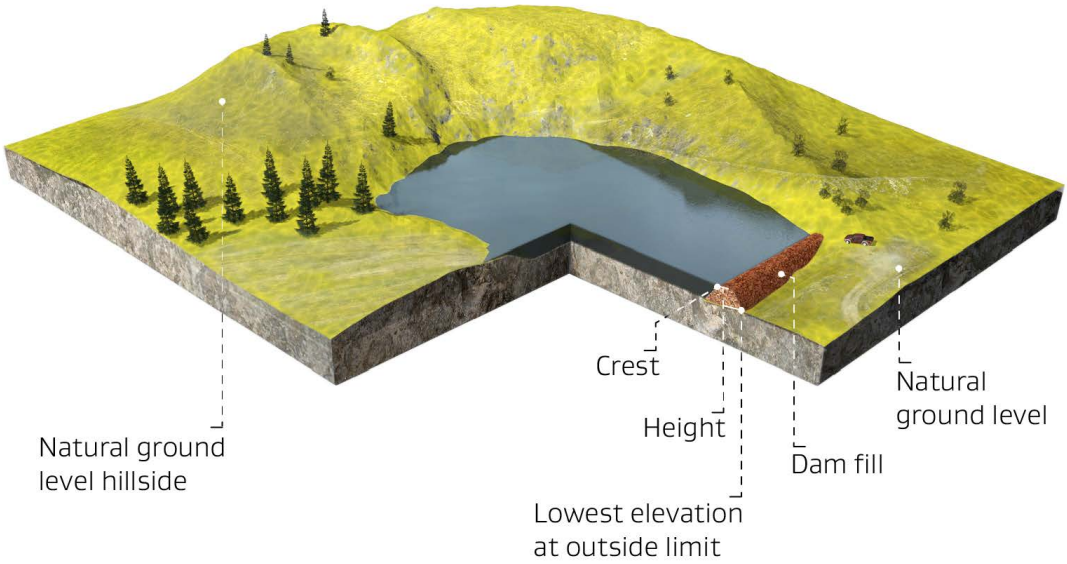
› Dams within canal systems – sidling canal



› **Dams within canal systems – fill-fill canal**



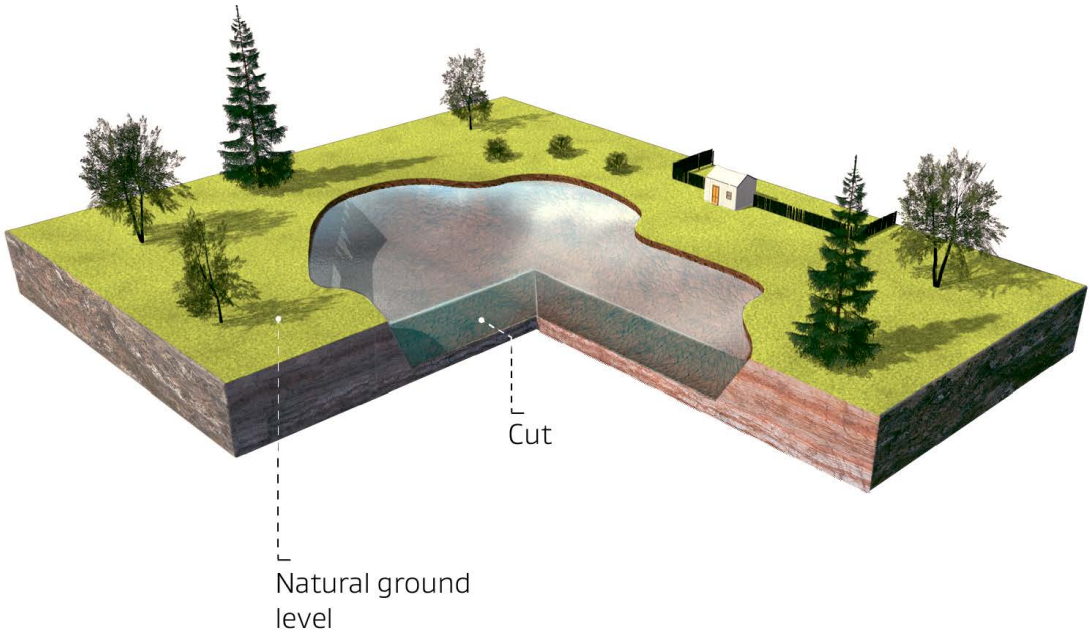
› **Flood detention dam**



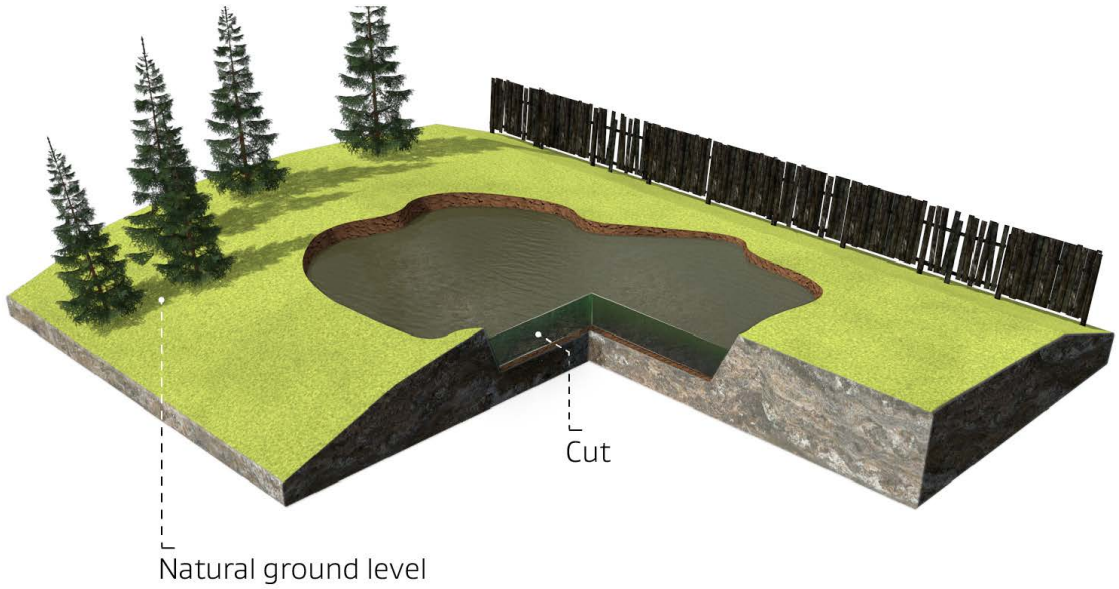
› Valley dam

Water retention structures that <u>are not</u> dams

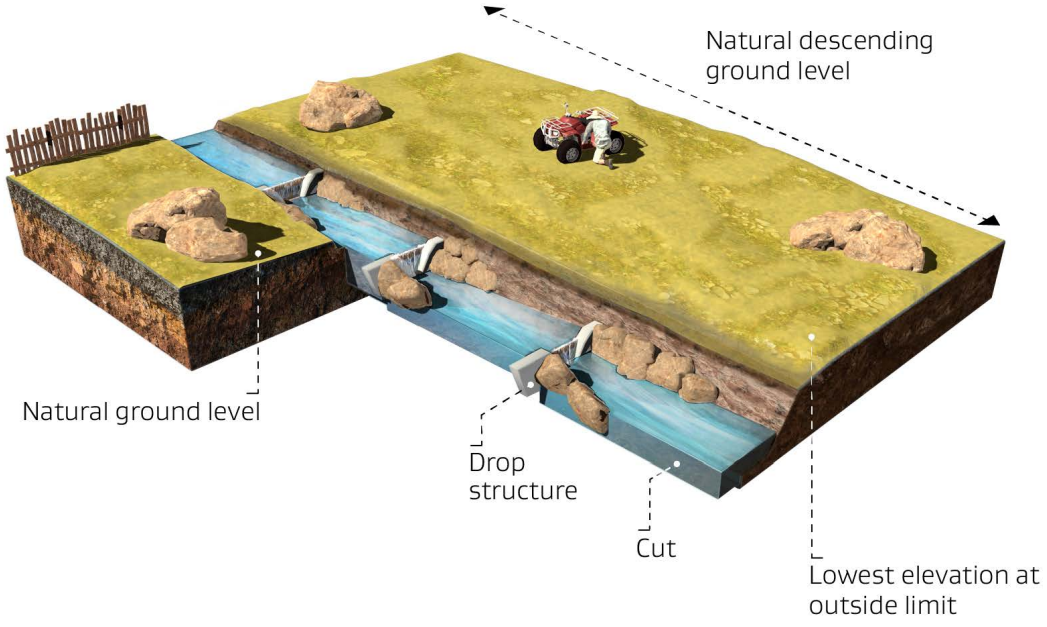
The following diagrams illustrate the types of water retention structures which will not be affected by the regulations:



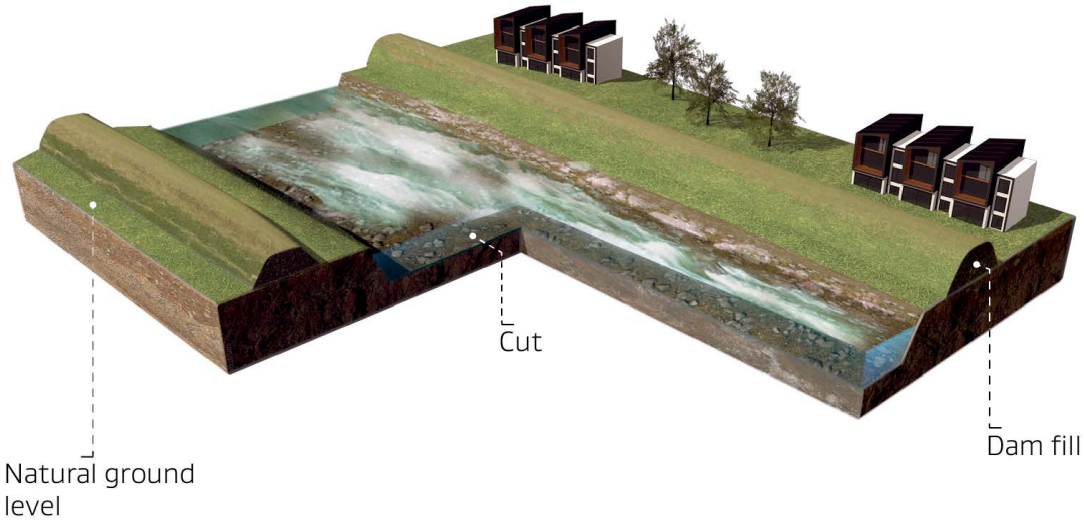
› Ponds that are not dams – pond cut into the ground



› **Ponds that are not dams – hilltop pond**



› **Canals, races, and drop-structures that are not storing water above natural ground level by a dam – cut into the ground**



› Stopbank

7.2 How to comply with the regulations

The purpose of this section is to help you understand whether a structure is affected by the regulations. It also outlines the minimum requirements to comply with the regulations.

It is the owner of the dam rather than the landowner on which the dam is located that needs to consider the regulatory requirements.

