

Submission to the Government Administration Select Committee on the Building Bill

THE NEW ZEALAND SOCIETY ON LARGE DAMS (NZSOLD)

29 October 2003

We wish to appear before the Select Committee in support of this submission

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A. Summary

1. **“The Special Nature of Dams.** Dams with their related structures and the storage reservoirs they form, have a special nature because of their scale, the water forces at work and the use of natural ground to form the major part of the reservoir containment. Most other man-made works are built of high strength manufactured materials, involve controlled geometry, do not involve large storage of fluid contents, and generally do not use the foundation other than to support the works themselves.....It is the close interaction between the natural ground and man made structures, together with water (and other fluid contents) stored at a higher level, which most strongly characterise the special nature of dams.....” . The above is an abstract from the New Zealand Dam Safety Guidelines. A complete version of this is attached in Schedule 3. Although NZSOLD supports the inclusion of dam safety legislation in the framework of the Building Bill we consider it should be treated in a different manner to a building for the reasons outlined in the above extract.
2. Dam safety legislation in the form outlined in the Bill is new to New Zealand, despite construction of new dams and maintenance of existing dams being undertaken as far back as the 19th century. However, both now and in the past, the industry at an operating level has had many systems, and industry practice guidelines to adequately address dam safety. This is especially true amongst the

larger dam owners and some Regional Councils. The problem has been that the regulatory responsibilities for ensuring dams remain in a safe condition during, and after construction, is unclear. It has been highlighted at recent NZSOLD Conferences that the interpretation of who is responsible for dam safety is inconsistent, at both a District Council and Regional Council level and also varies between regions.

3. The slowdown in new dam construction in New Zealand over the past 15 years has limited the available pool of dam engineering expertise within New Zealand. Given that these resources are finite, and future training opportunities are limited we are concerned that the dam safety regime proposed in the Bill may result in unnecessary duplication of effort and overload current expertise resources.
4. Our comments and proposed amendments reflect the special nature of dams, the presence of many systems and practice guidelines currently operating to address dam safety within the industry and the objectives of avoiding imposition of unnecessary costs and duplication of roles, which would result in overloading of finite expertise resources.
5. We support the intent of this Bill with respect to clarifying regulatory responsibility for dams and giving regional authorities the responsibility for performing functions under the Bill.
6. We support the intent of the Bill in requiring compliance schedules for medium and high potential impact dams, and advocate emergency action plans for both high and medium potential impact dams. We wish to note that such requirements already exist for many dam owners as conditions on resource consents for dams and their operations.
7. We support the submission by the Institution of Professional Engineers New Zealand (IPENZ) regarding the licensing regime in the Building Bill and their proposed rewording of clauses 173, 175 and 246.
8. We are eager to see the dam safety regime model included in the Building Bill reflect current industry best practice and the dam safety assurance programmes that many dam owners already have in place. Many of these programmes are aligned with NZSOLD Dam Safety Guidelines and international best practice and often exceed the expectations of the Bill. In addition we also propose that where dam owners have an existing a Dam Safety Assurance Programme in place, which is audited annually by an independent inspection agency against a recognised standard, the need for compliance schedules and warrants of fitness is superseded.
9. The principle that the dam owners are ultimately responsible for the safety of their dams is well established in the industry. Many dam owners have trained in-house staff with defined responsibilities under their dam safety assurance programmes. We consider the Bill must acknowledge the role of these in-house staff as well as that of the licensed building practitioners with respect to compliance schedules.

10. We have identified a number of clauses in the Bill related to dams which can be amended to ensure more efficient processes in the following areas:

- maintaining registers for dams,
- preventing the unnecessary capture of very low potential impact dams in registers, and
- ensuring a satisfactory compliance schedule regime that accommodates existing best practice in dam safety assurance programmes.

We present reasons for our proposed amendments to a number of clauses and define the proposed changes in Schedule 1.

B. General

11. The New Zealand Society on Large Dams (NZSOLD) is a voluntary professional body founded in 1981 to advance the technology of dam engineering and support socially and environmentally responsible development and management of water resources. The objectives of the society are:

- To promote the best practice in the development, operation, maintenance and refurbishment of dams and their associated impoundments throughout New Zealand.
- To integrate best practice into the regulatory process associated with the dam and impoundment management industry in New Zealand.
- To be recognized as a credible and respected professional body, and the national focus for all matters relating to dams and their associated impoundments in New Zealand.

