greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

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Committee	Social and Cultural Wellbeing Committee
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Seismic standard for water supply buildings and associated structures

1. Purpose

To approve a seismic standard for water supply buildings and associated structures that is appropriate for an essential service.

2. The decision-making process and significance

The matter requiring decision in this report has been considered by officers against the requirements of Part 6 of the Local Government Act 2002 (the Act).

2.1 Significance of the decision

Officers have considered the significance of the matter, taking into account the Council's significance policy and decision-making guidelines. Officers recommend that the matter be considered to have low significance.

The recommendation is based on officers' judgement that a high seismic standard for water supply buildings and associated structures will have a significant positive impact on the social and economic wellbeing of the residents and activities of the four cities, by allowing the bulk water supply to be restored sooner after a major earthquake. While there may be a cost involved in upgrading some buildings, this will be a part of the Annual Plan process.

Officers also consider that adopting a lower standard for an essential service, such as the bulk water supply, would generate a high degree of public concern and have a substantial negative impact on Greater Wellington's ability to perform its role following a major earthquake.

Officers do not consider that a formal record outlining consideration of the decision-making process is required in this instance.

3. Background

Greater Wellington's water supply group has adopted a high standard of design for its buildings, associated structures, plant and equipment since the formation of the Wellington Regional Council in 1981. The high standard of design recognises that the bulk water supply is an essential service requiring a high level of reliability in normal operations, and the resilience to facilitate restoration as soon as practicable following a major earthquake.

The design of water supply buildings and associated structures has complied with the national structural standards, codes and guidelines current at the time. However, as knowledge has increased these standards have changed and become more demanding, particularly in terms of seismic performance. A significant change in structural design concepts occurred in 1976 with the introduction of NZS 4203, and seismic requirements were developed further with subsequent amendments. A replacement structural design standard (AS/NZS 1170) was introduced in 2002, again raising the standard of seismic design. This standard has subsequently been modified for the Canterbury area following the Christchurch earthquake.

Changes to the Building Act in 2004 classified existing buildings that do not meet 33% of the new building standard (AS/NZS 1170) as "earthquake prone". Territorial Authorities are required by the Act to adopt policies on earthquake prone buildings, including requiring owners of buildings likely to be earthquake prone to have the building structural performance evaluated and upgraded to greater than 33% of the new building standard.

The Civil Defence Emergency Management (CDEM) Act requires Lifeline Utilities to "ensure they are able to function to the fullest extent possible, even though this may be at a reduced level, during and after an emergency". An entity that supplies or distributes water to the inhabitants of a city, district or other place is identified in the Act as a Lifeline Utility.

With the increased seismic performance required of building structures, and the essential need for water supply following a major earthquake, it is timely for Greater Wellington to formalise the structural standard it wishes to apply to its water supply buildings and associated structures and develop a programme to ensure it is achieved.

4. Comment

4.1 Importance Level

A key parameter in determining the standard of structural design for a building under the new building standard is its "Importance Level". The Importance Level is a scale from 1 to 5 based on the consequence of failure of the building, which then determines the intensity of event (e.g. earthquake) that a structure must be designed to withstand.

Buildings with special post-disaster functions or designated as essential facilities are assigned Importance Level 4 (the highest level covered by AS/NZS 1170). Importance Level 3 is a lower standard that covers buildings,

such as Utility buildings, not designated to have special post-disaster functions. While a building with Importance Level 4 may experience some damage, the damage should not impede the delivery of critical functions.

The CDEM Act's requirements on Lifeline Utilities are not currently linked to the Importance Levels in AS/NZS 1170, but an initiative is underway to do so. A guidance document has been prepared that identifies structural and seismic design to Importance Level 4 is necessary to meet the serviceability required by the CDEM Act.

Greater Wellington's water supply treatment plants, reservoirs and most pumping stations need to be able to function following a major earthquake, and be capable of operation as soon as the distribution system allows at least a partial supply of water to be restored. Importance Level 4 is therefore necessary for water supply buildings and structures except where they are not critical for supply following a major earthquake. These latter buildings could be assigned Importance Level 3, which allows structural design to a lower level of earthquake intensity under the new building standard.

4.2 Compliance with the new building standard

Greater Wellington's water supply buildings and associated structures designed to AS/NZS 1170 after 2002 are expected to meet 100% of the new building standard provided they were designed at Importance Level 4 (or Level 3 if not critical to the essential service).

Most of our water supply buildings and structures were built between 1976 and 2000 under the older structural design standard. While these are unlikely to be identified as earthquake prone, they may not meet 100% of the new building standard. The small number of buildings designed before 1976 may be identified as earthquake prone, particularly a few very old buildings.

The Building Act does not require buildings with post-disaster functions that are not classified as earthquake prone to be structurally upgraded. However, as an essential Lifeline Utility, it is proposed that all bulk water supply buildings and associated structures meet 100% of the new building standard at Importance Level 4 (or Level 3 if not critical to the essential service) wherever this is practical and cost-effective. This standard of compliance may not always be cost-effective, particularly for older buildings, and a lower level of compliance may need to be considered. In some cases, rebuilding could be a more cost-effective option.

4.3 Review of structural performance

It is intended to review the structural performance of all water supply buildings and associated structures relative to the new building standard, generally to Importance Level 4. The review will be a reasonably complex and specialist exercise that will take time to complete, therefore the buildings will be prioritised for review over the next 3 years.

Where a building does not meet 100% of the new building standard, the structural upgrade needed to achieve 100%, or as close to 100% as is

reasonably practicable, will be identified and its cost estimated on a case by case basis.

The Kaiwharawhara pumping station has already been identified by Wellington City Council as potentially an earthquake prone building. Review of this 1930's building by our consultant has confirmed that its structural performance is less than 33% of the new building standard for a building of Importance Level 4, and it is therefore classed as earthquake prone. Design is currently underway to raise its structural performance to 100% of the new building standard. In this case, full compliance can be achieved relatively easily and cost-effectively.

4.4 Potential impact on the capital works programme

The structural review of water supply buildings and associated structures is expected to identify upgrade work needed to raise the structural performance of some buildings, although the value of the upgrade work cannot be estimated at this stage.

When the review of a building is completed, the optimum solution for structural upgrade will be identified and the cost estimate to achieve 100% of the new building standard, or a lower percentage where appropriate. A project for the structural upgrade of water supply buildings will be included in the Water Supply annual capital works programme for Committee approval.

5. Communication

A media statement on the contents of this report or the decisions made is not considered necessary.

The city council water supply customer managers will be advised of the seismic standard adopted and the planned structural review of Greater Wellington's water supply buildings and associated structures.

6. Recommendations

That the Committee:

1. ***Receives** the report.*

2. ***Notes** the content of the report.*

3. ***Agrees** that all water supply buildings and associated structures are determined to be Importance Level 4 under the new building standard AS/NZS 1170, to provide an essential service following a major earthquake, except those buildings not critical for an essential service and identified as Importance Level 3.*

4. ***Notes** that all water supply buildings and associated structures are to be reviewed over the next three years on a prioritised basis to determine their structural performance relative to AS/NZS 1170.*

5. ***Agrees*** *that any structural upgrade of water supply buildings and associated structures will endeavour to meet 100% of AS/NZS 1170 where practicable and cost-effective.*

6. ***Notes*** *that the cost of any structural upgrade work identified by the review will be included in future Water Supply annual capital expenditure programmes for Committee approval.*

Report prepared by:	Report approved by:
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