The regulations only apply to a structure which meets the definition of:

1. A dam as per section 7 of the Building Act; and
2. A classifiable dam as per the regulations.

Many dams in Aotearoa New Zealand are not impacted by the regulations. This is because they do not meet the definition in the Building Act, and they do not meet the height and volume thresholds set in the regulations to be defined as a classifiable dam.

The New Zealand Dam Safety Guidelines provide more in-depth information about the recommended practices for the assessment, rehabilitation and operation of classifiable dams.

Step 1 – Determine whether you have a dam

If your structure meets the Building Act's definition of a dam, then the next step is to understand whether it is a classifiable dam.

If the dam does not meet the definition, then it is not impacted by the regulations.

What does the law say:

A dam, as defined by section 7 of the Building Act 2004:

(a) means an **artificial barrier**, and its **appurtenant structures**, that –

  (i) is constructed to **hold back water** or other **fluid** under **constant pressure** so as to form a reservoir; and

  (ii) is used for the storage, control, or diversion of water or other fluid; and

(b) includes –

  (i) a flood control dam; and

  (ii) a natural feature that has been significantly modified to function as a dam; and

  (iii) a canal; but

(c) does not include a stopbank designed to control floodwaters.

Appurtenant structure is defined in section 7 of the Building Act 2004 as a structure that is integral to the safe functioning of the dam as a structure for retaining water or other fluid.

Appurtenant structures

Appurtenant structures are important across the whole DSAP, but especially in elements three (inspection, and maintenance and testing of appurtenant structures and gate and valve systems with dam safety functions), four (intermediate dam safety reviews), and five (comprehensive dam safety reviews).

An appurtenant structure, in relation to a dam, means a structure that is integral to the safe functioning of the dam as a structure for retaining water or other fluid.[2] Examples of appurtenant structures include but are not limited to spillways, intakes, outlets, and sluice facilities together with their associated gates/valves and control equipment.

[2] See the New Zealand Dam Safety Guidelines for more information about appurtenant structures.

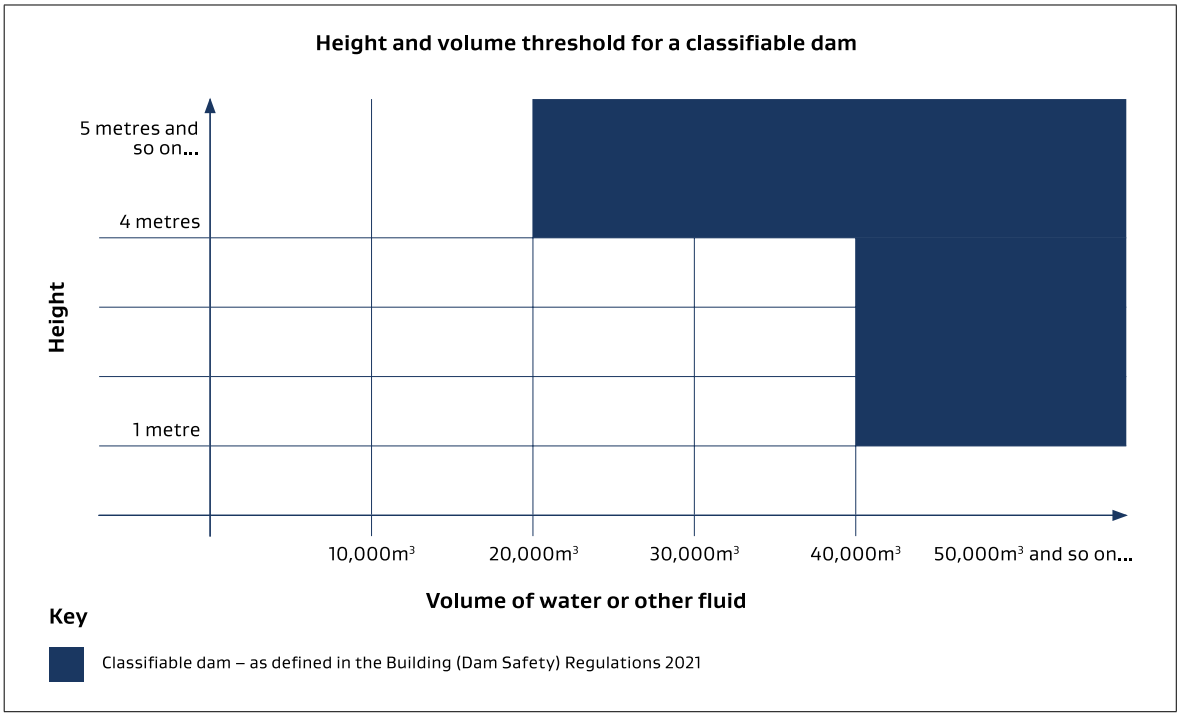
Step 2 – Determine whether you have classifiable dam

Whether your dam is classifiable depends on its height and the volume of water, or other fluid, it can store above natural ground level.

If your dam meets the height and volume of water, or other fluid, described below, it is a classifiable dam.

- A height of 4 or more metres and stores 20,000 or more cubic metres volume of water, or other fluid; or
- A height of 1 or more metres and stores 40,000 or more cubic metres volume of water, or other fluid.

Figure 1: Height and volume threshold for a classifiable dam



What does the law say:

The Building (Dam Safety) Regulations 2022 define a **classifiable dam** as a dam that:

(a) has a height of 4 or more metres and holds 20,000 or more cubic metres volume of water or other fluid; or

(b) has a height of 1 or more metres and holds 40,000 or more cubic metres volume of water or other fluid.

Refer to regulation five of the regulations for the meaning of a classifiable dam.

Measuring the height of a dam

To understand whether a dam is a classifiable dam, the height and volume of the dam needs to be measured. Sometimes this is straight forward and drawings from the dam's construction, or a record of a building consent or resource consent can be used. However, sometimes measurements of the dam will need to be taken. How easy it is to capture these measurements will depend on the type, shape, and accessibility of the dam. It is important that the height of a dam is measured accurately, and consistently.

The measurements and calculations can be carried out by anyone, but the PIC must be audited and certified by a recognised engineer.

To find a recognised engineer in your area, visit the Engineering New Zealand Te Ao Rangahau website www.engineeringnz.org/public-tools/find-engineer/.

Section 7.1 of this guidance contains diagrams of a variety of different types of dams. They may help you understand where measurements must be taken from in order to determine the height of the dam.

What does the law say:

- A dam's height must be measured in accordance with section 133B of the Building Act 2004.
- The Building Act defines the height of the dam as the vertical distance from the crest of the dam and must be measured:
  a) in the case of a dam across a stream, from the natural bed of the stream at the lowest downstream outside limit of the dam; and
  b) in the case of a dam not across a stream, from the lowest elevation at the outside limit of the dam; and
  c) in the case of a canal, from the invert of the canal.

Measuring the stored volume of a dam

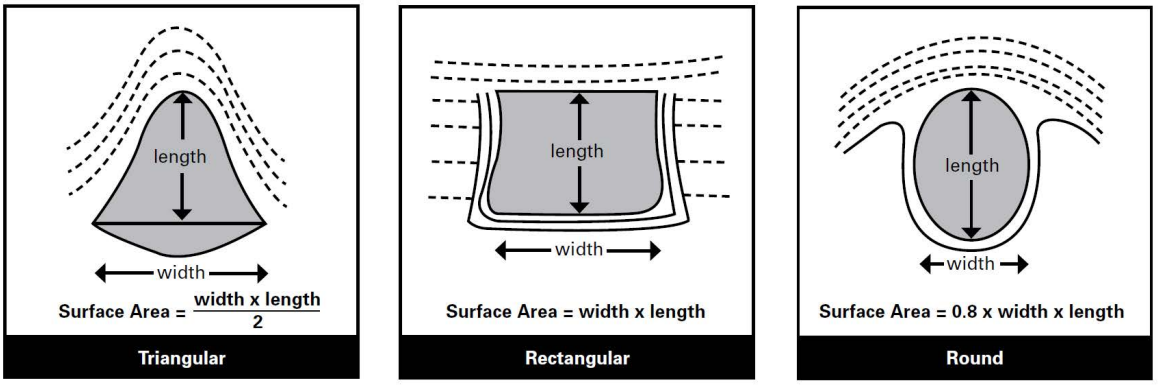
Figure 2 below provides a simplified calculation which can be used to measure the volume of the dam reservoir. If the reservoir's shape is complex or does not match a shape shown in figure 2 then the dam owner should consider the support of a technical practitioner[3] and/or use other methods to determine the reservoir's volume.

Note that the stored volume is calculated with reservoir level at crest level, even if it is rarely that high, and applying Section 133B of the Act and regulation 7.

Figure 2: Simplified Calculation of Reservoir Volume

Using the following formula, calculate the volume in cubic metres (m^3)

Volume (m^3) = 0.4 x Surface Area x Depth (0.4 is a conversion factor that takes into account the slope of the sides of dams)



Stored volume of water which should not be measured:

When measuring a dam's stored volume, the stored volume of water or other fluid does not include:

- in the case of a dam across a stream, water or fluid that is lower than the natural ground level at the lowest downstream outside limit of the dam
- in the case of a dam not across a stream, water or fluid that is lower than the natural ground level at the lowest elevation at the outside limit of the dam
- in the case of a canal where the canal invert[4] is below the natural ground level, water or fluid that is lower than the natural ground level at the lowest elevation at the outside limit of the canal structure.

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[3] The definition of a 'technical practitioner" can be found in the glossary of this document along with further discussion of their role in Section 8.

4 The definition of 'canal invert' can be found in the glossary of this document.

Next steps

If a dam meets the definition of a dam under the Building Act, and as a classifiable dam per the regulations, then the owner of the dam will need to fulfil the requirements of the regulations.

The regulations require the owner to classify their dam according to the potential impact of a failure of the dam, and have the classification audited and certified by a recognised engineer. This is the next step in the process.

Step 3 – Determine the potential impact classification of your dam

Assess the potential impact of a dam failure

The classification of a dam reflects the potential impact its failure could have on the community, historical or cultural places, critical or major infrastructure, and the natural environment.

A classifiable dam must be classified as having a low, medium, or high potential impact classification (PIC). The PIC forms the basis for the requirements of the dam safety assurance programme. A dam's PIC is critical information for dam owners, technical practitioners and regional authorities, as it forms the basis for ongoing operational safety and maintenance requirements.

A dam owner may choose to classify the dam themselves or they may instead decide that a technical practitioner is best placed to determine the dam's PIC. Regardless of who does the classification, the PIC must be audited by a recognised engineer against the classification criteria in the regulations and, if they agree, they must provide the dam owner with a certificate confirming the dam's PIC. All duties of non-compliance will be attached to the dam owner.

To find a recognised engineer in your area, visit the Engineering New Zealand Te Ao Rangahau website www.engineeringnz.org/public-tools/find-engineer/.

The two tables below are from the regulations and must be used to determine a dam's PIC. Instructions for how to use them are provided in the following pages.

What does the law say:

Section 134B of the Building Act 2004 (Method of Classification) -

1) The owner of a dam to whom section 134 applies must classify the dam according to the potential impact of a failure of the dam on persons, property, and the environment.
2) In classifying a dam, the owner must—
   a) apply the prescribed criteria and standards for dam safety; and
   b) give the dam one of the following classifications:
      i) low potential impact; or
      ii) medium potential impact; or
      iii) high potential impact; and
3) submit the classification of the dam to a recognised engineer for audit.