12. NZSOLD is a technical group within The Institution of Professional Engineers Incorporated (IPENZ) and has a management committee of 14 people representing dam owners, consultants and professionals working in the dam industry in New Zealand.

13. NZSOLD is made up of Corporate Members including the owners of large, medium and small dams, Regional, District and City Councils, consultants and contractors providing services to the dam industry, and a number of individual members and stakeholders.

14. NZSOLD is an active member of the International Commission on Large Dams, which is recognized as being the international forum for development and dissemination of best practice in dam engineering.

15. NZSOLD has considered dam safety issues in New Zealand as an area of prime focus since its' formation and have promoted the introduction of dam safety legislation. To foster discussion and exchange of ideas we have sponsored many national conferences addressing issues relating to dams over the past 20 years.

16. To assist the industry to meet statutory and safety requirements for dams the NZSOLD New Zealand Dam Safety Guidelines were first published in 1995 and were revised in November 2002. We have also published Guidelines on Inspecting Small Dams.

17. In preparing this submission NZSOLD has consulted with our membership through making the draft submission available to them through the Member-only area of the IPENZ website, and consultation through a symposium held in August 2003.
18. The submission represents the views held by NZSOLD in its capacity as the representative body of the wider dam industry. However, we understand that many of our members will be making individual submissions to the Bill and we respect their views. This submission does not represent the position of our Regional Council members as they wish to make their own submissions on the Bill.

C. Specific Comments

Clause 6 Definition of Dam

19. It is proposed to add to the definition of dam so that the appurtenant structures whose function is critical to ensuring reservoir safety are included. This means for example flow bypass structures such as spillways, sluice structures, and intakes etc. This definition will also assist in interpretation of clause 118 relating to the role of the building consent authority and territorial authority if a building is partly a dam. The proposed definition also assists the public safety issues related to dam safety and reservoir integrity by incorporating the dam safety related appurtenant structures into the regional authority areas of responsibility.
20. It is proposed that only a natural feature that has been significantly modified to function as a dam should be included in the definition of a dam.
21. We note that stopbanks have been excluded from the definition of a dam. NZSOLD has concerns regarding this exclusion, as the consequences of failure of some of these structures especially in urban areas would be significant. Stopbanks can fail under flood conditions, particularly if overtopped by an event larger than what they were designed for. As a consequence adjacent populations are placed at risk. In our view for public safety reasons this potential situation warrants an emergency action plan requirement similar to dams. We therefore suggest that stopbanks should be included and assessed on the basis of their potential impacts.
22. To clarify Item 19 it is suggested that a further definition be added to Clause 6 **appurtenant structures**, structures and equipment on a project site other than the dam itself. They include, but are not limited to such facilities as intake towers, powerhouse structures, tunnels, canals, penstocks, low-level outlets, surge tanks and towers, gate hoist mechanisms and their supporting structures, and all critical water control and release facilities.

Clause 23 Chief executive must consult in performing certain functions

23. It is proposed that in the case of dam safety related issues the chief executive must consult with appropriate professional bodies such as NZSOLD through our parent body IPENZ. Regulations made under Clause 353 will be a necessary aspect of the dam safety aspects of this Bill. Clause 354 requires the Minister to consult

before regulations are made. In our opinion it is also necessary for the chief executive to consult regarding regulations, the registers for dams, and to achieve uniform application of accreditation standards for regional authorities across the country.

Clause 118 Role of building consent authority and regional authority if building partly dam

24. Subsection 3 of this Clause appears to be a catchall that requires significant interpretation or exercise of discretion by the regional authority. To avoid confusion we have suggested amended wording to ensure that the specific provisions in the legislation relating to dams override any relevant sections captured by this clause that may relate to the same subject matter.

Clause 173 Licensed building practitioner must carry out or supervise building work

25. We support the proposed rewording presented in the IPENZ submission

Clause 175 Licensed building practitioner to certify building work

26. We support the proposed rewording presented in the IPENZ submission

Clause 218 Regional authority must classify dams

27. The intent of this clause is supported, but we would prefer to see the dams referred to as low, medium and high potential impact dams as is common in the dam industry. The word “potential” is also included in the Resource Management Act in the meaning of effect where it includes “Any potential effect of low probability which has a high potential impact.”

28. NZSOLD also propose that a very low potential impact category be acknowledged as has been included in our dam safety guidelines. We propose that the regional authority not be required to classify or register these dams. If this exclusion were not included, given the definition of dam in the Bill, the regional authority would be required to classify all minor dams, including for example small farm dams. We have attached the definitions of potential impact categories used in the NZSOLD Dam Safety Guidelines (Refer Schedule 2). The guidelines also include descriptions and arbitrary thresholds that provide an indication of the criteria for this very low potential impact category.

Clause 219 Compliance schedule for dam

29. We agree with the intent of the clause but propose changes as in many cases the model proposed in the Bill does not reflect best industry practice, and recognise the fact that many large dam owners already have competent systems in place that exceed the expectations of the proposed legislation.

30. As outlined above it is proposed to include the word potential when describing impact categories for dams.

31. The proposed amended wording of Subsection 1, 2, and 3 along with the amended wording proposed for later clauses assumes that the role of the regional authority in this process is to ensure that owners have a dam safety assurance regime in place, and monitor ongoing compliance. Through the use of licensed building practitioners it is assumed that minimal in-house expertise would be required within the regional authorities apart from that required for process auditing. If this model is followed we consider that it will avoid unnecessary costs, duplication of processes and result in the most efficient use of New Zealand's finite expertise resources in the area of dam safety management.
32. We agree with the intent of the clause. It is suggested that in 219 (2) (a) be amended to allow longer timeframes for the regional authority to complete the classification process and to assist owners with large number of dams to compile compliance schedules.
33. We have also proposed the addition of subsection 4 and 5 to allow owners to carry out their own Dam Safety Assurance Programme. The reasons for this are set out in the following:
- Many dam owners and most large dam owners currently have comprehensive, robust systems in place to assure dam safety. These Dam Safety Assurance Programmes (DSAP) generally consist of four main components:
 - Surveillance, monitoring and review
 - Potential deficiency evaluation and remediation.
 - Emergency preparedness planning
 - Independent safety reviews
 - The DSAP of many large dam owners exceeds the expected outcomes of the proposed legislation. There is a high level of independent inspection, assessment and review within the DSAP's with components being undertaken by skilled in-house staff, and both national and international dam engineering experts.
 - Those dam owners with existing DSAP will be faced with significant additional compliance costs to provide duplicate dam safety assurance programmes i.e. their own DSAP plus the compliance schedules and warrants of fitness required by the proposed legislation.
 - We believe there should be provision in the legislation for owners that have a comprehensive system in place to be exempt from some of the provisions of the legislation. The owner would be required to have their DSAP audited and certified annually by an independent accredited assessor to a recognised standard (e.g. ISO9000 or equivalent). The audit report would be provided to the regional authority on an annual basis. This would provide assurance to the regional authority that the dam owner has systems in place to assure dam safety without the need for duplicate systems.
 - The auditor will be required to be accredited by a recognised accreditation agency such as JAS-ANZ or IANZ

- Dam owners with such a system in place would be exempt from providing a compliance schedule and warrant of fitness.
 - Should the auditor find the owner has failed to meet the requirements of the standard then the owner would be given say 3 months to comply otherwise it will be required to meet the previously exempt provisions of the bill.
34. To clarify Subsection 4 and 5 it is suggested that a further definition be added to Clause 6: **dam safety assurance programme**, means a dam safety programme applying to any dam or dams, relating to surveillance, independent safety reviews, potential deficiency evaluation and remediation, and emergency preparedness planning.

Clauses 219 (3), 220, 221, 222

35. We support the provision of these clauses.

Clause 223 Content of compliance schedule for dam

36. Again the proposed amendments to this clause are based on the fact that in many cases the current proposed model in the Bill does not fit with current accepted practice within the industry.
37. The suggested amendments to this clause give effect to dam safety assurance procedures that follow the principles of international best practice and the principles of the NZSOLD Dam Safety Guidelines. In our view the licensed building practitioners associated with dams will be professional engineers registered under the Chartered Professional Engineers of New Zealand Act 2002 and self assessed as competent to be working in the field of dam engineering. The reality of dam safety assurance programmes is that they include some or all of the following aspects:
- Regular surveillance, monitoring and inspection of the dam. This is a key aspect to assure ongoing safe operation and incorporates regular inspection, monitoring instruments against safety criteria, testing and maintenance of structures, instruments, equipment, and spillway and discharge control facilities if these exist at the dam. Trained technical and professional staff, often employed by the owner, completes many of these activities.
 - An annual dam safety review. This involves dam specialists who consider the surveillance, monitoring and observation activities over the past year. An inspection of the dam with personnel directly involved with ongoing monitor is undertaken and the inspection, testing and maintenance procedures are checked against the required procedures. Progress in dealing with recommendations from independent safety reviews is also reported on. Engineers involved in this process would normally be a Chartered Professional Engineer (CPEng), and may be employed by the dam owner.
 - Comprehensive dam safety reviews. These are independent safety reviews undertaken typically at 5 yearly intervals for high potential impact dams, and 5 to 7 yearly intervals for medium potential impact dams. Independent dam

safety specialists are usually commissioned to carry out these reviews. These would obviously not fit into an annual warrant of fitness regime, but could be part of a compliance schedule, which identifies when they are due, and when they have been completed.