Instructions to determine a dam's potential impact classification:

Refer to Table 1: determination of assessed damage level

Whoever is evaluating the PIC of the dam must identify the likely effect that an uncontrolled release[5] of the stored contents of the reservoir, due to a failure of the dam when full, would have on each of the following specified categories (that is, if the dam fails, what is likely to occur?):

- community
- cultural
- critical and major infrastructure
  - damage done to critical and major infrastructure
  - time to restore critical or major infrastructure to pre-dam failure operations
- natural environment.

The assessment requires estimates of the extent and effects of downstream flood inundation due to uncontrolled release of the stored reservoir contents. The New Zealand Dam Safety Guidelines should be referred to for more information on how to determine the assessed damage level.

Once all categories have been assessed, you must select the highest damage level identified out of all the categories.

Any person, including the dam owner or a technical practitioner, may do the assessment themselves, but a recognised engineer must audit the classification and provide a certificate confirming the dam's PIC. For more complex dams or for people who don't have the expertise to complete the classification themselves, an experienced technical practitioner should assist or complete the assessment process.

In some situations, an estimate of dam-break flood hazard[6] extent may be easier to make due to the downstream topography – ie it may be obvious whether the flow is going to impact on infrastructure, or the natural environment, or find its way to a larger water course and not cause much damage.

Complex dams or topography may require engineers experienced in computer-based hydraulic modelling to assess the dam-break flood hazard extent and produce inundation maps. Once the inundation maps have been created, they are used to assist in evaluating the PIC of the dam.

[5] Refer to the New Zealand Dam Safety Guidelines for more information about what constitutes and 'uncontrolled release'.
[6] Refer to the glossary for a definition.

Table 1 – Determination of assessed damage level

Specified categories					
Damage level	**Community**	**Cultural**[7]	**Critical and major infrastructure**[8]		**Natural environment**
			Damage	***Time to restore critical or major infrastructure to pre-dam failure operations (see Note one)***	
Catastrophic	One or more of the following apply: › 50 or more household units rendered uninhabitable › 20 or more commercial or industrial facilities rendered inoperable › two or more community facilities rendered inoperable or uninhabitable.	Irreparable loss to two or more historical or cultural sites	Two or more critical or major infrastructure facilities rendered inoperable	One year or more	Extensive and widespread damage, with permanent, irreparable effects on the natural environment
Major	One or more of the following apply: › four or more but less than 50 household units rendered uninhabitable › five or more but less than 20 commercial or industrial facilities rendered inoperable › one community facility rendered inoperable or uninhabitable.	One or more of the following apply: › Irreparable loss to one historical or cultural site › loss to one or more historical or cultural sites where it is possible, but impracticable, to fully restore the site	One critical or major infrastructure facility is rendered inoperable	Three months or more but less than one year	Extensive and widespread damage where it is possible, but impracticable, to fully restore or repair the damage

[7] See the glossary for a definition and examples of what is meant by 'sites of historical or cultural significance'.
[8] See the glossary for a definition and examples of what is meant by 'critical and major infrastructure'.

Specified categories					
Damage level	**Community**	**Cultural**[9]	**Critical and major infrastructure**[10]		**Natural environment**
			Damage	***Time to restore critical or major infrastructure to pre-dam failure operations (see Note one)***	
Moderate	One or more of the following apply: › one or more but less than four household units rendered uninhabitable › one or more but less than five commercial or industrial facilities rendered inoperable › loss of some functionality of one or more community facilities.	Significant loss to one or more sites of historical or cultural significance where it is practicable to restore the site	One or more critical or major infrastructure facilities are affected by the loss of some functionality	Less than three months	Significant damage that is practicable to restore or repair
Minimal	Minor damage that does not materially affect the functionality of any household unit, commercial or industrial facility, or community facility (or no damage)	Loss to one or more historical or cultural sites that will require minor restoration only (or no loss to any historical or cultural site)	Minor damage to one or more critical or major infrastructure facilities (or no damage)	One week or less	Only minor rehabilitation or restoration may be required or recovery is possible without intervention (or no damage)

Notes

1. The estimated time required to repair the damage sufficiently to return the critical or major infrastructure to the normal operation that the infrastructure had immediately before the failure of the dam.

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[9] See the glossary for a definition and examples of what is meant by 'sites of historical or cultural significance'.
[10] See the glossary for a definition and examples of what is meant by 'critical and major infrastructure'.

Refer to Table 2: Determination of dam's potential impact classification

Using Table 2, a dam must be classified as having a low, medium, or high potential impact.

To determine a dam's PIC, the dam owner or someone they engage to undertake the task, needs to identify the estimated population at risk if the dam was to fail. The dam owner also needs to determine whether there would be any potential loss of life[11]. The New Zealand Dam Safety Guidelines should be referred to for more information on how to determine the population at risk and the potential loss of life.

The owner should then use the damage level identified from Table 1 (either catastrophic, major, moderate, or minimal), plus the population at risk and potential loss of life, and then using Table 2, line these up and assign the dam with a PIC which will be either low, medium, or high.

The New Zealand Dam Safety Guidelines should be referred to for more information on how to determine a dam's PIC.

Population at risk and potential loss of life

Table 2 requires the population at risk to be determined. This means the number of people likely to be affected by an uncontrolled release of all or part of the stored water or other fluid due to a failure of the dam, assuming that no person takes any action to evacuate. Examples of a population at risk include but are not limited to both permanent populations that are linked to a fixed location (such as people in residential, commercial, industrial and community buildings or facilities) and temporary populations (such as recreational users of tracks and waterways, campers, agricultural or horticultural workers, passengers in vehicles on highways and bridges.

Where a detailed survey is not possible, demographic information can assist in making reasonable assumptions about the average number of people likely to be present in a type of dwelling or area.

Depending on the assessed damage level and population at risk, Table 2 may also require the potential loss of life to be determined. That is, the number of people expected to lose their life as a result of an uncontrolled release of all or part of the stored water or other fluid due to a failure of the dam.

The New Zealand Dam Safety Guidelines has detailed guidance on how to estimate population at risk and potential loss of life.

Table 2 – Determination of dam's potential impact classification

Assessed damage level	Population at risk (number of persons)				Potential loss of life
	0	1–10	11–100	more than 100	
Catastrophic	High	High	High	High	No persons
	N/A (see Note 1)	High	High	High	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Major	Medium	Medium	High	High	No persons
	N/A (see Note 1)	Medium	High	High	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Moderate	Low	Low	Medium	Medium	No persons
	N/A (see Note 1)	Medium	Medium	Medium	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Minimal	Low	Low	Low	Low	No persons
	N/A (see Note 1)	Medium	Medium	Medium	One person
	N/A (see Note 1)	High	High	High	Two or more persons

Notes

1. Not applicable. Population at risk is zero therefore no potential loss of life.

[11] See the glossary for a definition of 'population at risk' and 'potential loss of life'.

Step 3a – Have the PIC audited and certified by a recognised engineer

Once the dam's PIC has been assessed using Tables 1 and 2, it needs to be submitted to a recognised engineer for audit and certification. The recognised engineer will work with the dam owner to complete a dam classification certificate. The certificate contains:

- information about the dam[12]
- the PIC given to the dam
- information about the dam owner
- certificate of the recognised engineer.

To find a recognised engineer in your area, visit the Engineering New Zealand Te Ao Rangahau website www.engineeringnz.org/public-tools/find-engineer/.

You can find a template for the dam classification certificate at www.building.govt.nz/managing-buildings/dam-safety/resources.

Step 3b – Submit the PIC to the appropriate regional authority

Once a dam's PIC has been audited and certified by a recognised engineer, the dam owner must provide the regional authority in whose region the dam is situated with the dam's classification certificate.

The dam owner must submit the dam's PIC no later than three months after the regulations come into force, or no later than three months after the dam is commissioned, whichever is later.

The PIC must be reviewed within five years of the regional authority approving it, and then not more frequently than every five years thereafter. It must also be reviewed if any building work on the dam occurs which requires a resource consent, and that building work results or could result in a chance to the dam's PIC.

What does the law say:

Section 135 of the Building Act 2004 – Owner must provide classification of, and certificate for, dam to regional authority –

1) An owner of a dam must provide the regional authority in whose region the dam is situated with—
   a) the classification given by the owner to the dam; and
   b) a certificate from an engineer.

Regional authority approves or refuses to approve the classification

The regional authority must give written notice to the dam owner as to whether they approve or refuse to approve the PIC. The regional authority can only refuse to approve the dam's classification is they are satisfied, on reasonable grounds, that the engineer who provided the certificate is not a recognised engineer.

[12] Including the GSP location of the dam in the Dam classification certificate will help regional authorities and technical practitioners understand where the dam is located.

What does the law say:

Section 136 of the Building Act 2004 – Regional authority must decide whether to approve or refuse dam classification.

1) A regional authority must, as soon as practicable after receiving a classification given by an owner to a dam under section 135, give written notice to the owner as to whether the regional authority—
   a) approves the classification; or
   b) refuses to approve the classification.
2) A regional authority may refuse to approve a classification only if the regional authority is satisfied, on reasonable grounds, that the engineer who provided the certificate referred to in section 135(1)(b) is not a recognised engineer.

If the regional authority decides not to approve the classification, then they must direct the owner to have the classification audited by a recognised engineer. The dam owner must have the classification re-audited by a recognised engineer and submit it to the regional authority along with a certificate from the recognised engineer within 15 working days after the date on which the regional authority decides not to approve the classification (or any later date that the regional authority allows).

What does the law say:

Section 138 of the Building Act 2004 – Regional authority must require re-audit of dam classification that it refuses to approve.

Step 4 – Prepare a dam safety assurance programme

What is a dam safety assurance programme and who completes it?

The dam safety assurance programme (DSAP) provides dam owners a structured framework of plans and procedures to plan and complete the activities required for the safe operation and management of their dam(s).

All dams with a medium and high PIC must have a DSAP. Dams with a low PIC do not require a DSAP.

A dam owner can prepare the DSAP themselves, but it must be submitted to a recognised engineer for certification. In some cases, a dam owner may arrange for a technical practitioner to prepare the DSAP in collaboration with their staff. A range of parties may assist the dam owner in the delivery of the DSAP's activities, however, the dam owner is responsible for delivery. The DSAP must be effective (not theoretical), and it must state clearly who does what, when, where and how.

To find a recognised engineer in your area, visit the Engineering New Zealand Te Ao Rangahau website www.engineeringnz.org/public-tools/find-engineer/.

An owner of a low PIC dam does not need to develop or submit a DSAP.

For a medium PIC dam, the DSAP must be:

- Certified by a recognised engineer and submitted to the regional authority for approval up to two years after the regional authority approves the PIC.
- It must be reviewed within ten years after the date which the regional authority approves the DSAP, and then after the first review, at intervals of not more than seven years.

For a high PIC dam, the DSAP must be:

- Certified by a recognised engineer and submitted to the regional authority for approval up to one year after the regional authority approves the PIC.
- It must be reviewed within five years after the date which the regional authority approves the DSAP, and then after the first review, at intervals of not more than five years.