- Potential deficiency evaluation and remediation procedures. The regular surveillance and the above safety reviews may identify safety deficiencies that need to be investigated. Should investigation confirm that a deficiency exists, appropriate actions are planned and implemented to address the deficiency. Dependent on the nature and scale of the potential problem this process is carried out by suitably qualified experts and is often peer reviewed.
- Emergency preparedness planning. It is recognized that dam operation can never be entirely risk free. To address the low residual risk associated with events such as a damaging earthquake or flood or other unforeseen event, an emergency action plan is prepared. The aim of the plan is to minimize the risk to the public downstream by managing and mitigating the effects of such an event.

38. In our opinion this clause must also recognize the role played by staff employed by dam owners to implement and manage their dam safety assurance programs, and not just the licensed building practitioner. We also consider that where the Bill refers to annual warrants of fitness for dams, that the word annual should be deleted. This allows for the regulations to consider the possibility that some aspects of the warrant process, such as the comprehensive dam safety reviews can specify cycle periods other than annual.

39. The following outlines the specific assumptions and objectives behind the suggested changes to this clause:

- Subsection 1 outlines the relationship between the regional authority and the dam owner. The licensed building practitioner is contracted to the owner and does not have a direct relationship with the Regional Authority. The role and duties of the licensed building practitioner is covered in subsection 2.
- The dam warrant of fitness does not necessarily need to be annual and the interval may change within the life of the dam.
- The owner has prime responsibility for the structure and many owners have highly qualified and trained in-house staff carrying out day to day surveillance operations.
- Monitoring should be included but the level of detail can be kept at a high level as outlined or prescribed in the regulations.
- The compliance schedule can limit the licensed building practitioner role to as high a level as required to ensure compliance with intent of the Act for each specific case.

- Subsection (1)(b)(ii) items should be deleted and covered in Clause 230 under emergency action plans.

Clause 224 Licensed building practitioner must be independent

40. We have suggested amendments in line with changes in Clause 223 (2).
41. As mentioned earlier in our submission many owners have in-house staff who would qualify as licensed building practitioners. In respect to this clause we seek clarification on whether an employee of the owner who has qualified as a licensed building practitioner under the proposed licensing regime, could be considered independent if he or she had no direct financial interest in the dam.
42. We do not see a conflict with the owner's staff being licensed building practitioners in respect of dams, where their credentials and background are such as to confirm their professional independence. An engineer with CPEng registration, competent to work in the dam engineering industry, and bound by the CPEng Code of Ethical Conduct would in our opinion meet such a requirement.
43. Given the proposed independent licensing regime is in place, and the limits on resources and expertise in the dam surveillance field in New Zealand, we consider that the use of certain in-house staff as licensed building practitioners would resolve resource and cost issues without compromising the intent of the Bill.

Clause 225 Obligation of owner in relation to compliance schedule

44. We support the provisions of this clause.

Clause 226 Alteration to dam

45. The compliance schedule requirements for a dam can alter throughout its life. Therefore we propose a mechanism where the dam owner can seek a revision to the compliance schedule.

Clause 227 Owner of dam must supply annual dam warrant of fitness

46. We support the intent of this clause. However we question whether an annual warrant of fitness is justified in all cases. As indicated above in discussion on clause 223 there are likely to be some components of the dam safety assurance programme that are not performed on an annual basis. We consider that the regulations and compliance schedules be the basis for defining the frequency with which warrants of fitness are issued for dams. We propose alternative wording that will still allow all the public safety issues of the compliance schedule and warrants to be addressed in a manner appropriate to dams.
47. The proposed practice of displaying the warrant of fitness on some remote structures is questionable. Alternative wording is proposed.

Clause 228 Owner of dam must obtain reports on compliance schedule

48. We support the intent of the clause. We propose modifications to reflect the fact that it will be both the owner's staff and the licensed building practitioner who have roles related to inspection, maintenance and reporting procedures. With a comprehensive safety review programme on a 5 to 7 year cycle it is appropriate that reports be kept for a minimum period of 10 years.
49. With regard to inspection of reports, we assume that the wording of the clause means that the reports would remain the property of the dam owner and therefore confidential. We support this view because it is our concern that if such reports become publicly available, there is a danger that they could be used out of context to create unnecessary concern about the safety of a dam. This situation could unnecessarily undermine public confidence in the safety of dams, which we consider is contrary to the intent of the Bill.

Clause 229 Regional authority may issue notice to fix if compliance schedule for dam not complied with

50. We support the intent of this clause. In our view the fines are excessive given that the fines do not relate to any direct dam or public safety issue, but rather the compliance schedule. Our proposed changes are consistent with the level of fines set out in Clause 227 (5).

Clause 230 Emergency action plans

51. We support the intent of this clause. However we consider that medium potential impact dams should also require an emergency action plan. Studies carried out by the United States Bureau of Reclamation indicate a significant proportion of the loss of life caused by dam failures in the USA over the past 20 years have resulted from failure of dams in the medium potential impact category. Amended wording has been suggested.
52. We propose that (1) (a) (i) be modified to cover any reasonable foreseeable emergency.
53. We note that there is no consultation process with the owner before a regional council refuses to approve an emergency plan. We propose a new clause 230 (2) to allow for this, and subsequent renumbering of following clauses. The proposed changes are consistent with the consultation process outlined in clause 221(2).
54. We support the level of fines proposed in this clause as they reflect the potential consequences of an offence under this clause.

Clause 231 Information to be provided to chief executive

55. We agree with the intent of this clause. However in our opinion the lines of reporting should be clarified. It would avoid confusion and duplication of effort if dam owners reported to the regional authority, and the regional authority in turn report to the chief executive. Our proposed changes are based on clarifying these reporting relationships.

Clause 232 Register of dams

56. We agree with the intent of having a register of dams. We consider it unnecessary to register all dams, as the consequences associated with the failure of very low potential impact dams are minimal. Our proposed change are conditional on the acceptance the comments and proposed changes to clause 218.

Clause 233 Meaning of dangerous dams

57. We support the intent of the clause. In our view the focus should only be on medium and high potential impact dams. Also a dam can be considered dangerous if it is likely to collapse in a moderate flood load case. Our proposed change to this clause addresses these issues.

Clause 234 Powers of regional authorities in respect of dangerous dams

58. We support the provisions of this clause

Clause 235 Regional authority must have regard to certain matters

59. We support the intent of this clause. Dams are not specifically covered by any current building code. In our opinion, it is preferable to refer to regulations and industry guidelines and we suggest an amendment. There are a significant number of guidelines and manuals available covering design, construction, operations and safe management of dams. Engineers competent in dam engineering will be aware of these industry guidelines. We are not aware of any country with a similar socio-economic environment to New Zealand where the dam industry is subject to building codes in a similar manner that would apply to other buildings. This does not reflect a lack of public safety awareness in the dam industry, but the reality of the difficulty of applying standards and codes to dams, which are unique to a given site.

Clause 236 Regional authority may carry out work

60. We support the provisions of this clause. However to provide some arbitrary test for the assigning of costs to the owner we suggest that the term reasonable should be added and the costs should be reasonable costs.

Clause 237 Power of regional authority not limited

61. We support the provisions of this clause

Clause 238 Measures to avoid immediate danger

62. When formulating measures to deal with a dangerous dam there are many options one being draining the reservoir to limit the consequences of failure. Unlike evacuating a dangerous building the impacts of this course of action are not confined to the immediate locality. The effects of such actions are wide ranging on the environment both upstream and downstream of the reservoir. Therefore we

suggest that when carrying out actions under this Clause the Chief Executive must have due regard for all reasonably foreseeable effects of the action.

Clause 239 Regional authority must apply to District Court for confirmation of warrant

63. We support the provisions of this clause

Clause 240 Building work includes decommissioning and demolition of dam

64. We support the provisions of this clause

Clause 241 Regional authority must adopt policy on dangerous dams

65. To ensure a consistent approach to the implementation of the legislation throughout the country we consider that the policy on dangerous dams should be defined in the regulations. Once a particular case has been identified in a region the action plan to address the relevant issues relating to the structure, can be formulated by the individual regional authority with due consideration for the local situation.