Dams managed as part of a scheme:

Where a dam is being managed as part of a wider scheme or portfolio of dams, the dam's DSAP may refer to scheme-wide policies and procedures that are documented on a scheme-wide basis. Where a single reservoir is retained by multiple dams, and these dams are owned by one person (or organisation), then a single DSAP will be appropriate in most cases. Within that single DSAP each dam's specific details and activities should also be addressed, eg. included and/or referenced. An example of this is a dam that is a canal, and which has different classifications (PICs) for different sections of the canal. See the diagram in section 7.1 of this guidance.

What does the law say:

- Sections 140-148B of the Building Act 2004 outline the requirements, contents, and dam owner's obligations to provide the DSAP.
- Sections 148A and 148B of the Building Act 2004 outline the legislative requirements for DSAPs for dams that are canals, and for two or more dams which form a single reservoir.

Content of dam safety assurance programme (DSAP)

A DSAP should be appropriate to the nature of the dam, including the design and construction type of the dam, its potential failure modes, its potential and confirmed dam safety deficiencies[13], as well as its potential impact classification.

When setting out procedures for the activities in Table 3 below, a DSAP must state who will carry out the activity, and when, where, and how the activity will be done.

The regulations provide minimum requirements for dam safety in Aotearoa New Zealand. The New Zealand Dam Safety Guidelines should be referenced for detailed guidance on preparing and implementing a DSAP, and more broadly for recommended industry practices for the investigation, design, construction, commissioning, assessment, rehabilitation, and safe management of classifiable dams.

[13] See the glossary in the appendices for a definition of potential failure modes, potential dam safety deficiencies, and confirmed dam safety deficiencies.

Table 3

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)
1. Dam and reservoir operation and maintenance	A DSAP must contain effective procedures for: › operating the dam and reservoir › ensuring that anyone who operates the dam and reservoir has adequate experience and training › maintaining accurate records of reservoir water or other fluid levels under all loading conditions › maintaining the functionality of the dam and reservoir: › **Explanation** – Dams and reservoirs are designed, constructed, and operated with intended functions. Maintaining functionality is about doing the maintenance and upkeep needed to continue fulfilling those functions.	The dam owner must have procedures within which their reservoir and dam are to be operated and maintained for normal, unusual, and extreme loading and operating conditions (to ensure that the dam and reservoir fulfil their intended functions). Operating and maintaining personnel must be competent, appropriately qualified and trained to fulfil the requirements of the dam's operation and maintenance procedures, including where dam and reservoir safety is dependent on the correct operation of gates and valves. The dam's operators and maintainers must also be familiar with the dam's performance, potential failure modes and any potential or confirmed dam safety deficiencies. Parameters associated with a reservoir's operation must be consistently and accurately recorded and stored securely in a way that allows their consideration during completion of element 2 (dam surveillance), element 4 (intermediate dam safety reviews) and element 5 (comprehensive dam safety reviews). As a minimum, reservoir water level (or other fluid) under all loading conditions must be recorded. Reservoir inflows, outflows, gate or valve operations and rainfall are also useful for dam safety evaluation.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)
2. Surveillance procedures	A DSAP must contain effective procedures for surveillance of the dam, including procedures for: › collecting dam surveillance data, evaluating dam performance, and carrying out associated quality assurance processes › carrying out visual inspections of the dam (including specifying the required frequency of the inspections) › reading dam performance monitoring instruments (including specifying the required frequency of the readings) › monitoring data, recording, and management systems › reporting surveillance and dam performance issues to the dam owner.	Dam surveillance provides the cornerstone for effective management of dam safety and operational risks and includes routine visual inspections, dam performance instrument monitoring, quality assurance, data evaluation and reporting on the performance of the dam. The dam owner must have procedures that describe who must carry out what activity, when, where and how. The procedures must include how data will be recorded and managed securely, and how dam performance issues will be escalated to the dam owner. The dam owner's personnel and technical practitioners completing dam surveillance must be trained, experienced and familiar with the dam's performance, potential failure modes and any potential or confirmed dam safety deficiencies.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)
3. Inspection, and maintenance and testing of appurtenant structures and gate and valve systems with dam safety functions	A DSAP must include effective procedures for: › identifying and documenting appurtenant structures › identifying and documenting the gate and valve systems that have dam or reservoir safety functions › inspecting and maintaining appurtenant structures › inspecting, maintaining, and testing the gate and valve systems and other equipment or systems that have dam or reservoir safety functions.	The Building Act defines an appurtenant structure as "a structure that is integral to the safe functioning of the dam as a structure for retaining water or other fluid". The New Zealand Dam Safety Guidelines provides further guidance on how to identify appurtenant structures by considering structures other than the dam that are designed and required for safe containment and control of the reservoir contents under all loading conditions. Gate and valve systems (and other dam or reservoir safety systems) are typically a sub-system of an appurtenant structure. The dam owner must have procedures that describe who must carry out what activity, when, where and how. The procedures must include frequencies and scopes for appurtenant structure inspection and maintenance activities, and frequencies and scopes for gate and valve system (and other dam or reservoir safety systems) inspections, maintenance, and functional testing. The goal of functional testing is to confirm that the system (including backup power supplies and controls) fulfils its dam or reservoir safety function reliably. Other dam or reservoir safety systems may include pump systems, high or low water level detection systems, and flood and earthquake alert systems. The dam owner's personnel and technical practitioners completing appurtenant structure and gate/valve/other system inspections, maintenance and testing must be trained, experienced and familiar with the structure and system performance, potential failure modes and any potential or confirmed dam safety deficiencies.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)
4. Intermediate dam safety reviews	A DSAP must provide for intermediate dam safety reviews **to be carried out every 12 months** (the interval between intermediate dam safety reviews must not exceed 15 months). For the purpose of intermediate dam safety reviews, a DSAP must contain effective procedures for: › carrying out on-site inspections of the dam and appurtenant structures › reviewing dam and reservoir operation records, surveillance records, and maintenance records › reviewing records of planned and actual maintenance and testing of the gate and valve systems that have dam or reservoir safety functions › evaluating the performance of the dam during the relevant period based on the on-site inspections and reviews. A DSAP must also require the person who carries out the intermediate dam safety review to prepare a report on the review, which includes information on: › the activities listed in the bullet points above › the dam safety issues (if any) that have been identified when carrying out those activities › the performance of the dam in the loading conditions experienced during the relevant period.	An intermediate dam safety review (IDSR) is a dam performance review that is intermediate in the sense that it fits between element 2 (dam surveillance) and element 5 (comprehensive dam safety reviews) in frequency and in its level of detail. The IDSR must evaluate dam performance for the loading conditions experienced during the relevant period. The IDSR must also identify any dam safety issues[14] and categorise them into physical infrastructure issues, potential or confirmed dam safety deficiencies, and non-conformances. The dam owner must have procedures that describe who must carry out what IDSR activity, when, where and how. The procedures must include scope and methodology for both the site inspection and reporting components of the IDSR.

[14] See the glossary for a definition of Dam Safety Issue as per the Building (Dam Safety) Regulations 2022.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)

5. Comprehensive dam safety reviews	A DSAP must provide for comprehensive dam safety reviews **to be carried out every five years** (the interval between comprehensive dam safety reviews must not exceed sixty-six months).
	
	For the purpose of comprehensive dam safety reviews, a DSAP must contain effective procedures for:
	› reviewing known and potential hazards and threats to dam performance
	› considering and commenting on the appropriateness of—
	  › the dam's potential failure modes
	  › the description of the corresponding loading conditions that have been identified for those potential failure modes
	  › any visual and instrument performance indicators that have been identified for those potential failure modes
	› carrying out an on-site inspection of the dam and appurtenant structures
	› carrying out an on-site inspection and testing of gates and valves and other equipment or systems that perform dam or reservoir safety functions
	› assessing the performance of the dam and its appurtenant structures in all design loading conditions
	› reviewing the dam owner's safety management resources, systems, and procedures (including the contents of the dam safety assurance programme).
	
	A DSAP must also require the person who carries out the comprehensive dam safety review to prepare a report on the review, which includes information on:
	› the activities listed in the bullet points above
	› the dam safety issues (if any) that have been identified when carrying out those activities
	› comment on previously identified dam safety issues and either the adequacy of their resolution, or whether there are impediments that prevent their resolution.
		A comprehensive dam safety review (CDSR) is a comprehensive, periodic, independent review of the design, construction, operation and performance of a dam, and all systems and procedures that affect dam and reservoir safety, against current dam safety guidelines, standards, and industry practice.
		
		The CDSR must identify any dam safety issues and categorise them into physical infrastructure issues, potential or confirmed dam safety deficiencies, and non-conformances. The CDSR must also comment on the adequacy of the resolution of previously identified dam safety issues or whether there are impediments that prevent their resolution.
		
		The dam owner must have procedures that describe who must carry out what CDSR activity, when, where and how. The procedures must include scope and methodology for the site inspection, site testing and reporting components of the CDSR.
		
		If a dam enters a dam safety deficiency management phase and if the dam owner is following a Special Dam Safety Review (or other detailed dam performance assessment) procedure, then the next regularly scheduled CDSR can be postponed until the dam is back in normal service (eg where the detailed review/assessment results in greater dam performance and dam safety management understanding than would be gained from a CDSR).
		
		Members of a dam's original design team may assist the CDSR by clarifying matters but should not be included in the CDSR team for the first two CDSRs to ensure an independent review of dam safety is completed.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)

6. Emergency planning and response	A DSAP must contain effective procedures for:
	› maintaining, exercising, and reviewing an emergency action plan
	› consulting the following persons or bodies on the content of the plan and providing them with the plan (to the extent that those persons or bodies may be affected by a failure of the dam):
	  › local authorities (within the meaning of section 5 of the Local Government Act 2002)
	  › a Civil Defence Emergency Management Group (within the meaning of section 4 of the Civil Defence Emergency Management Act 2002)
	  › emergency services (within the meaning of section 4 of the Civil Defence Emergency Management Act 2002).
	The emergency action plan must contain the following:
	› the purpose of the plan
	› the roles and responsibilities for implementing the plan
	› an emergency contact list.
	  › Depending on the size of the population at risk, the approach may be to have Civil Defence or Fire and Emergency Services as the primary emergency contact, so they can contact all persons with cell phones within the affected zone.
	› procedures for identifying, assessing, and responding to a potential or imminent dam failure
	› procedures for notifying those with roles and responsibilities under the plan of an actual or potential emergency involving the dam
	› information about preventive and emergency actions that must or may be taken, and resources, equipment, and materials that may be used, to avoid a failure of the dam or to mitigate the consequences of a failure
		The dam owner must have procedures that describe who must carry out what emergency planning and response activity, when, where and how. The procedures must ensure those who have roles in the dam owner's dam emergency action plan (EAP) have high levels of awareness and understanding of their responsibilities supported by training and exercises.
		The dam owner must consult local authorities, Civil Defence Emergency Management Group (CDEMG) and emergency services on the content of the EAP and provide them with the EAP (to the extent that those persons or bodies may be affected by a failure of the dam).
		Dam break inundation maps and tables assist Police, Civil Defence Emergency Management (CDEM), and territorial and regional authorities in the development of management and evacuation plans. Dam break inundation maps must show inundation areas at scales sufficient for the identification of areas at risk and should include tables that show the following at key locations:
		› the arrival time of first flood waters
		› the arrival time of the peak flood level
		› the peak flood elevation above mean sea level.
		It may also be useful to express flood levels as relative depths at key locations (eg bridges) and the time at which key structures become unusable.