Clause 242 Adoption and review of policy

66. Again the amended words are an attempt to provide consistency.

Clause 246 Class of license may be designated by regulation

67. We support the proposed rewording of this clause in the IPENZ submission

Clause 354 Minister must consult before recommending regulations to be made

68. We support the provisions of this clause. We see NZSOLD through our parent body IPENZ having an important role in assisting in the development of regulations appropriate to dams.

Clause 384 Transitional Provisions relating to the accreditation of territorial and regional authorities

69. We note that regional authorities have 18 months to apply for accreditation under the current Bill. While not proposing any changes to this clause we are concerned that as a consequence of the required timeframes in earlier clauses of the Bill, many of the processes and interactions between dam owners and regional authorities will occur in this transitional period. Without audited processes in place there is a risk of confusion and inconsistency in approach of individual regional authorities involved in these processes. As outlined earlier we support a consistent approach to the interpretation and implementation of the proposed legislation.

Schedule 1

Proposed Rewording

We suggest the following rewording:

6 Interpretation

dam

(a) means an artificial barrier constructed for the purpose of confining, storing, or transporting water or other fluid; and

(b) includes-

(i) all structures appurtenant to the artificial barrier whose failure would lead to uncontrolled release of the reservoir; and

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

(iii) a canal

appurtenant structures, structures and equipment on a project site other than the dam itself. They include, but are not limited to such facilities as intake towers, powerhouse structures, tunnels, canals, penstocks, low-level outlets, surge tanks and towers, gate hoist mechanisms and their supporting structures, and all critical water control and release facilities.

dam safety assurance programme, means a dam safety programme applying to any dam or dams, relating to surveillance, independent safety reviews, deficiency verification and resolution and/or emergency preparedness planning.

23 Chief executive must consult in performing certain functions

(c) Institution of Professional Engineers, New Zealand.

118 Role of building consent authority and territorial authority in relation to regional authority if building partly dam

(3) For the purposes of subsection (1) (a), Sections 120 and 200 apply-

(a) as if every reference in those sections to a territorial authority were a reference to a regional authority, and

(b) with all necessary modifications,

provided that to the extent that sections 218 to 242 contains specific provisions relating to dams, provisions and sections 120 to 200 that relate to the same subject matter will not apply.

218 Regional authority must classify dams

A regional authority must, in accordance with regulations made under section 353, classify each dam within its region, except those being defined in the Regulations as Very Low Potential Impact, into one of the following classes:

- (a) low potential impact dam:
- (b) medium potential impact dam:
- (c) high potential impact dam.

219 Compliance schedule for dam

- (1) The owner of a dam that has been classified, under section 218, as a high potential impact dam or a medium potential impact dam must-
 - (a) prepare a compliance schedule for the dam; and
 - (b) give the compliance schedule to the regional authority in whose region the dam is situated.
- (2) The owner must comply with subsection (1) no later than,-
 - (a) if the dam has been commissioned before the commencement of this Part, 6 months after notification from the regional authority of dams that are classified as having high or medium potential impact.
 - (b) if the dam is commissioned after the commencement of this Part, 3 months after the date on which the dam is commissioned.
- (3) The regional authority must, as soon as practicable after receiving a compliance schedule, by written notice to the owner,
 - (a) approve it; or
 - (b) decline to approve it.
- (4) A dam owner will be exempt from the requirements of clauses 219 to 223 and 227 relating to a compliance schedule and a dam warrant of fitness if they-
 - (a) have in place a dam safety assurance programme; and
 - (b) the programme is annually audited by an accredited external auditor to meet the standards prescribed in the regulations; and
 - (c) the results of the annual audit are notified to the regional authority.
- (5) Should the owner fail to meet the requirements of the standards prescribed in the regulations in any annual audit then the dam owner will

- (a) be given 3 months to meet the standards; and
- (b) if those requirements are not met within the 3 month period, be required to meet the provisions of clauses 219 to 223 and 227.

223 Content of compliance schedule for dam

- (1) The compliance schedule for a dam
 - (a) must be in the prescribed form; and
 - (b) must state -
 - (i) the interval between successive dam warrants of fitness, and
 - (ii) the monitoring, inspection, maintenance, and reporting procedures to be followed by the dam owner in respect to the dam.
- (2) For the purposes of subsection (1)(a), the monitoring, inspection, maintenance, and reporting procedures of the compliance schedule -
 - (a) must state the review procedures that shall be undertaken by a licensed building practitioner
 - (b) may be identified -
 - (i) by description in the compliance schedule; or
 - (ii) as the procedures that are considered appropriate by the regional authority.

224 Licensed building practitioner must be independent

- (1) A licensed building practitioner who carries out work, under section 223 (2), must have no financial interest in the dam.

226 Alteration to dam

A regional authority must determine whether or not to amend the provisions of a compliance schedule approved for a dam if-

- (a) building work that requires a building consent is carried out on that dam; and
- (b) the building work results in the alteration of that dam, or
- (c) at the request of the dam owner.

227 Owner of dam must supply dam warrant of fitness

- (1) An owner of a dam for which a compliance schedule has been approved must supply to the regional authority a dam warrant of fitness in accordance with subsection (2).
- (2) The dam warrant of fitness must -
 - (a) be supplied as per the interval prescribed in the compliance schedule; and
 - (b) state that the monitoring, inspection, maintenance, and reporting procedures of the compliance schedule have been fully complied with during the prescribed interval; and
 - (c) be signed by a licensed building practitioner who has reviewed the monitoring, inspection, maintenance, and reporting procedures of the compliance schedule; and
 - (d) be in the prescribed form; and
 - (e) contain the prescribed information.
- (3) (a) The owner must publicly display a copy of the dam warrant of fitness in a prominent place either:
 - (i) on the dam site; or
 - (ii) in some other place agreed on by the owner and the regional authority,
- (4) A person commits an offence.....
- (5) A person who commits an offence.....

228 Owner of dam must obtain reports on compliance schedule

An owner of a dam for which a compliance schedule has been approved must-

- (a) keep written reports relating to the monitoring, inspection, maintenance, and reporting procedures of the compliance schedule for a period of not less than 10 years; and
- (b) produce those reports for inspection, when required, by -
 - (i) the regional authority; and
 - (ii) any person or organisation who or that has the right to inspect the dam under any Act.

229 Regional authority may issue notice to fix if compliance schedule for dam not complied with

- (1) A regional authority may issue a notice at any time if it is satisfied, on reasonable grounds, that -
 - (a) a dam warrant of fitness is not correct; or
 - (b) the monitoring, inspection, maintenance, and reporting procedures of a compliance schedule are not being or have not been properly complied with.
- (2) The notice must be -
 - (a) in the prescribed form; and
 - (b) taken as a notice to fix under section 177.
- (3) A person commits an offence if the person fails to comply with a notice issued under this section.
- (4) A person who commits an offence under this section is liable to a fine not exceeding \$5,000 and, in the case of a continuing offence, to a further fine not exceeding \$1,000 for every day or part of a day during which the offence has continued.

Clause 230 Emergency action plans

- (1) The owner of a dam that has been classified under section 218 as a high and medium potential impact dam-
 - (a) must prepare an emergency action plan that -
 - (i) identifies any reasonably foreseeable emergency conditions that could endanger the integrity of the dam; and
 - (ii) states procedures to be followed in an emergency to safeguard persons, property, and the environment; and
 - (b) must give a copy of the plan to the regional authority in whose region the dam is situated.
- (2) The regional authority must determine whether to -
 - (i) approve the plan
 - (ii) refuse to approve the plan and require amendments to it.

- (3) Before a regional authority refuses to approve an emergency action plan, the regional authority must-
- a) advise the owner of its intention not to do so; and
 - b) advise the owner of the grounds for not approving the emergency action plan; and
 - c) give the owner a reasonable opportunity to make submissions on the matter; and
 - d) consider those submissions.
- (4) If the regional authority refuses to approve an emergency action plan, the owner of the dam must-
- (a) amend the plan in the manner required by the regional authority; and
 - (b) resubmit the plan to the regional authority within the period specified by the regional authority
- (5) Subsections (2), (3) and (4) apply to an amended emergency action plan.
- (6) The owner of a dam commits an offence if the owner fails to comply with this section.
- (7) A person who commits an offence under this section is liable to a fine not exceeding \$200,000 and, in the case of a continuing offence, to a further fine not exceeding \$20,000 for every day or part of a day during which the offence has continued.

231 Information to be provided to chief executive

- (1) Each owner of a dam must provide information to the regional authority in accordance with regulations made under section 353.
- (2) Each regional authority must provide information to the chief executive in accordance with regulations made under section 353.

232 Register of dams

The chief executive must establish and maintain a register of all dams classified as low, medium or high potential impact.

233 Meaning of dangerous dams

A dam is dangerous for the purposes of this Act if it has a medium or high potential impact classification and the dam is likely to collapse -

- (a) in the ordinary course of events; or

(b) in a moderate earthquake (as defined in the regulations).