DSAP element	Procedures to be included in each element, as per the regulations	Supporting information (refer NZ Dam Safety Guidelines for detailed guidance)
6. Emergency planning and response (continued)	› information about access to the site of the dam, including site location maps and main and alternative access routes › procedures for maintaining the plan › procedures for training and exercises for those with roles and responsibilities under the plan › dam break inundation maps and tables.	
7. Identifying and managing dam safety issues	A dam safety assurance programme must contain effective procedures for: › recording, prioritising, and tracking dam safety issues › investigating, assessing, and resolving dam safety issues.	The identification and management of dam safety issues is an essential part of dam safety management for any dam and should be addressed with established procedures in all DSAPs. Dam safety issues are a broad set of issues that affect dam safety including physical infrastructure issues, dam safety deficiencies (potential or confirmed) and non-conformances. Refer to definitions provided in the Dam Safety Regulations (regulation 3, subclause 2). While dam safety issues may be identified during the implementation of any DSAP element, the Dam Safety Regulations require they be identified in elements 4 (Intermediate Dam Safety Reviews) and 5 (Comprehensive Dam Safety Reviews) and managed in this element 7. The dam owner must have a systematic and auditable approach to recording, prioritising, tracking, investigating, assessing, and resolving their dam safety issues. Guidance for the investigation, assessment, and resolution of dam safety deficiencies, including the use of risk informed decision making and dam safety risk management processes, is provided in the NZ Dam Safety Guidelines.

What does the law say:

› Regulations 11 to 18 of the Building (Dam Safety) Regulations 2022 outline the criteria and standards for dam safety that a dam safety assurance programme must meet for the purposes of section 141 of the Building Act 2004.

Step 4a – Have the DSAP certified by a recognised engineer

In some cases, a dam owner may arrange for a technical practitioner to prepare the DSAP in collaboration with the dam owner's staff, but only a recognised engineer can certify the DSAP. The recognised engineer will work with the dam owner to prepare and certify their DSAP form. The form contains:

- the DSAP, attached documents, and any other referenced documents
- information about the dam
- the PIC given to the dam
- information about the dam owner
- a summary of compliance with criteria and standards
- documentation of the DSAP[15]
- a list of appurtenant structures, and
- certificate of the recognised engineer.

To find a recognised engineer in your area, visit the Engineering New Zealand Te Ao Rangahau website www.engineeringnz.org/public-tools/find-engineer/.

You can find a template for the DSAP form at www.building.govt.nz/managing-buildings/dam-safety/resources.

Step 4b – Submit the DSAP to the appropriate regional authority

Once the DSAP form has been prepared and certified by a recognised engineer, it must be sent to the regional authority. The regional authority must approve the form, unless it considers on reasonable grounds that the engineer who prepared the DSAP form is not a recognised engineer.

If the regional authority decides not to approve the DSAP, then the dam owner will be directed to have it audited by a different recognised engineer within 15 days, unless a later date is agreed on by the regional authority.

What does the law say:

- Sections 142-145 of the Building Act 2004 outline the role of regional authorities and their approval or refusal of DSAP, as well as the requirements of dam owners in this process.

Implement the dam safety assurance programme

Dam owners should ensure that the procedures outlined in the DSAP are followed to ensure the dam is operated, maintained, and managed safely.

A dam owner must make sure that except for any identified, minor items of non-compliance, all procedures in the DSAP are fully complied with. An example of a minor non-compliance is if a DSAP stated that 12 visual inspections of the dam would be conducted throughout the course of a year, but there was a significant event or circumstance (eg site construction work, equipment breakdown, loss of access, pandemic, staff shortage) that prevented one of the inspections from occurring, so only 11 took place that year. Another example may be that the DSAP stated four spillway gate system backup power tests would be completed in one year but due to a significant event or circumstance, only three were completed.

[15] Include a list of the location of all documentation, manuals, and publications referred to in the DSAP. See section 148 of the Building Act 2004 for information about where and how the DSAP must be kept.

Step 5 – Prepare an annual dam compliance certificate

Every 12-month anniversary of a dam owner's DSAP approval date, a dam owner must have a recognised engineer audit evidence of their compliance with the DSAP and prepare an annual dam compliance certificate, which is prescribed in the regulations. The certificate contains:

- the dam's name and relevant regional authority
- the PIC given to the dam
- approval of the DSAP
- information about the dam owner
- compliance information, and
- certificate of the recognised engineer.

You can find a template for the annual dam compliance certificate at www.building.govt.nz/managing-buildings/dam-safety/resources.

Step 5a – Have the annual dam compliance certificate certified by a recognised engineer

A recognised engineer must audit the dam owner's reports, records and other documents relating to completion of the procedures in the DSAP and certify that the dam owner has complied with the DSAP during the previous 12 months (except for any identified, minor items of non-compliance – refer examples in Step 4b).

Step 5b – Supply the dam compliance certificate to the regional authority

Supply or have a recognised engineer supply the regional authority with a dam compliance certificate on each anniversary of the DSAP approval.

The dam owner must publicly display a copy of the dam compliance certificate in a prominent place on the dam or publicly available via the dam owner's website or other electronic platform.

What does the law say:

Section 150(2) of the Building Act 2004: The dam compliance certificate must—

(a) be supplied on each anniversary of the approval, or deemed approval, of the dam safety assurance programme; and

(b) state that, except for the identified, minor items of non-compliance, all procedures in the dam safety assurance programme have been fully complied with during the previous 12 months; and

(c) be signed by,—

(i) if the owner is an individual, that individual; or

(ii) if the owner is a body corporate, the chief executive of that body corporate or, if there is no chief executive, a person with an equivalent position in the body corporate; and

(d) be in the prescribed form; and

(e) contain the prescribed information; and

(f) have attached to it a certificate from an engineer that—

(i) confirms that—

(A) the engineer has reviewed the owner's reports and other documents relating to the procedures in the dam safety assurance programme that the owner has followed in the previous 12 months; and

(B) except for the identified, minor items of non-compliance, all procedures in the dam safety assurance programme have been complied with during the previous 12 months; and

(ii) states that the engineer is a recognised engineer; and

(iii) has attached to it evidence that the engineer is a recognised engineer.

Step 6 – Review the potential impact classification

A dam owner must review their dam's PIC within five years of the regional authority approving it. After the first review, it must then be reviewed at intervals of not more than five years (ie within five years).

The dam's PIC must also be reviewed any building work that requires a building consent is carried out on the dam which results, or could result, in a change to the potential impact of a failure of the dam on persons, property, or the environment.

What does the law say:

Section 139 of the Building Act 2004 outlines when an owner must review their dam's classification.

Step 7 – Review the dam safety assurance programme

A DSAP should be appropriate to the design and construction type of the dam, its potential failure modes, its potential and confirmed dam safety deficiencies and its PIC.

The contents of the DSAP must be reviewed to make sure they are still appropriate, or whether any updates may be required because of any changes to the dam or its PIC.

An owner of a medium PIC dam must review their dam's DSAP within ten years of the regional authority approving the DSAP, and then after the first review, at intervals of not more than seven years.

An owner of a high PIC dam must review their dam's DSAP within five years of the regional authority approving the DSAP, and then after the first review, at intervals of not more than five years.

What does the law say:

- Section 146 of the Building Act 2004 outlines the review of dam safety assurance programmes.
- As per section 146(2) of the Building Act 2004, in addition to the timeframes listed about, a dam owner must also review a DSAP if at any time –
  - (i) building work that requires a building consent is carried out on the dam; and
  - (ii) the building work results, or could result, in a change to the potential impact of the dam on persons, property, or the environment; or
  - (b) when requested by the regional authority to do so, if the dam is an earthquake-prone dam or a flood-prone dam.

7.3 Existing resource consent conditions and the new regulations

Regional authorities are responsible for ensuring that large dams meet the requirements of the Resource Management Act 1991 (RMA) and existing dams may have needed to obtain a resource consent, for example, in order to control the environmental effects of their construction; any environmental effects on water life and habitats as a result of their construction; and as a result of any disruption to the natural flow of water.

Resource consents are granted with conditions, and in the absence of dam safety regulations under the Building Act 2004, some regional authorities may have included conditions on dam safety relating to the control of environmental effects (regional authorities may have alternatively utilised section 19 of the Building Act).

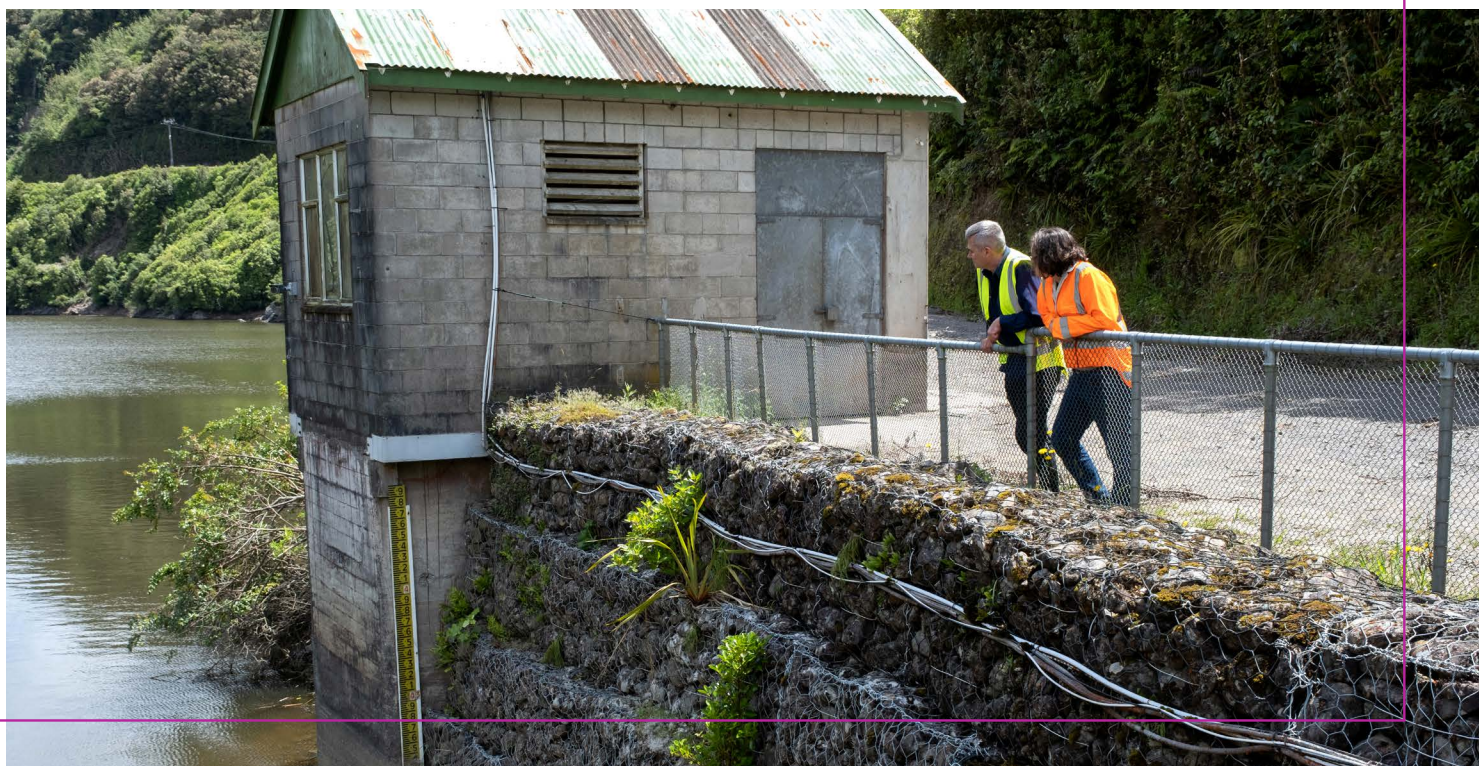
Regulations provide a robust and nationally consistent approach to dam safety which will protect people, property, and the environment from the potential impacts of dam failure. As a result, some existing resource consents may contain conditions which now duplicate the new regulations. Where there is duplication, there are a variety of options available to both the regional authorities and the consent holder.