(c) In a moderate flood (as defined in the regulations)

235 Regional authority must have regard to certain matters

In imposing a requirement under section 234(1), the regional authority must have regard to -

(a) accepted industry practice; and

(b) the prescribed matters.

236 Regional Authority may carry out work

(3) If the regional authority carries out building work under the authority of an order made under subsection (1), -

a) the owner of the dam is liable for the reasonable costs of the work; and

b) the regional authority may recover those reasonable costs from the owner; and

c) the amount recoverable by the regional authority becomes a charge on the land on which the work was carried out.

238 Measures to avoid immediate danger

(2) the chief executive of a regional authority may, by warrant issued under his or her signature, cause any action to be taken that is necessary, in his or her judgement to remove that danger. In undertaking such action, the chief executive, must have a due regard for all reasonably foreseeable effects of the action.

241 Regional authority must adopt policy on dangerous dams

(1) a regional authority must, within six months after the commencement of this part, adopt a policy on dangerous dams, within its district.

(2) the policy must

(a) state, the approach that the regional authority will take in performing its functions under this part,

(b) state the regional authority's priorities in performing those functions and

(c) comply with the requirements prescribed in the regulations.

242 Meaning of dangerous dams

(6) a policy must comply with the requirements prescribed in the regulations.

Schedule 2

NZSOLD Potential Impact Classification for Dams

<i>Potential Impact Category</i>	<i>Potential Incremental Consequences of Failure</i>	
	<i>Life</i>	<i>Socio-economic, Financial, & Environmental</i>
High	Fatalities	Catastrophic damages
Medium	A few fatalities are possible	Major damages
Low	No fatalities expected	Moderate damages
Very Low	No fatalities	Minimal damages beyond owner's property

The consequences (life, economic losses) with the higher rating determine the Potential Impact Category.

Schedule 3

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PART I – INTRODUCTION

I.2 The Special Nature of Dams

Dams with their related structures and the storage reservoirs they form, have a special nature because of their scale, the water forces at work and the use of natural ground to form the major part of the reservoir containment. Most other man-made works are built of high strength manufactured materials, involve controlled geometry, do not involve large storage of fluid contents, and generally do not use the foundation other than to support the works themselves. In the case of dams, however, account has to be taken of:

- dam site topography which usually cannot be altered significantly because of cost
- dam site and regional geology which greatly influences water retention and structural safety
- the most appropriate materials to build the dam from and the dam structure arrangements to assure a safe operable dam
- the nature of the materials stored behind the dam which, because of density and toxicity (e.g. mine tailings), may require an even higher level of safety than normal
- the management of flood risk and bypassing of floods while the dam is being built
- the earthquake forces which the dam with its stored contents may experience
- the potential floods which may pass through the reservoir and how these may be taken past
- the dam and returned to the river without risk of dam overtopping (unless specifically designed for overtopping), or erosion damage
- the surveillance, maintenance, and operational procedures (which may include the operation of flood gates) to ensure the dam works as intended Part I – Introduction I-2
- the management of sediment passage down the river
- the management of other risks such as volcanic activity

It is the close interaction between the natural ground and man made structures, together with water (or other fluid contents) stored at a higher level, which most strongly characterise the special nature of dams. From the time it is first stored and for the whole life of the dam, the retained fluid has the potential to escape through any geological or man made weakness. Dams age and deteriorate through ongoing geological and chemical processes and also may be found to be less safe than is desirable through technological advances which improve knowledge of dam and foundation behaviour, and earthquake and flood risk. Dam failures resulting in the uncontrolled escape of the stored contents can be catastrophic and preservation of safe

conditions requires never ending vigilance. Even canals which are on elevated topography or involve high embankments have the potential to cause significant damage and these too are classed as dams. Similarly, relatively modest closure embankments or “saddle dams” filling a gap in the rim of a reservoir, can have high damage potential and must also be considered as dams. As well as all dams constituting a special class of structure, each dam will have unique characteristics, particularly in terms of site geology and geometry. The variations in geology, building material types, geometry, earthquake and flood risk and the like, mean that it is not practicable to develop a standardised code-type design for dams. Each dam must be treated individually, taking all relevant factors into account. These Guidelines aim to assist that process. It should be noted that retarding basins and canals containing large volumes of water with damage potential if there is an uncontrolled escape, may also act as dams, and should be treated accordingly. River stopbanks are generally not regarded as dams and government agency advice is that they will be specifically excluded from any dam safety legislation that is written.