Given that details of each resource consent will be site-specific, it would be best for the regional authority and an individual consent holder to discuss options.

What does the law say:

Section 127 of the Resource Management Act 1991 outlines the change or cancellation of consent condition on application by consent holder.

Section 128 of the Resource Management Act 1991 outlines how a regional authority can decide to review an existing consent.



8. Roles and responsibilities

The key groups impacted by the regulations are dam owners, recognised engineers, and regional authorities. This is because the regulations require these groups to carry out certain actions.

8.1 Dam owner

Dams are owned by a variety of different people or groups, whether it be a farmer or vineyard with an irrigation dam, a regional authority who owns a dam and provides safe drinking water for the community, or an energy company that owns a large dam for hydropower generation. It is the owner of the dam, regardless of the dam's purpose, who is primarily responsible for safe management of the dam and needs to fulfil the dam safety regulatory requirements. This is a legal obligation.

Dam owners will need understand whether their water retention structure is a dam (using the Building Act definition), and if it is, they will need to determine whether it meets or exceeds either of the two height and volume thresholds to be considered a classifiable dam.

If the dam does not meet the definition of a classifiable dam, then it is not impacted by the regulations and the dam owner is not required to carry out any further dam safety activities as outlined in the regulations.

If the dam does meet the definition of a classifiable dam, then the dam owner has certain responsibilities under the Building Act and regulations and should refer to the section below and section 7 of this guidance.

If a dam owner has reasonable grounds for believing that their dam is, or has become dangerous, then they must immediately notify the relevant regional authority. If the dam is an earthquake-prone dam or a flood-prone dam, then the dam owner has a responsibility under the Building Act to review their dam's DSAP when requested by the regional authority to do so.

Owners of classifiable dams

Many owners of classifiable dams already have dam safety management systems in place that are based on the New Zealand Dam Safety Guidelines. Dam owners will be able to continue operating these systems under the new regulations if they can clearly demonstrate to a recognised engineer how the dam safety management system addresses the regulations' DSAP requirements.

For owners of classifiable dams who have limited or no dam safety procedures in place, they will need to become familiar with their responsibilities under the Building Act and regulations, and what actions they must take. An experienced technical practitioner or recognised engineer will be able to assist with understanding the responsibilities.

Owners of classifiable dams will be required to classify and register any classifiable dam they own within three months of the regulations commencing on 13 May 2024 or, if the dam is being built during that time or later, within three months of the dam being commissioned.

The Building Act and regulations require the owner of a classifiable dam to:

- Classify the dam as either a low, medium, or high PIC dam, have the classification certified by a recognised engineer by using the dam classification certificate, and submit the classification to the appropriate regional authority for approval.
- For medium and high PIC dams, prepare a DSAP, have it certified by a recognised engineer by using the dam safety assurance programme form, and submit it to the appropriate regional authority for approval.

- For medium and high PIC dams, have a recognised engineer audit evidence of DSAP fulfilment and supply the regional authority with the Dam Compliance Certificate on each anniversary of the DSAP approval.
- Review the dam's PIC within five years of the regional authority approving it. After the first review, it must then be reviewed at intervals of not more than five years (ie within five years).
- An owner of a medium PIC dam must review their dam's DSAP within ten years of the regional authority approving the DSAP, and then after the first review, at intervals of not more than seven years. An owner of a high PIC dam must review their dam's DSAP within five years of the regional authority approving the DSAP, and then after the first review, at intervals of not more than five years.

What does the law say:

Subpart 7 – Safety of dams of the Building Act 2004 are particularly relevant to dam owners to fully understand their responsibilities under the Act.

8.2 Regional authority

Regional authorities perform the functions of a building consent authority, that relate to dams.

The Building Act requires regional authorities to:

- administer and monitor the regulations, this involves:
  - establishing and maintaining a register of dams in its district
  - considering and approving or refusing dam classifications (based on whether they have been certified by a recognised engineer as defined in the regulations)
  - approving or refusing dam safety assurance programmes
  - receiving the annual dam safety assurance programme compliance certificates
- adopt and implement a policy on dangerous dams, flood-prone dams, and earthquake-prone dams
- take action, if necessary, if any dam, large or small, poses an immediate danger to the safety of persons, property, or the environment
- provide building consent processing and inspection services for classifiable dams, such as issuing project information memoranda (PIMs), building consent processing, compliance monitoring and enforcement of the Building Code and regulations.

Transfer of functions, duties and powers of a regional authority

A regional authority may transfer one or more of its functions, duties, or powers under the Building Act to another regional authority. Several regional authorities have chosen to do this when it comes to the compliance monitoring and enforcement of dams related legislation.

What does the law say:

The following sections of the Building Act 2004 are particularly relevant to regional authorities:

- Subpart 7 – Safety of dams of the Building Act 2004
- Sections 244 to 246 of the Building Act 2004 – transfer of functions, duties and powers of regional authority.

8.3 Technical practitioner

In many cases, a dam owner may seek support from an experienced dam safety practitioner to comply with the Building Act and regulations. This guidance document refers to the experienced dam safety practitioner as a technical practitioner. The technical practitioner may also be registered as a recognised engineer and/or may have a recognised engineer within or outside their organisation who can certify that the work they have done meets the Building Act and regulations requirements.

In a broad sense technical practitioners may have the knowledge and experience required to prepare PICs and/or prepare and audit DSAPs, but if they have not been assessed by Engineering New Zealand Te Ao Rangahau and registered as a recognised engineer, they are not able to certify PICs or DSAPs.

8.4 Recognised engineer

There are two types of recognised engineer – a PIC recognised engineer and a DSAP recognised engineer. A recognised engineer can be either, or both, depending on their competencies as assessed and registered by Engineering New Zealand Te Ao Rangahau.

PICs and DSAPs can be prepared by anyone, whether it be the dam owner themselves, a farm consultant, or a technical practitioner. However, the recognised engineer's key role in the dam safety regulatory framework is to certify PICs and DSAPs before they are submitted to a regional authority for approval. Also, only a recognised engineer can certify that all procedures in the DSAP have been complied with during the previous 12 months (except for the minor items of non-compliance).

All recognised engineers must be Chartered Professional Engineers who are subject to a code of ethical conduct. They must, in the course of their engineering activities, take reasonable steps to safeguard the health and safety of people and report adverse consequences. If, during the recognised engineer's completion of PIC certification or DSAP certification or audit they become aware that a dam may be dangerous, then they have an ethical obligation as well as a legal obligation to inform the dam owner and the relevant regional authority.

Qualification and competency requirements for recognised engineers

The Building Act specifies that a recognised engineer must be registered under the Chartered Professional Engineers of New Zealand Act 2002 and have such additional qualifications and competencies as specified in the regulations.

Regulations 21, 22 and 23 specify the competencies that recognised engineers are required to hold for each of the PIC and DSAP regulatory roles the recognised engineer must fulfil.

The following competencies are required for recognised engineers. The competencies are clustered into those required to audit a PIC and those required to certify and audit a DSAP. Recognised engineers may choose to be assessed for the competencies required to audit a PIC, the competencies required to certify and audit a DSAP, or both sets of competencies.

Potential impact classifications (PIC)	Relevant sections of the Building Act, and regulations in the regulations which provide for a recognised engineer to audit and certify the classification of a dam
Prescribed qualification: Engineering New Zealand Te Ao Rangahau has assessed that the engineer is able to practise competently, to the reasonable standard of a professional engineer practising in the area. Prescribed competency: Engineering New Zealand Te Ao Rangahau has assessed that the engineer has demonstrated that they have the experience and knowledge in the following things that would be reasonably expected of a professional engineer practising in the area: a) the identification and classification of dams under section 134B of the Building Act and clause 9 of the regulations. b) the identification of appurtenant structures c) the assessment of the hazard of potential dam-break floods to downstream community, historical or cultural places, critical or major infrastructure, and the natural environment (for example, assessing the extent of inundation, depth of inundation, velocity, flow, time to peak flow, and duration of inundation).	Sections 134B, 135, 136, 138, and 139. Regulations 21 to 23 of the regulations.
Dam safety assurance programmes (DSAP)	**Relevant sections of the Building Act, and regulations in the regulations which provide for a recognised engineer to audit, certify, and review dam safety assurance programmes**
Prescribed qualification: Engineering New Zealand Te Ao Rangahau has assessed that the engineer is able to practise competently, to the reasonable standard of a professional engineer practising in the area. Prescribed competency: Engineering New Zealand Te Ao Rangahau has assessed that the engineer has demonstrated that they have the experience and knowledge in the following things that would be reasonably expected of a professional engineer practising in the area: a) the general requirements for dam safety assurance programmes (see regulation 11): b) procedures for the operation and maintenance of dams and reservoirs (see regulation 12): c) surveillance procedures (see regulation 13): d) procedures for the identification, inspection, and maintenance of appurtenant structures (see regulation 14): e) procedures for the inspection, maintenance, and testing of gate and valve systems with dam or reservoir safety functions (see regulation 14): f) procedures for intermediate dam safety reviews (see regulation 15): g) procedures for comprehensive dam safety reviews (see regulation 16): h) procedures for emergency planning and response (see regulation 17): i) procedures for identifying and managing dam safety issues (see regulation 18).	Sections 140 to 148B and 150. Regulations 23.

9. Dangerous, earthquake-prone, and flood-prone dams

9.1 Overview of dangerous dams, earthquake-prone dams, and flood-prone dams

If a recognised engineer finds evidence that a dam is dangerous[16] (ie when certifying the DSAP or certifying an annual compliance certificate), then they must notify the regional authority and dam owner in writing within five working days after they come to believe that the dam is dangerous.
See the appendices for definitions of dangerous dam, moderate earthquake and moderate flood events.

What does the law say:

Section 135A of the Building Act 2004 – Certifying engineer must notify regional authority and owner if dam dangerous:

1) An engineer engaged to provide a certificate for the purposes of section 135(1)(b), 142(1)(b), or 150(2)(f) must notify the regional authority and the owner of the dam if he or she believes that the dam is dangerous.
2) The notice must be—
   i) in writing; and
   ii) given within five working days after the engineer forms the belief in question.
3) Nothing in subsection (1) requires an engineer to act outside the terms of his or her engagement by investigating whether the dam is dangerous or not and a breach of the duty in subsection (1) does not give rise to any civil liability in damages.

If a dam owner has reasonable grounds for believing that their dam is, or has become dangerous, then they must immediately notify the relevant regional authority. If the dam is an earthquake-prone dam or a flood-prone dam, then the dam owner has a responsibility under the Building Act to review their dam's DSAP when requested by the regional authority to do so.

What does the law say:

Section 153B of the Building Act 2004 – Owner must notify regional authority of dangerous dam:

The owner of a dam who has reasonable grounds for believing that the dam is, or has become, dangerous must immediately notify the regional authority in whose region the dam is situated.

[16] The process for determining whether a dam is earthquake prone, flood prone or dangerous is typically technical and complex, and should be carried out by a technical practitioner.
See the glossary for definition of; dangerous dam, moderate earthquake, moderate flood, earthquake-prone dam, Z factor, annual exceedance probability, earthquake threshold event, flood-prone dam, and flood threshold event.

9.2 Functions of a regional authority regarding dangerous dams, earthquake-prone dams and flood-prone dams

Section 161 of the Building Act requires a regional authority to develop a dangerous dams, earthquake-prone dams, and flood-prone dams policy within their region. The policy must be reviewed at intervals of not more than five years.

The purpose of the policy is to help prevent the catastrophic failure of a potentially dangerous dam, and to ensure deficiencies in an earthquake-prone or flood-prone dam are addressed.

Each policy must state the regional authority's approach for fulfilling and prioritising its functions around these types of dams. The policy must also state how it will be applied to heritage dams.

These policies can be found on a regional authority's website, or you can contact them directly.

What does the law say:

The following sections of the Building Act 2004 and Building (Dam Safety) Regulations 2022 are particularly relevant when it comes to dangerous dams, earthquake-prone dams and flood-prone dams:

- Section 153 to 162 of the Building Act 2004.
- Regulations 19 and 20 of the Building (Dam Safety) Regulations 2022.

Sections 154 to 158 of the Building Act outline the functions of a regional authority in relation to dangerous dams.

These functions and powers include:

- putting up a hoarding or fence to prevent people from getting too close to the dam
- attaching a notice on or near the dam that warns people not to approach the dam
- requiring work to be carried out on the dam by the owner within a specified period (which must not be less than 10 days), to reduce or remove the danger.

Under section 146(2)(b) of the Building Act the regional authority may request a large dam owner to review their dam safety assurance programme if the dam is an earthquake-prone dam or a flood-prone dam.

9.3 Dams posing an immediate danger

Section 157 of the Building Act outlines what a regional authority can do to remove the danger if it considers a small or large dam poses an immediate danger to the safety of people, property, or the environment.

The chief executive of a regional authority may take any action necessary to remove the immediate danger and later apply to the District Court for a confirmation of warrant for undertaking the appropriate actions. The regional authority may recover the costs for these actions from the dam owner.

10. Non-compliance with the regulations

10.1 Dam owner fails to submit their dam's classification to the regional authority for approval

What does the law say:

Section 134C of the Building Act 2002 – Offence of failing to classify dam:

A person to whom section 134 applies who fails to classify the dam in accordance with section 134B commits an offence and is liable on conviction,—

a) in the case of an individual, to a fine not exceeding $50,000:

b) in the case of a body corporate, to a fine not exceeding $150,000.

10.2 Dam owner fails to comply with the regional authorities direction to re-audit their dam's classification

What does the law say:

Section 138 of the Building Act 2004 – Regional authority must require re-audit of dam classification that it refuses to approve:

5) A person who commits an offence under this section is liable on conviction,—

   a) in the case of an individual, to a fine not exceeding $20,000:

   b) in the case of a body corporate, to a fine not exceeding $60,000.

10.3 Dam owner fails to submit a DSAP to the regional authority for approval

What does the law say:

Section 140 of the Building Act 2004 – Requirement for dam safety assurance programme:

4) A person who commits an offence under this section is liable on conviction,—

   a) in the case of an individual, to a fine not exceeding $50,000:

   b) in the case of a body corporate, to a fine not exceeding $150,000.

10.4 Dam owner fails to comply with the regional authorities direction to re-audit their dam's DSAP

What does the law say:

Section 145 of the Building Act 2004 – Regional authority must require re-audit of dam safety assurance programme that it refuses to approve:

5) A person who commits an offence under this section is liable on conviction,—
   a) in the case of an individual, to a fine not exceeding $50,000:
   b) in the case of a body corporate, to a fine not exceeding $150,000.

10.5 Dam owner fails to supply the regional authority with an annual dam compliance certificate

What does the law say:

Section 150 of the Building Act 2004 – Owner of dam must supply annual dam compliance certificate:

4) A person commits an offence if the person knowingly—
   a) fails to display a dam compliance certificate that is required to be displayed under this section; or
   b) displays a false or misleading dam compliance certificate; or
   c) displays a dam compliance certificate otherwise than in accordance with this section.
5) A person who commits an offence under subsection (4)(a) or (c) is liable on conviction,—
   a) in the case of an individual, to a fine not exceeding $20,000:
   b) in the case of a body corporate, to a fine not exceeding $60,000.
6) A person who commits an offence under subsection (4)(b) is liable on conviction,—
   a) in the case of an individual, to a fine not exceeding $50,000:
   b) in the case of a body corporate, to a fine not exceeding $150,000.

10.6 After given notice by a regional authority, a dam owner fails to carry out work on a dangerous dam to reduce or remove the danger

What does the law say:

Section 154 of the Building Act 2004 – Powers of regional authorities in respect of dangerous dams

4) A person who commits an offence under this section is liable on conviction,—
   a) in the case of an individual, to a fine not exceeding $300,000:
   b) in the case of a body corporate, to a fine not exceeding $1,500,000.

11. Appendices

11.1 Glossary

Term	Definition and explanation
Annual exceedance probability	In accordance with regulation 19 of the regulations, annual exceedance probability, in relation to an earthquake or a flood of a particular intensity or flow rate, means the probability that an earthquake or a flood of that intensity or flow rate will be equalled or exceeded in any year. **Example** If a flood with a particular flow rate has an AEP of 1 in 50, the probability of a flood of at least that intensity occurring in any year is calculated as follows: 1 ÷ 50 = 2%
Appurtenant structure	Is defined in section 7 of the Building Act as "a structure that is integral to the safe functioning of the dam as a structure for retaining water or other fluid." Examples of appurtenant structures include spillways, intakes, outlets, and sluice facilities together with their associated gates/ valves and control equipment.
Canal invert	In accordance with regulation 7 of the regulations, canal invert means the lowest point of the inside of the canal structure which holds water or fluid.
Classifiable dam	In accordance with regulation 5 of the regulations, for the purposes of the Building Act, classifiable dam means a dam that— a) has a height of four or more metres and stores 20,000 or more cubic metres volume of water or other fluid; or b) has a height of one or more metres and stores 40,000 or more cubic metres volume of water or other fluid.
Commercial or industrial facility	In accordance with regulation 3 of the regulations, commercial or industrial facility means a building, other than a farm building, that is used for commercial, business, industrial, or professional purposes; but does not include any critical or major infrastructure.

Term	Definition and explanation
Community facility	In accordance with regulation 3 of the regulations, community facility means any of the following: a) an early childhood education and care centre or registered school within the meaning of section 10 of the Education and Training Act 2020: b) the premises of an institution within the meaning of section 10 of the Education and Training Act 2020: c) a rest home or a residential disability care institution (within the meaning of section 58(4) of the Health and Disability Services (Safety) Act 2001): d) a building that is used to provide health or disability services as defined in section 5 of the Health and Disability Services (Safety) Act 2001 (other than a hospital building referred to in paragraph (b) of the definition of critical or major infrastructure): e) a marae, a community hall, or an event centre. Some examples of a community facility include sports stadiums.
Confirmed dam safety deficiency	In accordance with regulation 3 of the regulations, a confirmed dam safety deficiency is an issue where the dam owner or a person acting on their behalf has already observed adverse performance of the dam or where the owner or that person knows, or ought reasonably to know, that adverse performance of the dam is reasonably likely to occur under design loading conditions.
Confirmed dam safety deficiency	In accordance with regulation 3 of the regulations, a confirmed dam safety deficiency is an issue where the owner or a person acting on their behalf has already observed adverse performance of the dam or where the owner (or that person) knows, or ought reasonably to know, that adverse performance of the dam is reasonably likely to occur under design loading conditions.
Crest	Section 7 of the Building Act defines a crest, in relation to a dam, as the uppermost surface of a dam, not taking into account any camber allowed for settlement, or any curbs, parapets, guard rails, or other structures that are not part of the water-retaining structure; and for the avoidance of doubt, any freeboard is part of the water-retaining structure for the purposes of this definition.

Term	Definition and explanation
Critical or major infrastructure	In accordance with regulation 3 of the regulations, a critical or major infrastructure means any of the following: a) a building or other infrastructure operated or used by a lifeline utility within the meaning of section 4 of the Civil Defence Emergency Management Act 2002. Examples include electricity, water, sewage, gas, telecommunications and rail infrastructure. b) a hospital building that is likely to be needed in an emergency (within the meaning of section 4 of the Civil Defence Emergency Management Act 2002) to provide— i. emergency medical services; or ii. ancillary services that are essential for the provision of emergency medical services: c) a building that is used to provide emergency response services (for example, policing, fire, ambulance, or rescue services): d) buildings or infrastructure that are essential to the containment of a hazardous substance (as defined by section 2 of the Hazardous Substances and New Organisms Act 1996): e) the dam, another dam, or flood protection works if the service the dam, other dam, or flood protection works provide is critical to the community (for example, energy supply, drinking water storage, wastewater treatment, flood detention dams) and that service cannot be reasonably provided by alternative means.
Dam owner	The individual or organisation that holds the legal property title to the dam, dam site or reservoir. The dam owner is responsible for the safety of a dam.
Dam safety issue	In accordance with regulation 3 of the regulations, a) a physical infrastructure issue where dam performance cannot be adequately verified because of any problems with any of the following: i. any equipment used to verify dam performance: ii. obtaining access to or around the dam for visual inspection and instrument reading: iii. any instruments for measuring dam performance and reservoir water or fluid level: iv. any communications systems for instrument readings: v. how the dam has been, or is being, maintained: b) an issue where the owner or a person acting on their behalf knows, or ought reasonably to know, that the performance requirements of the dam under design loading conditions may not be met (a potential dam safety deficiency): c) an issue where the owner or a person acting on their behalf has already observed adverse performance of the dam or where the owner or that person knows, or ought reasonably to know, that adverse performance of the dam is reasonably likely to occur under design loading conditions (a confirmed dam safety deficiency): d) a procedure or requirement of the dam safety assurance programme has not been complied with.

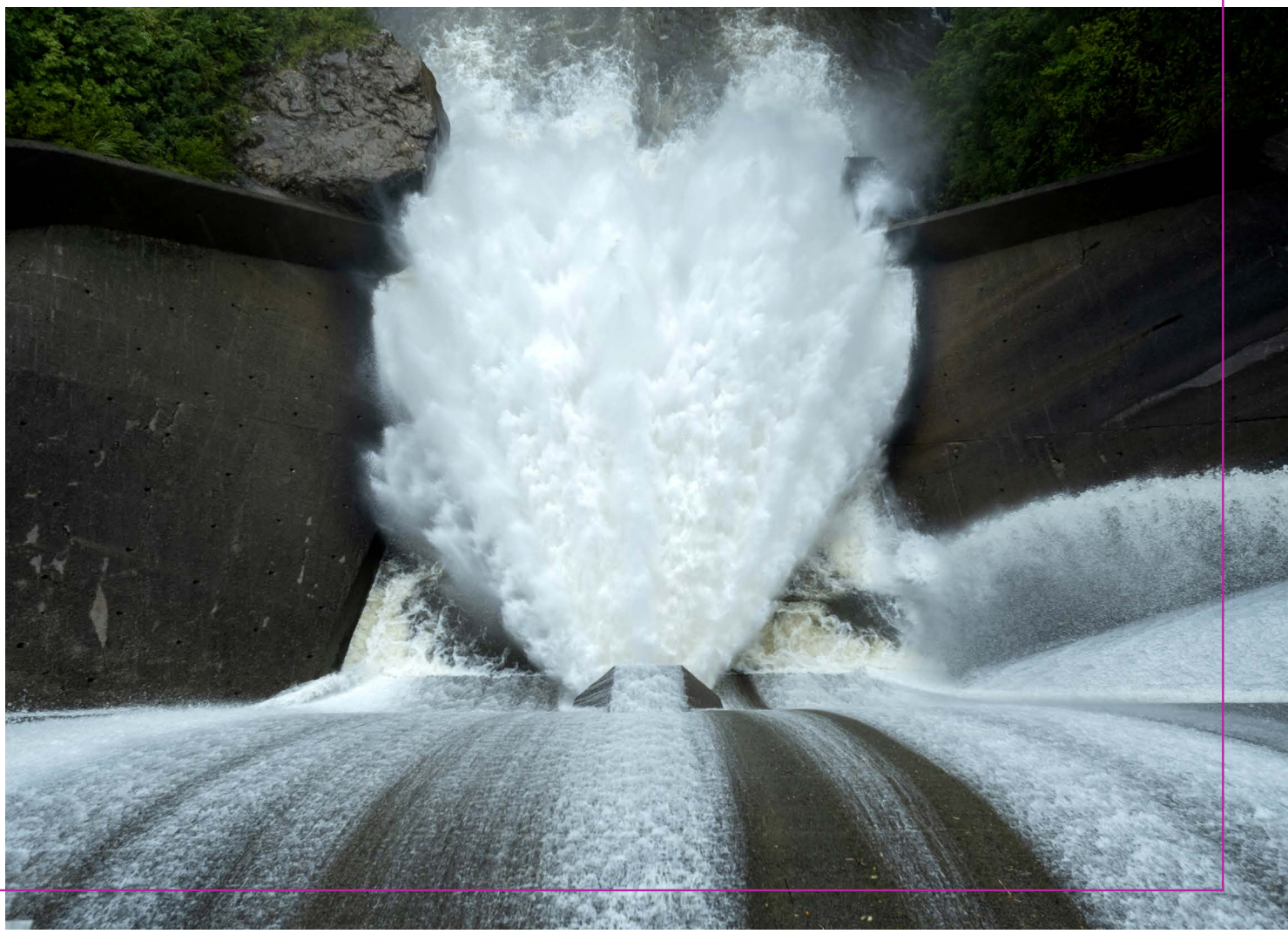
Term	Definition and explanation
Dam-break flood hazard assessment	The 2015 New Zealand Dam Safety Guidelines define a dam-break flood hazard assessment as an "assessment of the hazard of a potential dam-break flood to downstream people, property and the environment (for example, extent of inundation, depth of inundation, velocity, flow, time to peak flow, duration of inundation)."
Dangerous dam	Section 153 of the Building Act states that a dam is 'dangerous' for the purposes of the Building Act if it: a) is a high potential impact dam or a medium potential impact dam; and b) is likely to fail i. in the ordinary course of events; or ii. in a moderate earthquake (as defined in the regulations); or iii. in a moderate flood (as defined in the regulations). Regulation 19 of the regulations provide the following definition for 'moderate earthquake': a) in relation to a high potential impact dam, means an earthquake that would result in ground shaking, at the site of the dam, at an intensity with an annual exceedance probability of 1 in 100 (determined by normal measures of acceleration, velocity, and displacement) but not less than the 1 in 100 annual exceedance probability shaking determined using a seismic hazard factor (Z factor) of 0.10; and b) in relation to a medium potential impact dam, means an earthquake that would result in ground shaking, at the site of the dam, at an intensity with an annual exceedance probability of 1 in 50 (determined by normal measures of acceleration, velocity, and displacement) but not less than the 1 in 50 annual exceedance probability shaking determined using a seismic hazard factor (Z factor) of 0.10. Regulation 19 of the regulations provide the following definition for 'moderate flood': a) in relation to a high potential impact dam, means a flood that would result in water or other fluid flowing, into the reservoir formed by the dam, at a flow rate with an annual exceedance probability of 1 in 100; and b) in relation to a medium potential impact dam, means a flood that would result in water or other fluid flowing, into the reservoir formed by the dam, at a flow rate with an annual exceedance probability of 1 in 50.

Term	Definition and explanation
Earthquake prone dams	Section 153A of the Building Act states that a dam is an earthquake-prone dam if the dam: a) is a high PIC dam or medium PIC dam; and b) is likely to fail in an earthquake threshold event (as defined in the regulations). Regulation 19 of the regulations provide the following definition for 'earthquake threshold event': a) in relation to a high potential impact dam, an earthquake that would result in ground shaking, at the site of the dam, at an intensity with an annual exceedance probability of 1 in 500 (determined by normal measures of acceleration, velocity, and displacement) but not less than the 1 in 500 annual exceedance probability shaking determined using a seismic hazard factor (z factor) of 0.10; and b) in relation to a medium potential impact dam, an earthquake that would result in ground shaking, at the site of the dam, at an intensity with an annual exceedance probability of 1 in 250 (determined by normal measures of acceleration, velocity, and displacement) but not less than the 1 in 250 annual exceedance probability shaking determined using a seismic hazard factor (Z factor) of 0.10 Regulation 20 of the regulations states that the seismic hazard factor (Z factor) must be calculated in accordance with New Zealand Standard NZS 1170.5:2004 (Structural design actions—Part 5: Earthquake actions—New Zealand), regardless of whether or not that standard would otherwise apply.
Flood-prone dams	Section 153A of the Building Act states that a dam is a flood-prone dam if the dam: a) is a high PIC dam or medium PIC dam; and b) is likely to fail in a flood threshold event (as defined in the regulations). Regulation 19 of the regulations provide the following definition for 'flood threshold event': a) in relation to a high potential impact dam, a flood that would result in water or other fluid flowing, into the reservoir formed by the dam, at a flow rate with an annual exceedance probability of 1 in 500; and b) in relation to a medium potential impact dam, a flood that would result in water or other fluid flowing, into the reservoir formed by the dam, at a flow rate with an annual exceedance probability of 1 in 250.
Height of dam	A dam's height must be measured for the purposes of regulation 5 in accordance with section 133B of the Building Act.
Population at risk	In accordance with regulation 3 of the regulations, population at risk means the number of people likely to be affected by an uncontrolled release of all or part of the stored water or other fluid due to a failure of the dam (assuming that no person takes any action to evacuate).

Term	Definition and explanation
Potential dam safety deficiency	In accordance with regulation 3 of the regulations, a potential dam safety deficiency is an issue where the owner or a person acting on their behalf knows, or ought reasonably to know, that the performance requirements of the dam under design loading conditions may not be met.
Potential failure mode	In accordance with regulation 3 of the regulations, potential failure mode means a mechanism or set of circumstances that could result in the uncontrolled release of all or part of the stored water or other fluid.
Potential loss of life	In accordance with regulation 3 of the regulations, potential loss of life means the number of people expected to lose their life as a result of an uncontrolled release of all or part of the stored water or other fluid due to a failure of the dam.
Relevant period	In accordance with regulation 15 of the regulations, relevant period means: a) in relation to the first intermediate dam safety review of a dam as referred to in subclause (5), the period starting when this regulation first applies to the dam and ending on the date of the report under subclause (3); and b) in any other case, the period since the date of the previous report under subclause (3).

Term	Definition and explanation
Sites of historical or cultural significance	Sites of historical or cultural significance means: a) any of the following that forms a part of the historic or cultural heritage of Aotearoa New Zealand, which is listed on the New Zealand Heritage List/Rārangi Kōrero or identified by other, independent means, and that lies within the territorial limits of Aotearoa New Zealand: i. land, including an archaeological site, a cemetery, or urupā (or part of an archaeological site, cemetery, or urupā) ii. a building or structure (or part of a building or structure) iii. any combination of land, buildings, structures, or associated buildings or structures (or parts of buildings, structures, or associated buildings or structures); and b) includes anything that is in or fixed to land described in the bullet points above. This definition aligns with the Heritage New Zealand Pouhere Taonga Act 2014. The intent is that only historical or cultural sites that have already been identified or designated as heritage sites are considered, rather than seeking out or introducing ones. Some examples of historical places or sites include: locations of important events, whaling station sites, battlefields, historic roads, wāhi tapu, wāhi tupuna, goldmining sites, boundary markers, coastal defences, archaeological sites, and historic sites of scientific value (eg palaeontological sites). Historical areas are areas of land which contain an inter-related group of historic sites, buildings, structures and/or sites that contribute towards an understanding and appreciation of Aotearoa New Zealand's history and cultures. Examples include historic streets, historic towns, and rural historic environments. Heritage New Zealand has a list of Aotearoa New Zealand's significant heritage places, including National Historic Landmarks. The list can be accessed from their website, Aotearoa New Zealand's significant heritage places. The Department of Conservation manages a range of historic sites around Aotearoa New Zealand. A register of these sites can be found on their website, National Register of heritage sites managed by DOC.
Specified categories	In accordance with regulation 3 of the regulations, specified categories are community, cultural, critical or major infrastructure, and natural environment. A dam owner or technical practitioner uses table 1, schedule 2 of the regulations, to identify the likely effect that an uncontrolled release of all of the contents of the reservoir due to a failure of the dam when full would have on each of the specified categories.
Stored volume	Stored water or other fluid that is retained by a dam. Only water or other fluid which is held above ground level is considered to be stored water.

Term	Definition and explanation
Technical Practitioner	An individual who has the knowledge and skills necessary to prepare PICs and DSAPs. But they may not be a recognised engineer and therefore are not able to audit PICs or DSAPs.
Z factor	The seismic hazard factor (Z) is an index value which reflects the relative seismicity for different locations across Aotearoa New Zealand. It can be determined for any domestic location using NZS 1170.5:2004 and its commentary.



Te Kāwanatanga o Aotearoa
New Zealand Government

BP 8204